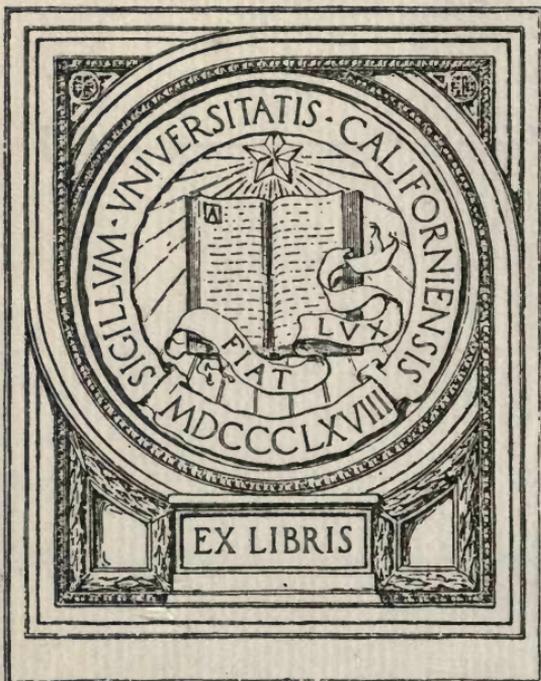


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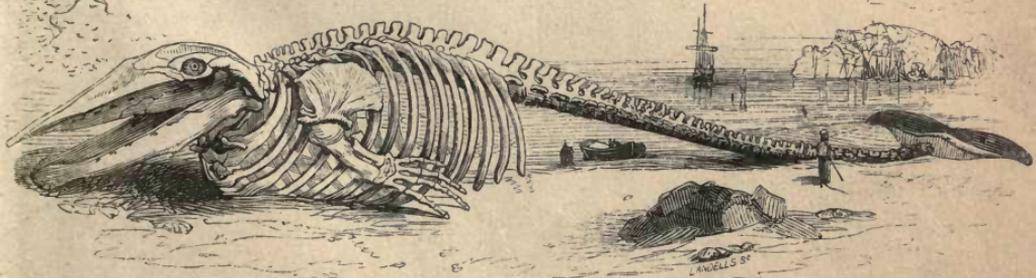


A GENERAL INTRODUCTION
 TO
THE NATURAL HISTORY
 OF
MAMMIFEROUS ANIMALS,
 WITH A PARTICULAR VIEW OF THE
PHYSICAL HISTORY OF MAN,
 AND
 THE MORE CLOSELY ALLIED GENERA OF THE ORDER
QUADRUMANA, OR MONKEYS.

By W. C. LINNÆUS MARTIN, F.L.S.

Illustrated with 296 anatomical, osteological, and other incidental
 Engravings on wood; and 12 full plate representations
 of animals, drawn by

WILLIAM HARVEY.



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NATURAL HISTORY,

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INTRODUCTION.

THE earth and the waters display the energy of the creative fiat—they teem with life. To whatever part of Nature's domain we direct our attention, a countless throng of living beings bursts upon our view, and overwhelms us with astonishment. Not only are the woods, hills, and plains peopled by the larger tribes of earth and air, but every leaf has its colony, every drop of water its busy multitude. Varying in size, in form, in structure, and in habits, all, from the gigantic Elephant to the microscopic animalcule, play their assigned parts, and conduce, each in its station, to the order and harmony of nature. Amidst this profusion of life, a due balance of power and number is maintained, by the influence of species upon species. They are destined to act and re-act upon each other, and a law of destruction and renovation is perpetually in operation, by which the proportions of animal existence are preserved in their just equilibrium. Multitudes are doomed to become the prey of others—whole races seem created as though for slaughter; but, great as is the loss, the increase is equivalent, in order to the preservation of the species. Yet, as regards individuals, the instinctive means of attack on the one hand, and of self-preservation on the other, are such, as to equalize their respective chances. Speed, caution, watchfulness, inaccessible retreats, the nature of their clothing, and even its colour, alike protect the timid and the defenceless; while the bolder oppose force to force. Those that are most obnoxious to destruction are the most prolific; their numbers are rapidly recruited: while such as are secure in their bulk, strength, and prowess, only increase in a ratio sufficient to replenish the losses occasioned by accident, or by natural dissolution. Insects, for example, are the common prey of birds and beasts, reptiles and fishes, and, often, of each other; yet who has ever known their numbers perceptibly thinned? at all events, it is unquestionable that the myriads destroyed are replaced by other myriads. How

great is the daily havoc made among fishes! they are the prey of each other: the Cachalot, the Grampus, the Porpoise, the Otter, and the Seal, devour them in multitudes: thousands of oceanic birds find in them their natural aliment, whilst man draws them by shoals from the deep; such, however, is their astonishing fecundity, that all these losses are duly repaired. The number of eggs in the roe of the Codfish has been calculated to be 3,686,760,—of the Flounder 1,357,400,—of the Herring 36,960,—of the Mackarel 546,680,—of the Smelt 38,280,—of the Sole 100,360,—of the Tench 383,250. Of an increase by numbers like these no examples exist among the higher classes of vertebrata, viz., Birds and Mammalia: still, the law of the balance of increase and decrease is not the less established among them: hence we justly conclude, that each part of the creation depends upon another; and though, at a slight glance, all may seem confusion, it will be found, upon mature reflection, that order and a due equipoise of parts are the results of a scheme equally well adapted and wisely ordained.

On the advantages attending the study of Natural History, it is superfluous to enlarge. So many animals are directly or indirectly subservient to the necessities, pleasures, or luxuries of man,—from so many does he experience direct or indirect injuries, that a knowledge of them is almost indispensable to his existence: our table, our dress, our household furniture, and a variety of conveniences which we enjoy, will remind us, if we reflect for a moment, of a multitude of animals, which, in one way or other, are essential to our comfort; and we may with equal ease form a catalogue of such as, on the contrary, are injurious to our welfare. But, leaving out of the question the necessity thus imposed upon us, of gaining a general knowledge of natural objects, we may observe, that the study of natural history is peculiarly fitted for strengthening and enlarging the mind: it disciplines the memory, it demands the exercise of patient investigation, it enforces an attention to minutæ, it leads us to detect differences, where none but the practised eye would perceive them, and to trace out analogies, or affinities, which reflection alone can discover: its aim is truth; and so far it must be a noble and exalted pursuit. If to correct the imagination, and strengthen the powers of reason, be among the advantages attending the study of the exact sciences, not less beneficial are the results attending the study of Nature. Yet, independently of this consideration, Nature holds out other motives to excite our interest; she asserts her intrinsic value, and, while claiming our admiration of her work, speaks of unerring wisdom and almighty power.

To every man, whose heart is well attuned, whose feelings are pure and undebased, Nature presents a thousand charms: at every step she delights him with new wonders, she invites him to acquaintance, and well

is he rewarded who obeys her call. The votary of Nature deems no object unworthy of examination, none destitute of interest; nor does the spirit of philosophic inquiry suffer him to rest satisfied with a casual glance at the multitudinous phenomena around him: he is not content merely to wonder and admire; but, urged onward, he attempts to trace back effects to their causes; he investigates, he discriminates, he analyzes, he combines, and, still proceeding in his course, endeavours to obtain a glimpse (imperfect it may be) of the mighty plan of creation,—a knowledge of the grand scheme, by which the whole is blended into unity.

So various and manifold are the subjects of Nature's empire, that, were the life of one man, however zealous and indefatigable he might be, lengthened out to twenty, nay, a hundred times beyond the allotted term, his materials would be unexhausted; he would still have much to study, and, after all, leave a *systema naturæ* to be enlarged and corrected by those who should come after him. Hence the advantage of co-operating numbers, each working in his favourite department, and contributing his portion of labour to the public good. The result is an accumulated mass of riches, which, transmitted to our immediate successors, may be by them assayed, refined, and increased, and, in due order, passed on to generations following. The wisdom, then, of selecting a portion of Nature's empire, on which to concentrate our energies, is very apparent. We may—nay, we must—survey the whole, in order to study a portion to advantage; but while in the one case we content ourselves with a general outline, in the other we follow out the minutest lines, tracing them through all their several curves and ramifications.

Cuvier, whose philosophic labours are appreciated by every lover of science, has divided the ANIMAL KINGDOM into four grand Divisions, or Sub-kingdoms, viz:—

1. *Animalia Vertebrata.*
2. *Animalia Mollusca.*
3. *Animalia Articulata.*
4. *Animalia Radiata.*

These divisions answer to the Spini-cerebrata, Cyclo-gangliata, Diplo-neura, and Cyclo-neura of Dr. Grant—terms, which this celebrated anatomist has adopted in reference to the development of the nervous system, and as being, from the importance of that system in the economy of animal life, more definite and philosophical than those usually employed. It is with the first Sub-kingdom, or Subregnum, namely, *Animalia*

Vertebrata, or Spini-cerebrata, that we are immediately concerned, inasmuch as it is that which includes the Mammalia, the class to which this work is devoted.

The vertebrate section (Vertebrata or Spini-cerebrata) of the animal kingdom contains five great Classes, agreeing in the following particulars : First,—In the possession of a brain and a spinal chord (medulla spinalis), conjointly enclosed in a cranium and vertebral column, whence emerges a well-developed nervous system ; Secondly,—In the possession of an internal osseous fabric, or skeleton ; Thirdly,—In the number of the limbs never exceeding four ; Fourthly,—In the possession of organs of vision, hearing, smell, and taste ; Fifthly,—In the mouth consisting of two jaws, placed one above the other, and not on opposite sides ; Sixthly,—In the heart being muscular, and the blood red ; Seventhly,—In the individual distinctiveness of the sexes.

These five classes are :—I. Mammalia.—II. Aves.—III. Reptilia.—IV. Amphibia.—V. Pisces.*

* The arrangement of the animal kingdom by Dr. Grant, beginning from the lowest type of organization, and proceeding to the highest, is exemplified in the following table :—

ANIMALIA.

I.—Subregnum CYCLO-NEURA, or RADIATA.

- Classis 1. Polygastrica. (Infusory Animalcules, as Cercaria, &c.)
 2. Porifera. (Sponges.)
 3. Polypifera. (Zoophytes, as Gorgonia, Caryophyllia, Corals, Hydra, &c.)
 4. Acalephæ. (Sea-nettles, Physalia, Beroe, Rhizostoma, Velella, &c.)
 5. Echinodermata. (Sea-stars, Echini, &c.)

II.—Subregnum DIPLO-NEURA, or ARTICULATA.

- Classis 6. Entozoa. (Internal parasitic Worms.)
 7. Rotifera. (Wheel-like Animalcules, as Hydatina.)
 8. Cirrhopoda. (Barnacles, &c.)
 9. Annelida. (Leech, Nereis, Worm, &c.)
 10. Myriapoda. (Centipedes, &c.)
 11. Insecta. (Insects.)
 12. Arachnida. (Spiders.)
 13. Crustacea. (Crabs, Lobsters, Shrimps.)

III.—Subregnum CYCLO-GANGLIATA, or MOLLUSCA.

- Classis 14. Tunicata. (Pyrosoma, Cynthia, &c.)
 15. Conchifera. (Bivalve-shelled Molluscs, as Mussels, Oysters, &c.)
 16. Gasteropoda. (Slugs and Univalve-shelled Molluscs, as Snails, land or marine.)
 17. Pteropoda. (Clio borealis.)
 18. Cephalopoda. (Cuttle-fish.)

IV.—Subregnum SPINI-CEREBRATA, or VERTEBRATA.

- Classis 19. Pisces. (Fishes.)
 20. Amphibia. (Frogs, Newts, &c.)
 21. Reptilia. (Snakes, Lizards, &c.)
 22. Aves. (Birds.)
 23. Mammalia. (Mammiferous animals.)

Other Physiologists give a modification of this arrangement, separating into a fifth class termed *Acrita* ("ἄκριτος, confusus, α, non, and κρινω, cerno), the *Acalephæ* (or Sea-nettles), the *Sterelmintha* (or solid intestinal worms with a parenchymatous structure), the *Polypifera* (or Zoophytes), the *Porifera* (or Sponges), and the *Polygastrica* (or infusory Animalcules), animals in which the nervous

PISCES (fishes) may be described as oviparous animals, with cold and red blood; with a bilocular heart, that is, a heart consisting of one auricle, and one ventricle; breathing by permanent branchiæ, or gills; with extremities modified into fins, for aquatic progression; having the body covered with scales; bones more or less cartilaginous; the vertebræ with a funnel-shaped cavity on each articular surface, filled with an elastic intervertebral substance, on which, as on a sort of cushion, each vertebra moves; the mouth destitute of salivary glands; the teeth numerous, and irregular; no external ears; the eyes destitute of eyelids. Respiration is effected by the transmission of water through the mouth, over the surface of the fringe-like branchiæ; and the blood is transmitted to the gills from the ventricle, whence, instead of returning immediately to the heart, it is conveyed, by the branchial veins, to the body: these veins, after giving branches to the anterior parts, unite to form the aorta, which sends the arterialized blood through the rest of the system, without the aid of a systemic heart: the brain does not fill the cavity of the cranium; it consists of a medulla oblongata, optic lobes of great magnitude, cerebral hemispheres, olfactory tubercles, and a cerebellum.

AMPHIBIA.—Oviparous vertebrate animals, with cold and red blood, and with a naked skin; commencing life as aquatic beings, immediately after exclusion from the egg, and sometimes continuing aquatic through life. They have, therefore, when young, branchiæ, by which to breathe, and a bilocular heart like that of a fish, together with a cup-shaped cavity on each articular surface of the bodies of the vertebræ. The greater number of Amphibia, as the Frog, Toad, and Newt, are caduci-

matter does not assume the form of threads, as it does in the higher cycloneurose animals (Sea-stars, for instance), but is diffused through their homogeneous composition. The following is an arrangement given in a Course of Lectures by Professor Owen:—

ANIMALIA.

I.—Subregnum ACRITA.

- | | |
|--------------------------|---|
| Classis 1. Polygastrica. | Classis 4. Sterelmintha (Tape-worms, &c). |
| 2. Spongiæ. | 5. Acalephæ. |
| 3. Polypti. | |

II.—Subregnum NEMATONEURA (Νῆμα, a thread, Νεύρον, a nerve).

- | | |
|---|---|
| Classis 6. Echinoderma. | Classis 8. Epizoa (external parasites). |
| 7. Cœlelmintha (transparent soft
cavitary intestinal worms). | 9. Rotifera. |

III.—Subregnum HOMOGANGLIATA, (Ὅμοσ, a pair, or two alike, Γαγγλιον, the knot of a nerve.)

- | | |
|------------------------|------------------------|
| Classis 10. Cirripeda. | Classis 13. Arachnida. |
| 11. Annelida. | 14. Crustacea. |
| 12. Insecta. | |

IV.—Subregnum HETEROGANGLIATA (Ἑτερος, other, Ἑτεροτης, diversity). Γαγγλιον.

- | | |
|-------------------------|------------------------|
| Classis 15. Tunicata. | Classis 18. Pteropoda. |
| 16. Palliobranchiata. | 19. Gasteropoda. |
| 17. Lamelliobranchiata. | 20. Cephalopoda. |

V.—Subregnum VERTEBRATA.

- | | |
|---------------------|-------------------|
| Classis 21. Pisces. | Classis 23. Aves. |
| 22. Reptilia. | 24. Mammalia. |

branchiate :* thus, at a certain epoch they undergo a metamorphosis ; the gills become obliterated, the lungs developed, the heart acquires three cavities, viz., two auricles, and one ventricle. The perennibranchiate † Amphibia, as the Proteus, the Axolotl, and the Siren, though they acquire lungs, do not lose their branchiæ ; they are permanently aquatic. The skin of the Amphibia is a highly sensitive and secreting surface, and the blood, circulating through its vessels, becomes partially arterialized ; hence it compensates for the limited use of the lungs, during submersion, or hibernation. The toes are destitute of claws ; there is no external auditory apparatus ; the brain in the perennibranchiate group, and in the larva or tadpole state of those which, as the Frog or Newt, lose the gills, resembles that of the fish : as the metamorphosis of the tadpole takes place, and the legs and arms become developed, the cerebral hemispheres enlarge, but present neither convolutions nor ventricles or internal cavities. Limbs variable,—four or two.

REPTILIA.—Vertebrate animals, with cold and red blood, with true lungs ; oviparous : the heart has two auricles and one ventricle ; the latter cavity receives both the venous and the arterialized blood, and is divided more or less by an ascending imperfect valve ; the body is covered with scales, or horny plates ; there is either no external auditory apparatus, or only a simple orifice, open in some, in others covered with a transparent tympanic membrane, and, in a few, as the Alligators, protected by a moveable valve. Brain, with the cerebral hemispheres exceeding the optic lobes in magnitude, and containing each a distinct ventricle ; the cerebellum remarkable for its proportionate smallness. Limbs variable,—four, or two, or wanting.

AVES (Birds).—Vertebrate animals, with warm and red blood ; oviparous : heart with four cavities, viz., two auricles and two ventricles, whence there is a distinct pulmonic and systemic circulation ; lungs ample, but fixed, and communicating with extensive air-cells, and also with the cavities of the bones of the extremities, which (except in a few, as the Penguins and great Auk) are destitute of marrow. The brain fills the cavity of the cranium ; the hemispheres extend backward, cover the optic lobes, and come into contact with the enlarged and sulcated, or furrowed, cerebellum, but they are still destitute of convolutions ; the optic lobes are large, but separated from each other to the sides of the medulla oblongata ; the olfactory tubercles are small. The eyes have not only eyelids, but a third membraneous covering, or membrana nictitans, capable of being drawn over the eye at pleasure ; the ears are open externally ; the jaws are covered with a horny sheath, forming a beak. There is no epiglottis. The limbs are always four, the anterior

* Having perishable gills, from *caducus*, perishable, *branchia*, a gill.

† Having permanent gills (*perennis*, permanent).

pair of which (with a few exceptions) are destined for organs of flight. The body is covered with feathers.

MAMMALIA.—Vertebrate animals, with warm and red blood; with true lungs, free and divided: the heart consists of two auricles and two ventricles, and, together with the lungs, is enclosed in a distinct chest, divided from the abdominal cavity by a diaphragm, or muscular partition. The jaws are furnished with teeth emerging from deep alveoli; the limbs are generally four, sometimes two; the epiglottis is distinct. The mode of reproduction is viviparous; the young are suckled on the mother's milk, secreted in mammary glands, which open by ducts, externally. The brain is highly developed; the hemispheres contain large ventricles, and are usually convoluted; the optic lobes are small, concealed, solid, and divided by a transverse furrow; the spinal chord is less, in proportion to the cerebral mass, than in the inferior classes. In the lower Mammalia, as the Rodentia and Marsupialia, the brain approximates to that of the bird, and is destitute of external convolutions; but in none do the cerebral hemispheres cover those of the cerebellum, till, ascending in the scale, we arrive at the higher Simiæ,—and these are eclipsed by Man in all that constitutes the highest condition of cerebral development.

Here it may be observed, that the cerebral system not only exhibits an ascending series of advances, from the lowest fish up to the highest mammal, but that, in the highest mammal, a parallel series of advances obtains, from the fish-like condition of the brain, at an early foetal stage, up to its complete development. In the human foetus, for example, the optic lobes, as in the fish, are larger than the hemispheres, and are hollow within; and their cortical portion in like manner predominates. The cerebral hemispheres are then, as also in fishes, particularly the osseous fishes, destitute of internal ventricles and external convolutions, having a smooth cortical surface; a wide longitudinal canal runs down the centre of the spinal chord, as in fishes, and the cerebellum appears in the form of a simple lobe—its permanent condition in the highest of those animals.

As it is to the brain that all impressions produced by external agents on our bodily senses are conveyed—as it is here that the incitements to bodily motion originate—as it is in this mysterious laboratory that all mental operations are conducted—moreover, as, according to the degree of excellence of this organ, so is the grade of the animal in the chain of being, we are called upon to enter into a few details respecting its parts and composition. It has been already stated that, among the vertebrate classes, we find the brain the most completely developed in the Mammalia—and, among the Mammalia, in Man: to the human brain, therefore, it is that our observations have now especial reference. This wonderful organ, which may be regarded as the central axis, to which the whole nervous system converges, and which is, in fact, the expanded

termination of the medulla oblongata, consists of two substances, forming, together, a soft compressible mass; these substances are regularly disposed, but their distinct physiological influence and properties yet remain to be discovered: the one is termed the cineritious or cortical, the other the medullary substance. The cineritious or cortical substance is of a greyish colour, soft, and appears to the eye to be of an homogeneous composition: it is, however, permeated by minute blood vessels, the presence of which may be demonstrated by means of coloured injections.

The medullary substance is firmer in its texture than the cineritious; of a white colour, and perfectly opaque: it consists, as is discernible by means of a lens, of fibres disposed in different directions; and it would appear to be comparatively destitute of blood vessels, or to have them of extraordinary minuteness, as coloured injections do not penetrate throughout the whole of its parts. In the brain, exclusively so called, the cineritious matter invests the medullary substance, which latter constitutes the mass of the interior: in the medulla oblongata, on the contrary, the cineritious matter is posited in the interior. Chemistry throws but little light on animal physiology, or the vital properties of organs, in living bodies: to learn, therefore, that the brain, as analyzed by Vauquelin, consists of water, fatty matter, white, and reddish; of albumen, osmasome, phosphorus, acids, salts, and sulphur—or that, in the cineritious matter, Professor John detected muriate of soda, a sulphate, the phosphates of lime, soda, ammonia, and magnesia, with a trace of the phosphate of iron, and silica, is but of trifling importance. The brain, then, thus constituted of a cineritious and a medullary substance, is divided into several parts, and covered with certain membranes for its better protection: of these, the first is the dura mater, which lines the skull; it forms also various processes, or expanded sheets, which divide between or support the different parts of the brain; and it forms, moreover, between its folds, large tortuous canals, or sinuses, for the reception of the venous blood: it is of a tough and fibrous tissue, and is closely connected with the internal table of the cranial bones, by means of numerous blood vessels. Beneath the dura mater is a more delicate membrane, beautifully transparent, enveloping the brain, but without dipping into its convolutions: it is termed, from its fineness, the arachnoid membrane (*membrana arachnoïdea*).

The third membrane is the real investment of the brain: it is termed the pia mater, and is of exceeding thinness and vascularity, exhibiting numerous blood vessels, which are beautifully distributed over it, and which pass from it into the cineritious substance of the brain itself. Instead of simply investing the brain, it follows all its convolutions and inflections, and lines its different cavities.

The brain, considered as a whole, when fully developed, consists of

the cerebrum, the cerebellum, and the medulla oblongata, the continuation of which latter is termed the medulla spinalis.

The cerebrum constitutes, in Mammalia, by far the largest mass, and, in Man, it occupies the whole of the upper and anterior portions of the cranial cavity. It is primarily divided by a deep vertical fissure, running, longitudinally, into two nearly equal parts, termed hemispheres. Each of these hemispheres is made up of three lobes,—an anterior, a middle, and a posterior. The anterior lobe is frontal, and rests on the orbital plate of the frontal bone, a plate which constitutes the roof of the orbit; the middle rests on the sphenoid and temporal bones; the posterior covers and rests on the cerebellum, in Man, but not in the lower Mammalia. Gently separating the two hemispheres of the cerebrum (between which is inflected a reduplication of the dura mater), at the bottom of the fissure may be observed a white transverse body, or commissure, termed the corpus callosum,* and also an anterior and posterior medullary chord or commissure (*commissuræ cerebri anterior et posterior*). Underneath the corpus callosum is the delicate partition between the ventricles, termed septum lucidum, of which the inferior side is vaulted, and forms the fornix. On the respective sides of the septum lucidum are the cavities of the cerebrum, termed its lateral ventricles, which communicate with each other near the middle of the fornix. In the lower and interior parts of each ventricle is a curved medullary process, termed, from its form, cornu Ammonis. In the anterior part of each ventricle is a pyramidal process of a cineritious colour, exposing, when divided, a striated texture, whence it is termed corpus striatum. Behind these are two eminences of a white colour, called thalami nervorum opti-*corum*, and between them is a third ventricle. After death these ventricles are found to contain a serous fluid, more or less in quantity. Behind the thalami is the pineal gland (which Des Cartes regarded as the seat of the soul), remarkable for containing, at least very commonly, small gritty concretions of phosphate of lime, which, when the gland is crushed between the fingers, communicate a rough sand-like sensation to the touch. Beneath the pineal gland, are the optic lobes, of an insignificant size compared to what they are in fishes (where they are hollow, and exceed the cerebral hemispheres), and divided into four parts; hence called corpora quadrigemina.

In each lateral ventricle is a tissue of vessels, termed the choroid plexus, which is spread upon the thalami, the pineal gland, and the optic tubercles.

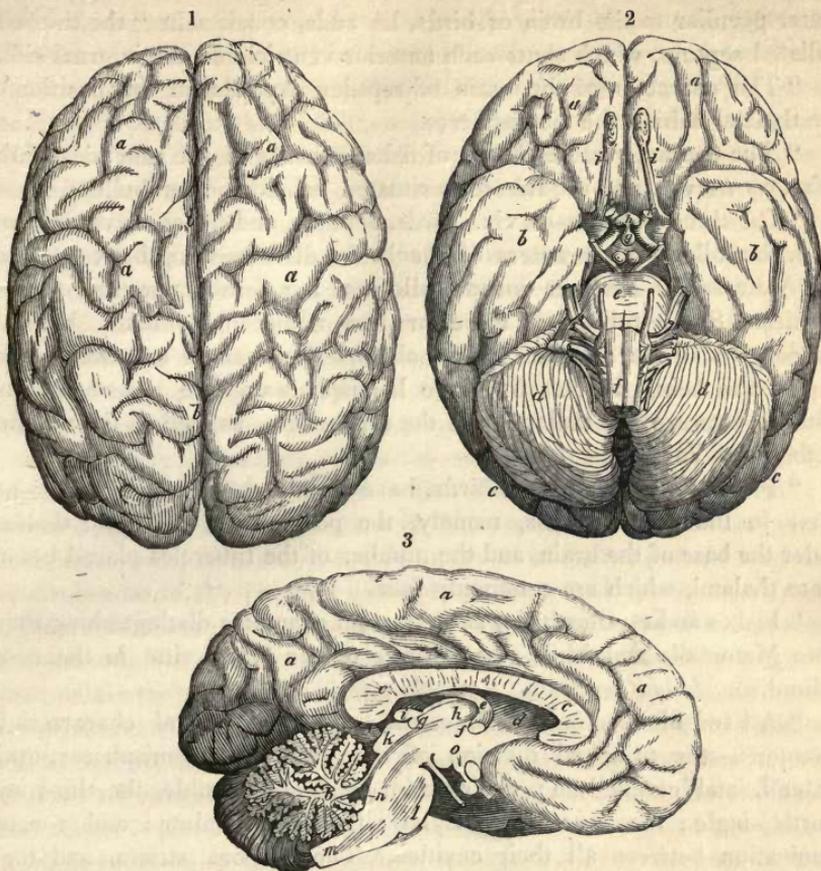
The cerebellum, in Man, is covered by the posterior lobes of the cerebrum, and rests on the floor of the occipital bone; in the lower Mammalia, the Orangs and Monkeys excepted, it is not covered by the cerebrum, but is placed behind that portion of the brain. Its surface is beautifully

* It will be seen, hereafter, that the corpus callosum does not exist in the marsupials.

marked by transverse furrows, which are parallel and contiguous. It is of firmer consistence than the cerebrum, and is composed of cineritious matter, through which the medullary substance ramifies in an arborescent manner, so that, upon a longitudinal section being made, the medullary matter appears like the stem and branches of a tree, trained regularly against a wall. To this arrangement of the medullary matter the appellation, *arbor vitæ*, has been given. The cerebellum is divided into two lobes, or hemispheres, and the medullary union, or commissure, between them, is termed the vermiform process. At the inferior part of the cerebellum, where it rests on the commencement of the spinal chord, is a small cavity, termed the fourth ventricle, at the bottom of which is an angular impression, termed, from its resemblance to a writing pen, *calamus scriptorius*. This fourth ventricle is, in fact, a continuation of the third, with which it communicates by a passage termed the aqueduct of Silvius.

The commencement of the spinal chord (or rather, perhaps, its termination, before merging into the brain), while yet within the cranial cavity, is formed by four crura, or medullary stems, two of which proceed from the cerebrum, and two from the cerebellum. The cerebral crura arise between the anterior and middle lobes; those of the cerebellum from its base, or trunk of the *arbor vitæ*. The body, formed by the union of these crura, is termed the medulla oblongata. Its line of separation from the cerebrum is indicated by a transverse medullary band, striated transversely, and termed the pons Varolii, or *tuber annulare* (bridge of Varolius, or annulated eminence), which, of course, can only be seen by viewing the brain in its basal aspect.

Passing from the *tuber annulare*, the medulla oblongata is marked with a longitudinal furrow down the middle, and with one on each side. Within each lateral furrow is a slight eminence, termed *corpus olivarium*; and between the lateral furrows and the medial are two oblong elevations, termed *corpora pyramidalia*. Invested with a continuation of the membranes covering the brain, the medulla oblongata now enters the spinal canal, marked, on its dorsal aspect, by a longitudinal furrow, and having also a groove on each side—the indications of its component fasciculi. The precise influence of all the parts above enumerated, physiologists do not pretend to explain. It is, however, ascertained, that, with the presence, or full development of certain parts, is associated mental elevation in the scale of being; while an incompleteness of union between the different portions of the brain, the rudimentary condition, or absence of certain parts, and the development of others, accompany mental, and, it may be said, also, organic inferiority. To render the foregoing description more intelligible, the following illustrations of the brain, in different aspects, are annexed; that representing its base, shewing the origin of the nerves arising from it.



1, 2, 3. Three Views of the Human Brain.

Fig. 1. View of the upper surface of the brain.—*a, a, a*, the cerebrum, divided by the fissure, *b, b*, into two hemispheres; each hemisphere consisting of three lobes, as seen on the basal view, fig. 2.

Fig. 2. Basal view of the brain.—*a, a*, anterior lobes of the cerebrum;—*b, b*, middle lobes of ditto;—*c, c*, posterior lobes of ditto;—*d, d*, cerebellum;—*e*, pons Varolii;—*f*, medulla oblongata;—*g*, peduncle of the infundibulum;—*h*, the pituitary gland;—*i, i*, olfactory nerves;—*k*, optic nerves. The other nerves, the origin of which is seen in this view of the brain, cannot, in so small a figure, be individually marked.

Fig. 3. Vertical section of the brain.—*a, a, a*, convolutions of the cerebrum;—*b*, cut surface of the cerebellum, shewing the arbor vitæ;—*c, c*, the great commissure, or corpus callosum;—*d*, the septum lucidum;—*e*, the fornix;—*f*, the anterior commissure;—*g*, the posterior commissure;—*h*, the pineal gland;—*k*, corpora quadrigemina, or optic lobes, divided into four parts;—*l*, pons Varolii, or tuber annulare, cut;—*m*, cut surface of the medulla oblongata;—*n*, fourth ventricle;—*o*, infundibulum.

According to Cuvier, the characters which distinguish the brain of Mammalia from that of the other red-blooded vertebrata, consist in the existence of the corpus callosum, the fornix, the cornu Ammonis, and the tuber annulare; in the position of the tubercula quadrigemina upon the aquæductus Sylvii; in the absence of ventricles, or cavities, in the optic thalami; in the position of these thalami within the hemispheres, and in the alternate white and grey lines within the corpora striata. The cha-

racter peculiar to the brain of birds, he adds, consists in “ the thin and radiated septum, which shuts each anterior ventricle on the internal side.

“ The character of the brain of reptiles depends on the position of the thalami behind the hemispheres.

“ The character of the brain of fishes consists in the tubercles of the olfactory nerves, and the tubercles situated behind the cerebellum.

“ The three last classes, viz., birds, reptiles, and fishes, have, in common, the following characters of the brain, distinguishing between them and Mammalia :—neither corpus callosum, nor fornix, nor their dependencies. Some tubercles, more or less numerous, situated between the corpora striata and the optic thalami,—the thalami containing ventricles, and being distinct from the hemispheres. The absence of any tubercle between the thalami and the cerebellum, as well as the absence of the pons Varolii.

“ Fishes, in common with birds, have certain characters which do not exist in the other classes, namely, the position of the optic thalami under the base of the brain, and the number of the tubercles placed before these thalami, which are commonly four.

“ Fishes and reptiles have, as a common character distinguishing them from Mammalia and birds, the absence of the arbor vitæ in the cerebellum.

“ All red-blooded animals have the following cerebral characters in common :—the principal division of the brain into hemispheres, optic thalami, and cerebellum ; the anterior ventricles double, the third and fourth single ; the aquæductus Sylvii ; the infundibulum ; and a communication between all their cavities. The corpora striata, and their appendices, called hemispheres, in the form of a vault. The anterior and posterior commissures, and the valve of the cerebrum. The bodies named pineal and pituitary glands. The union of the great single tubercle, or cerebellum, by two transverse crura, with the rest of the brain, which gives origin to the two longitudinal crura of the medulla oblongata.

“ It appears, moreover, that certain relations exist between the faculties of animals and the proportions of their common parts. Thus, the intelligence they possess appears more perfect, in proportion to the volume of the appendix to the corpus striatum, which forms the vault of the hemispheres. Man has that part greater, and more reflected, than the other animals. In proportion to the descent from Man, it is observed to become smaller, and smoother on the surface,* and that the parts of the brain are less complicated or united with each other, but seem to be unfolded, and spread out longitudinally. It even appears that certain parts assume, in all classes, forms which have a relation to particular

* In some of the Marmozet Monkeys, if not in all, it is smooth, as in the Rodentia.

qualities of animals : for example, the anterior tubercula quadrigemina of the Carp tribe, the most feeble and least carnivorous of ordinary fishes, are proportionably larger than in the other genera, in the same manner as they are in the herbivorous quadrupeds. By following these inquiries, we may hope to obtain some knowledge of the particular uses of each of the parts of which the brain consists."—(See *Anat. Comp.* vol. ix. p. 8.)

It appears, for instance, that, in the herbivorous Mammalia, the anterior lobes of the corpora quadrigemina exceed the posterior, while the reverse obtains among the Carnivora ; in Man and the Simiæ they are nearly equal. In the lower Mammalia, as the Rodentia and Marsupialia, the cerebral hemispheres present the lowest grade of development among mammals, being not only the smallest, but being, also, destitute, or nearly so, of those convolutions by which the superficies of the brain, in the higher orders, is actually increased. The Pachydermata and the Ruminantia occupy an intermediate station, in this respect, between the Rodentia and the Carnivora, the Simiæ and Man, in which latter groups we find the convolutions of the cerebral hemispheres deep and symmetrical, and also the cerebellic laminæ numerous. In proportion to the development of the cerebral hemispheres, is that of the optic thalami and the corpora striata ; while the magnitude of the olfactory tubercles, and the depth of their cineritious investment, increase in an equal degree with the degradation of the cerebrum, as is remarkably exemplified in the Marsupialia. It may, further, be regarded as a rule, that where the cerebrum, in the Mammalia, is least expanded, the spinal chord increases in comparative circumference, as is found in the herbivorous races generally ; whereas, in the higher groups, as the Carnivora, not only the cerebral and the cerebellic hemispheres, but the great commissure between the two cerebral hemispheres—the crura prolonged from them, and also the pons Varolii—are relatively larger.

With respect to the spinal chord, compared with the cerebral mass, it is smaller in Man than in other Mammalia ; but is continued completely down the spinal canal.* From the spinal chord are given off the nerves of sensation and motion ; the former from the posterior, the latter from the anterior columns, and the motor roots and anterior columns are smaller than the sensitive : in Man, the sensitive roots of the spinal nerves are larger than in other Mammalia. It is, however, when the brain of the Mammalia, generally, is compared with that of the lower classes, that its superiority becomes manifest. In the Mammalia it is, that the central axis, to which the nervous system converges, is most developed, and has its parts most intimately united, so as to form a perfect and com-

* In many Mammalia the spinal chord divides, before it has reached the termination of the vertebral canal. In the Hedgehog, indeed, it is remarkable that the chord does not pass, in an undivided condition, beyond the extent of two-thirds down the canal.

compact whole. While, in the lower classes, the brain is, as it were, spread out, and its component parts thrown asunder, it is here braced up, if the expression may be allowed, to the establishment of a full communication between its hemispheres and their dependencies; and, consequently, to the more perfect connexion of every part of the great nervous system concentrated in this focus. It may be observed, too, that the great sympathetic nerve is here the most fully developed, and most thoroughly blended with the spinal and cranial nerves. Constituting a system of its own, forming ganglia along the spinal column, and in the cavities of the chest and abdomen, as well as plexuses, or intricate meshes, whence the vital organs are abundantly supplied, it pervades the whole of the nutritive system, and constitutes a chain of communication, a bond of mutual dependence, and the source of harmony of action between all the organs of animal and vegetative life, the functions of which depend upon its agency.

Much has been said by anatomists and physiologists respecting the weight of the brain compared with that of the body, but with very inconclusive results: it has, moreover, from very early times, been asserted, that Man has not only a brain comparatively larger, with regard to the weight of the body, than the lower animals, but that he has positively a larger brain than any of them; neither of these propositions is absolutely true. It is in the development of the cerebral hemispheres, the complexity and volume of the apparatus (especially of the corpus callosum), by which its several parts are brought into communication, and the increased extent given to the surface of the hemispheres, by means of the convolutions, that the brain of Man rises above that of other Mammalia. Nevertheless, the size of the human brain is a remarkable character; but, as if to prove that its superiority consists in the arrangement and development of its parts, it is smaller, compared with the bulk of the body, than in many of the passerine birds; and though it absolutely exceeds the brain of some of the large Mammalia, it does not exceed the brain of all. In the Rhinoceros, however, it is smaller than in Man; for Sparrman found the cranial cavity, in the enormous two-horned Rhinoceros of Southern Africa, to be only six inches long and four inches deep; and, on filling a skull of this animal with peas, it barely contained one quart; while a human skull, measured at the same time, required nearly three pints to fill it. Tiedemann observes, that the brain, in the average of the human race, attains its full size towards the seventh or eighth year.* Its weight in the male † varies, between three pounds three ounces,

* Soemmerring says, erroneously, that the brain does not increase after the third year. Gall and Spurzheim, on the other hand, are of opinion, that it continues to grow till the fourteenth year. The brothers Wenzel have shewn, that the brain arrives at its full growth about the seventh year; and this is confirmed by Hamilton's researches.

† The brain of Cuvier weighed four pounds eleven ounces four drachms and thirty grains, Troy weight; that of the celebrated surgeon, Dupuytren, four pounds ten ounces, Troy.

and four pounds six ounces; in the female, between two pounds eight ounces, and three pounds eleven ounces, Troy weight. In a child, six years old, Haller found it to be two pounds twenty-eight drachms and a half. In Tyson's Chimpanzee, the weight of the brain was eleven ounces seven drachms, while the stature was only twenty-six inches: a proportion, Lawrence observes, equal to that of the human subject; which, however, is not the case, inasmuch as the shortness of the lower limbs of the Chimpanzee, compared to the bulk of the body, renders the admeasurement of the animal fallacious, when opposed, in this point of view, to that of Man. With respect to the comparative weight, or size, of brain, between Man and the lower animals, there is much difficulty in arriving at correct estimates; nor, when attained, do we thence derive any results of importance. Monro states, that he "found the brain of a large Ox not to weigh more than one-fourth part of the human brain, whilst the weight of the Ox was six times greater than that of the Man; or the brain of Man was, in proportion to his weight, twenty-four times heavier than that of the Ox:" on the contrary, according to Cuvier, the brain of the Seal is larger in proportion to the body than in Man, as is also that of the Sai (an American Monkey). But, admitting these facts, what is the inference? It cannot be concluded, from the latter, that the animals in question are intellectually superior to Man; or, on the other hand, that the Ox is inferior to these animals; it may, or it may not be—and, in either case, as is very plain, the mere size of the brain, compared with that of the body, affords no index, which is only to be sought for in the modification of its parts, and their respective degrees of development. Moreover, this test is invalidated by the fact, that, while the weight of the body varies from a multitude of circumstances, is increased by the development of the muscular system, resulting from athletic exercises, and by the accumulation of fat, or is diminished by emaciation during illness, or a flaccid state of the muscles, the weight of the brain is not sensibly affected, but remains stationary. Hence the contradictory scales of comparison given by different authorities. The ratio in the Cat, for example, is stated by one author to be as one to eighty-two, and by another as one to 156; and, according to the observations of different physiologists, in some Dogs it is as one to forty-seven, and in others as one to 305.*

* The weight of the brain, compared to that of the body, in Man and certain other animals, has been thus stated by physiologists:—

Child, six years old, as	1 to	32
Adult human being	1 ..	85
Gibbon and Mangabey	1 ..	48
Malbrouck	1 ..	24
Callitriche and Patas	1 ..	41
Saimiri	1 ..	22
Sagou	1 ..	11
Sai (<i>Cuvier</i>)	1 ..	25
Sai (<i>Ebel</i>)	1 ..	16

Seeing, then, that the size of the brain, in comparison with that of the body, could not be taken as the test of intellectual endowments, Soemmerring proposed, between Man and other animals, a criterion, which he considered to be much less deceptive than a comparison of the body with the brain; namely, that of the brain with its own nerves.* His theory is, that, as far as mere animal existence is concerned, a small portion of the brain is sufficient to influence the nerves; and that, therefore, the surplus quantity beyond this small portion (a portion not determined) will be available for the purposes of intellectual operations; so that where the greatest surplus exists, there the highest intellectual capacity will be enjoyed. Man, for instance, whose bodily powers are only moderate, has the largest brain in proportion to the nerves, and to the demand made upon their agency, as regards mere animal life. After Man come the Simiæ. As a further illustration of his position, to which he says he was conducted by a most careful and accurate comparison of a great number of brains, he remarks, that the largest Horse's brain in his possession weighed one pound seven ounces,

Ouistiti, as.....	1 to 28
Coita	1 ... 41
Macaque	1 ... 86
Magot	1 ... 105
Vari	1 ... 84
Bat	1 ... 96
Mole	1 ... 36
Bear	1 ... 265
Fox	1 ... 205
Ferret	1 ... 138
Beaver	1 ... 290
Hare	1 ... 228
Rat	1 ... 76
Mouse	1 ... 43
Field Mouse	1 ... 31
Elephant	1 ... 500
Sheep	from 1 to 192 to 1 ... 351
Ox	from 1 ... 750 to 1 ... 860
Horse	from 1 ... 400 to 1 ... 700
Ass	1 ... 254
Dolphin	from 1 ... 25 to 1 ... 102

Among birds, in the Eagle, the proportion is as 1 to 260; in the Falcon as 1 to 102; in the Goose as 1 to 360; in the Cock as 1 to 25; in the Red-breast as 1 to 32; in the Chaffinch as 1 to 27; in the Sparrow as 1 to 25; and in the Canary bird as 1 to 14: among reptiles, in the Frog as 1 to 172; in the Tortoise as 1 to 2240; in the Turtle as 1 to 5688; and among fishes, in the Carp, as 1 to 560; in the Pike as 1 to 1305; in the Shark as 1 to 2496.—HALLER, *El. Phys.*, l. x. s. 1. EBEL, *Obs. Neu.*, in LUDWIG'S *Script. Neu.*, vol. iii. p. 150. SOEMMERRING, *Korp. ver. Neg. v. Eur.* p. 61. CUVIER, *Anat. Comp. Lect.* ix. art. 5. LAWRENCE, *Lect.* p. 123, note.

* "Desmoulinis is of opinion, that the brain decreases in size in old people. From this circumstance he explains the diminution of the functions of the nervous system and intellectual powers. The truth of this assertion has not, as yet, been determined. The brothers Wenzel and Hamilton deny it. It is remarkable, that the brain of a Man, eighty-two years old, was very small, and weighed but three pounds two ounces two drachms; and the brain of a Woman, about eighty years old, weighed but two pounds nine ounces one drachm. I have generally found the cavity of the skull smaller in old Men than in middle-aged persons. It appears to me, therefore, probable, that the brain really decreases in old age, only more remarkably in some persons than in others."—*Professor Tiedemann, on the Brain of the Negro; Phil. Trans. Royal Soc.—Part 11. 1836.*

and the smallest adult human brain he ever met with exceeded this weight by fourteen ounces and a quarter ; yet the nerves on the base of the former were of ten times greater magnitude than were those on the base of the latter. " It must not, however, be concluded," he observes, " that Man has smaller nerves than any other animal. In order that my ideas may be better understood, I shall state the following hypothetical case :—Suppose the ball of the eye to require six hundred nervous fibrils in one instance, and three hundred in another, though only half the size of the former ; and farther, that the eye with six hundred fibrils possesses a brain of seven, and that with three hundred of only five, drachms ; to the latter we ought to ascribe the largest brain, and a more ample capacity of registering the impressions made on the organs of vision ; for, allowing one drachm of brain to each hundred fibrils, the brain which is absolutely the least will have a superfluous quantity of two drachms, while the larger has only one. That the eye, which is supplied with a double quantity of fibrils may be a more complete organ of sense, may be readily admitted, but the remark is inapplicable to the point in question."

The statement of Soemmerring, that Man possesses a larger brain than any other animal, compared with its nerves, is probably correct. It is, however, by no means an established fact, that nerves of the same magnitude do require the same proportion of brain for the exercise of their respective functions ; or that the same nerve in different animals demands an equal quantity ; or, farther, that the proportion of brain required by a large nerve, is greater than that required by one of inferior size. Moreover, to say that the size of the brain, compared with its nerves, affords an index of the differences existing between Man and the lower animals, or between different animals, with regard to intellectuality, is an assumption unsupported by solid proof.

After all, the most striking characteristic of the human brain consists in the prodigious development of the cerebral hemispheres—no animal, whatever may be the proportion which the brain bears to the body, affording a parallel. Not any quadruped approaches Man in the magnitude of the hemisphere of the brain ; namely, that part of the organ, which serves as the principal instrument of the intellectual operations. Hence arises the corresponding development of the anterior portion of the cranium ; the index, at the same time, of the development of the cerebral hemispheres, and of their predominance over the portion of the cerebral mass devoted to the external senses ; and hence, also, is the volume of the cranium in Man greater, compared to that of the face, than in any other mammal.

Allusion has already been made to the low condition of the brain of the Marsupialia : with this condition is associated a parallel inferiority of intellect. The low grade of development of the brain in these animals is

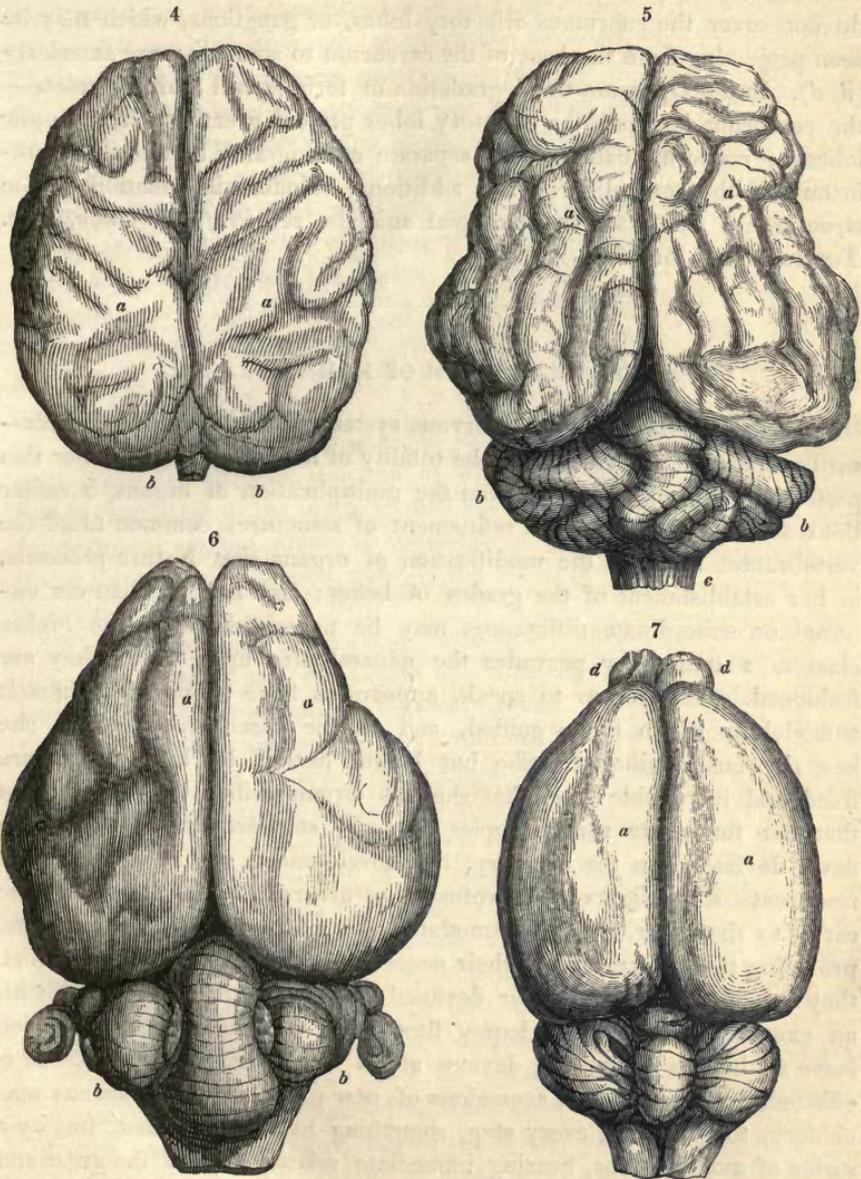
not only seen in the diminution of the cerebral hemispheres; in the smoothness of their surface; in the more or less complete removal of the cerebellum from the cerebrum, so as frequently to bring the corpora quadrigemina (or optic lobes) into view, as in the Opossum; and in the magnitude of the olfactory ganglia;—but, in the absence of that union, by means of the great commissure (*corpus callosum*), which exists in ordinary Mammalia, and of which the extent is in proportion to the development of the cerebral hemispheres.* In birds the *corpus callosum* is entirely wanting; the union between the cerebral hemispheres consisting only in a rudimentary fornix, and in the anterior, posterior, and soft commissures, which are also present in ordinary Mammalia (see fig. 3, p. 11). Now, in the Marsupialia, as has been shewn by Professor Owen, a small commissural medullary band represents the *corpus callosum*, but does not unite the masses of the two hemispheres above the ventricles, as in other mammals (see fig. 3, p. 11, *c, c*); and is, in fact, the fornix, or commissure of the hippocampi, into which its fibres, running along the floor of the ventricles, pass. Here, then, is a cerebral condition approximating to that of birds, between which class and the ordinary Mammalia, as it respects the development of the brain, the marsupials are intermediate. The anterior commissure is remarkable for its comparative magnitude, being in proportion to the size of the ganglion, or protuberance forming the root of the olfactory nerve.

The annexed sketches represent the upper surface of the brain of the Chimpanzee (fig. 4); of the Tigress (fig. 5); of the Kangaroo (fig. 6); and of the Wombat (fig. 7).

The Chimpanzee is the most anthropomorphous, or man-like, of the Simiæ, and, accordingly, we find an approach to Man in the general form of the brain (fig. 4), and the proportions of its respective parts. Its general form, viewed from above, is a short oval, and the convolutions of the cerebral hemispheres (*a, a*) are well marked. Nevertheless, the cerebellum (*b, b*) is not completely covered by the cerebrum, but projects beyond the posterior line of the latter, so as to be visible, which, on reference to the brain of the human subject (fig. 1, page 11), will be found not to be the case in Man. In the Orang, the posterior projection of the cerebellum is carried somewhat farther. In the feline animals, of which the Tiger is an example, the brain (fig. 5) presents us with a still greater departure, in form and proportions, from that of Man:—the cerebellum (*b, b*) is completely posterior to the cerebral hemispheres (*a, a*), the comparative magnitude of which is diminished; notwithstanding, the convolutions are strongly marked. The medulla oblongata (*c*) has now acquired a greater

* It is found that extensive and intimate communication, by means of this great commissure, between the cerebral hemispheres, has more influence upon, or accordance with, intellectual superiority, than has the mere size of the hemispheres.

volume, proportionately to the mass of the brain, than is found either in Man or the Chimpanzee. Descending lower in the scale, we at last arrive at



the marsupial group,—of two animals of which, the brains are here represented. That of the Kangaroo (fig.6) shews the cerebral hemispheres (*a, a*); not, perhaps, so much diminished in bulk as narrowed anteriorly, and almost destitute of convolutions on their surface. The cerebellum (*b, b*)

is remarkable for the development of its lateral lobes, and for the transverse striæ with which it is marked. In the brain of the Wombat (fig.7) the cerebral lobes (*a, a,*) are, in form and smoothness, like those of birds, and do not cover the enormous olfactory lobes, or ganglions, which may be seen projecting from the base of the cerebrum to some distance anteriorly (*d, d*). In the Opossum the degradation of form is still more complete—the cerebrum is small, the olfactory lobes project greatly, and the optic lobes, or corpora quadrigemina, separate considerably between the cerebrum and the cerebellum. For additional valuable information on the structure of the brain in marsupial animals, see *Professor Owen, Phil. Trans.* Part I. for 1837.

OSSEOUS SYSTEM OF MAMMALIA.

WITH the perfection of the nervous system of the Mammalia is necessarily connected a perfection in the totality of their organization; but this perfection, instead of arising from the multiplication of organs, is rather the result of the progressive refinement of structures common to all the vertebrata. It is by the modification of organs that Nature proceeds, in her establishment of the grades of being; and hence, whatever external or subordinate differences may be perceived among the higher classes, a uniformity pervades the general plan upon which they are fashioned. Nature, so to speak, appears to have proposed to herself a model by which to be guided, and to the essentials of which she has rigorously adhered. She has bound herself by laws which are fixed and immutable: not that she has circumscribed her power; not that her forms are servile copies of some standard, from which she never deviates; on the contrary, her developments are as varied as her resources—she delights in a profusion of diversities: to the air, to the earth, to the water, she accommodates the multitudes of her creation, providing them, according to their necessities, with the means by which they are enabled to fill their destined stations. All this is done with an exquisite simplicity, a happy fitness, an ease and elegance, which leave all human works and devices at an immeasurable distance. It is effected, not by perpetual accessions of new parts, not by cumbrous machinery, to which, at every step, something has to be added, but by a series of modifications, bearing immediate relationship to the great end to be attained.

It will be evident, upon consideration, that the general contour and proportions of the body are determined by its internal osseous framework, or skeleton; for it is to this framework that the muscles are affixed; it is upon its parts, as levers, that they act; and within it are enclosed

the organs of animal life and of the senses; yet, if we compare the fish, the reptile, the bird, and the mammal, so great is the variation of form between them, that it is only by an analysis of the parts of this framework, and a consideration of its essentials, that we become convinced that the laws of simple modification have not been deviated from. The presence of an internal skeleton is peculiar to the vertebrata, and two parts of this skeleton are essential, as connected with the great centres of the nervous system, the brain, and spinal chord, which they enclose and protect: these two parts are the skull and the vertebral column:* the other parts are their accessories, and may be present or absent as the conditions of existence render necessary: these accessories are the ribs and the limbs, or extremities. The skull encloses the brain, and in the cavities of its facial portion lodge three of the organs of the senses; viz., those of sight, taste, and smell. The organs of hearing are in the cranial portion: the sense of feeling is more or less universal over the body.

The vertebral column adjoins the skull, and consists of numerous distinct bones, by the due junction of which a canal is formed, enclosing that prolongation of the brain, termed the spinal chord. The structure of the vertebral column allows it considerable flexibility of motion, and in many animals it is carried out, by the addition of supplemental bones, into a tail.

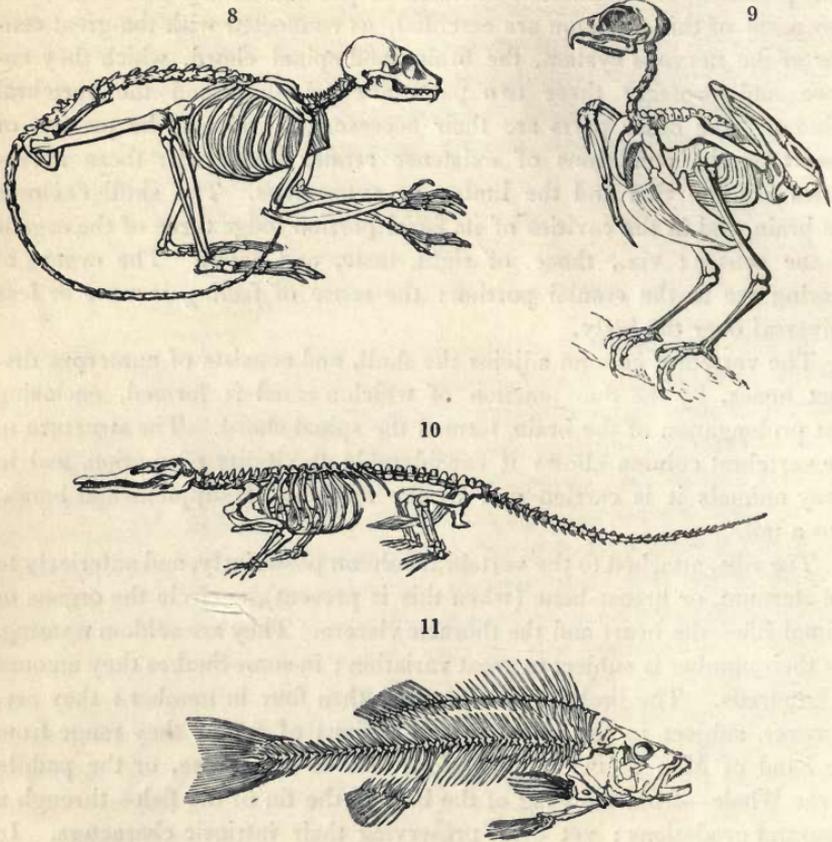
The ribs, attached to the vertebral column posteriorly, and anteriorly to the sternum, or breast-bone (when this is present), encircle the organs of animal life—the heart and the thoracic viscera. They are seldom wanting, but their number is subject to great variation; in some Snakes they amount to hundreds. The limbs are never more than four in number: they are, however, subject to the utmost modifications of form; they range from the hand of Man to the solidungulous foot of the Horse, or the paddle of the Whale—from the wing of the bird to the fin of the fish—through a thousand gradations; yet ever preserving their intrinsic characters. In some, as in the cetaceous mammals, one pair is wanting, and this is always the posterior; in others, as Serpents, either both pairs are deficient or, as in the Boa and Python, one pair, the posterior, exists in a rudimentary condition, but not destitute of utility.

The following sketches may be taken as representations of the osseous framework, as modified in Mammalia, birds, reptiles,† and fishes. In each example, the skull encases the brain; and the vertebral column, the spinal chord. The organs of sight, smell, taste, and hearing, have,

* The skull itself is to be regarded as consisting, elementarily, of vertebræ modified in their parts, so as to become a case for the brain.

† The reptiles of Cuvier are now usually divided into *Reptilia* and *Amphibia*; the latter corresponding to his order of "*Batrachiens*."

in each, the same respective situation ; but the modification of the bones of the skull, vertebral column, and organs of locomotion, is greatly varied : in the fish, indeed, the bones of the cranium, in particular, present what, in reference to Mammalia, may be termed an elementary condition.

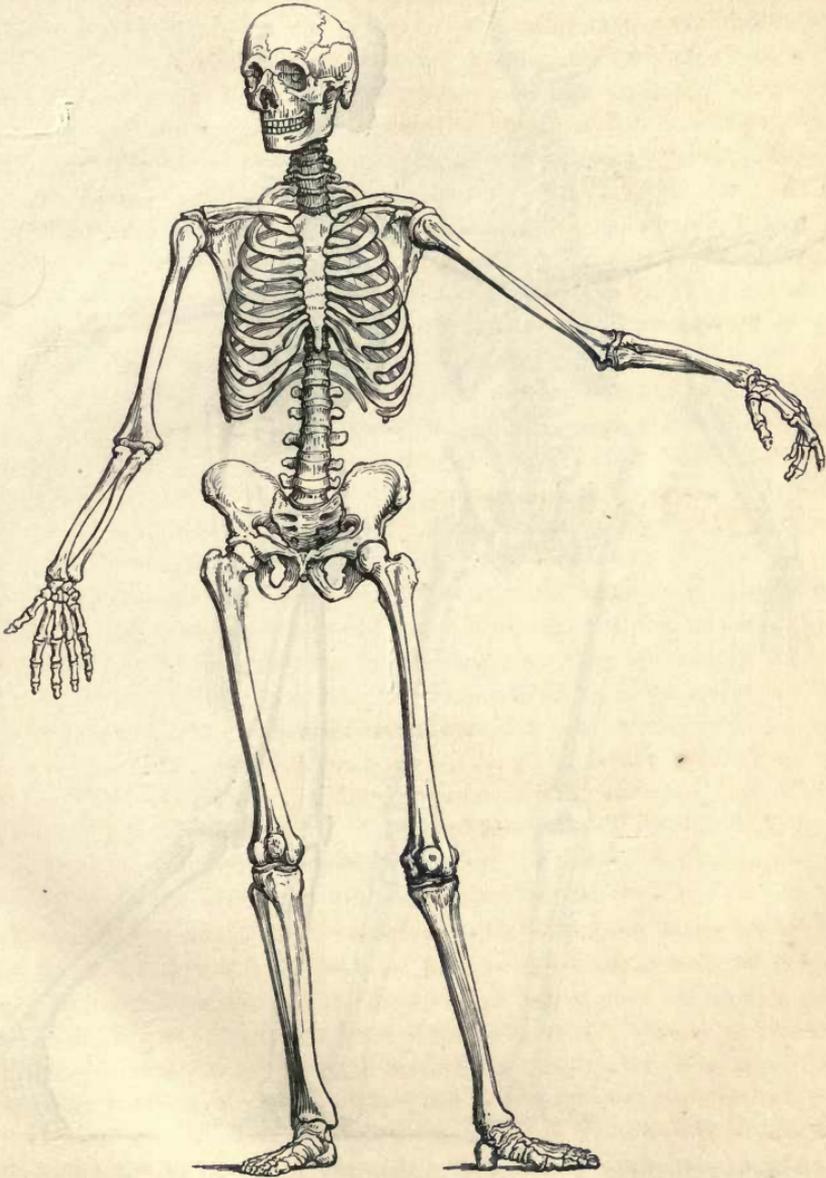


Of the above figures, 8 is the skeleton of the Lemur ; 9, that of the Eagle ; 10, that of the Alligator ; 11, that of the Carp. In all the above examples of the vertebrata, the essentials of the osseous framework are present : it is easy, however, to see how the extremities are modified in each ; and how, from the almost human limbs of the Lemur, they merge into the swimming organs of the fish ;—the modification of the ribs and sternum is, also, no less remarkable.

The importance attached to the structure of the osseous framework of the Mammalia, as conducive to a correct knowledge and just appreciation of the various groups of which the class consists, has been acknowledged by all naturalists, and will be a sufficient justification

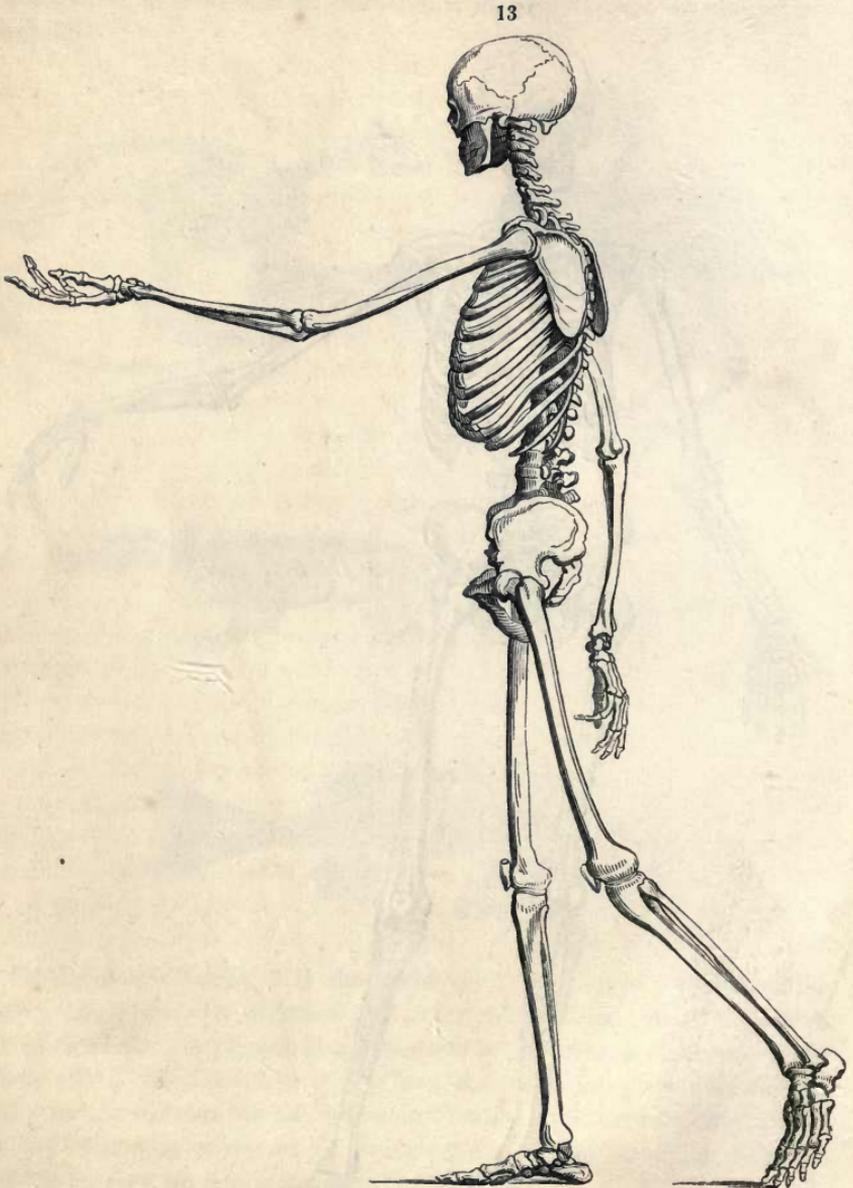
of the course here pursued, in instituting a more detailed examination of the skeleton, and of the parts composing it, than is usually adopted in

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works of the present nature. The advantage is self-evident. It must be assumed that Man is the standard, and that, as animals approach or recede ✓
from that standard, they approach or recede from the type of animal or-

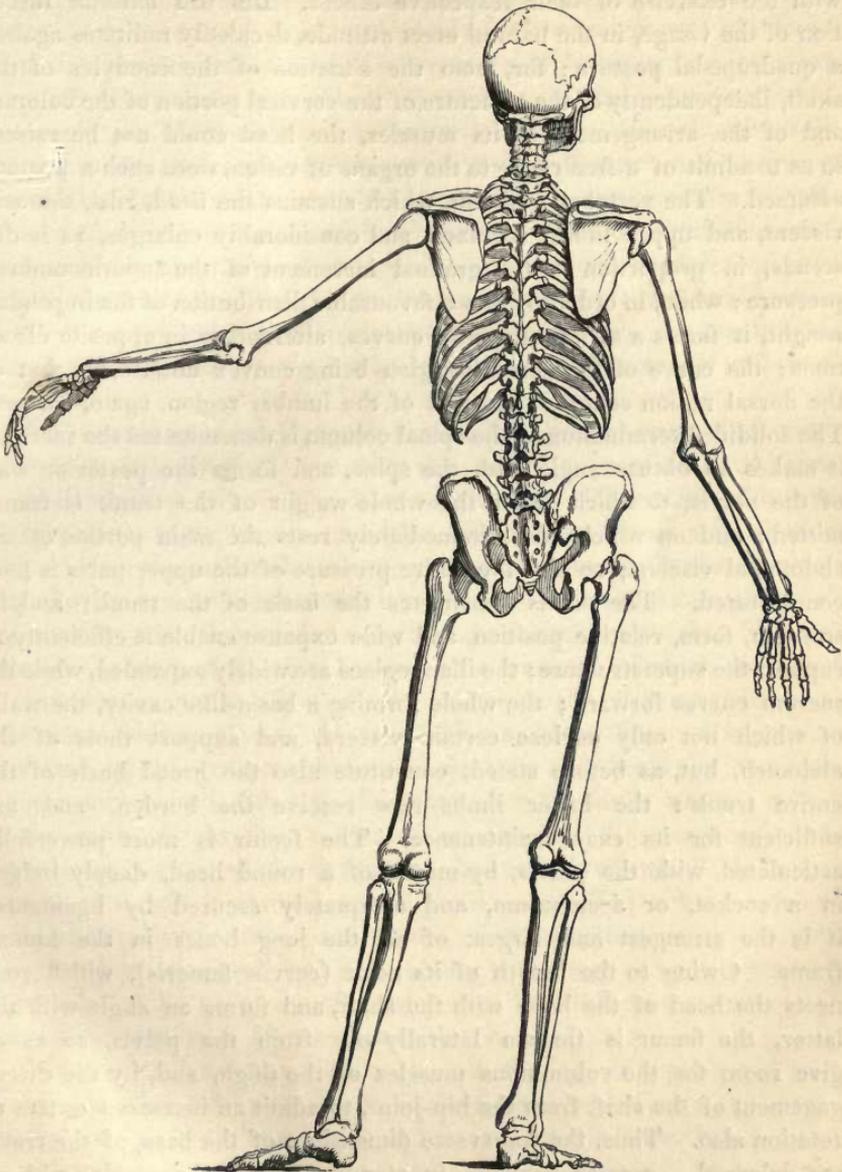
ganization: it is, therefore, to the structure and arrangement of parts, as exemplified in his frame, that our reference is to be made, by way of



comparison. Three representations of the human skeleton are here given: an anterior view (fig. 12); a lateral view (fig. 13); and a posterior view (fig. 14).

The first thing that strikes us, on contemplating the human skeleton, is its express adaptation for the erect attitude, and a bipedal mode of pro-

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gression; the two superior extremities being free. With this adaptation, as exhibited by the limbs, are combined the condition of the whole of the osseous structure, and, in accordance therewith, the disposition of the muscular and ligamentary systems.

The skull, globe-like, rests poised, or nearly so, on the summit of the vertebral column; its facial portion being so placed as to give the greatest advantage to the organs of the senses seated in it, connected with the exercise of their respective offices. But this anterior direction of the visage, in the natural erect attitude, decidedly militates against a quadrupedal posture; for, from the situation of the condyles of the skull, independently of the structure of the cervical portion of the column, and of the arrangement of its muscles, the head could not be raised, so as to admit of a free range to the organs of vision, were such a posture assumed. The vertebral column, which sustains the head, ribs, thoracic viscera, and upper limbs, regularly and considerably enlarges, as it descends, in proportion to the gradual increment of the superincumbent pressure; while, in order to allow a favourable distribution of the impended weight, it forms a series of gentle curves, alternating in opposite directions; the curve of the cervical region being convex anteriorly, that of the dorsal region concave, and that of the lumbar region, again, convex. The solidified termination of the spinal column is denominated the sacrum; it makes an obtuse angle with the spine, and forms the posterior wall of the pelvis, to which latter the whole weight of the trunk is transmitted; and on which, also, immediately rests the main portion of the abdominal viscera; so that the entire pressure of the upper parts is here concentrated. The pelvis constitutes the basis of the trunk; and its strength, form, relative position, and wide expanse enable it efficiently to support the superstructure; the iliac regions are widely expanded, while the sacrum curves forward; the whole forming a basin-like cavity, the walls of which not only enclose certain viscera, and support those of the abdomen, but, as before stated, constitute also the broad basis of the entire trunk: the lower limbs now receive the burden, and are sufficient for its easy maintenance. The femur is most powerfully articulated with the pelvis, by means of a round head, deeply lodged in a socket, or acetabulum, and adequately secured by ligaments: it is the strongest and largest of all the long bones in the human frame. Owing to the length of its neck (*cervix femoris*), which connects the head of the bone with the shaft, and forms an angle with the latter, the femur is thrown laterally out from the pelvis, so as to give room for the voluminous muscles of the thigh, and, by the disengagement of the shaft from the hip-joint, to admit an increased extent of rotation also. Thus, the transverse dimensions of the base of the trunk are enlarged—greater firmness in standing being the result, without impediment to progression. The shaft of the femur is not perpendicular, but inclines inward, so that the knees approach each other, and are brought perpendicularly under the pelvis, the weight of the body bearing obliquely upon them; this oblique direction of the femur necessitates

an increase in the comparative length of its internal condyle, otherwise the direction of the tibia would be oblique, which would interfere with the position of the feet, and with freedom of progression. The obliquity of the shaft, the superior length of its inner compared with its outer condyle, arising from the breadth of the pelvis, and the length of the cervix, combined with the necessity of bringing its lower end perpendicularly under the pelvis, in reference to the secure support of the trunk, are characteristics of the human femur. Its axis, also, coincides with the centre of gravity, and its line of direction follows that of the trunk. In all these conditions it displays a strong contrast to that of even the most anthropomorphous Ape; in which the cervix femoris is comparatively short, the shaft straight, and the two condyles of equal length, the entire bone forming an obtuse angle with the vertebral column, if the latter be perpendicularly raised;—which angle, in quadrupedal Mammalia, elevated on the hinder extremities, is necessarily still more acute.

The human knee, as Camper remarks, is of greater depth than width, while that of the Orang is less deep than wide; a proof that this animal is not destined to a vertical mode of progression. The extent of the articular surfaces of the knee-joint in Man, affords, also, a more ample basis of support than the extent of the same part in quadrupeds; at the same time that the leg can be continued perpendicularly from the femur, the whole constituting a firm column beneath the superincumbent weight. The articulations, indeed, of the tibia, both with the femur and the foot, are of such a character as not to allow of our ordinary mode of progression being otherwise than vertical. At the ankle, a broad base of support is produced by the great expansion of the tibia and fibula: of these, the former only is articulated to the femur, but the latter concurs with it at the ankle, in forming a sort of mortise, for the reception of the articulating surface of the astragalus, by means of which the superincumbent weight is thrown on the pedal arch. The ankle, therefore, is mechanically so strong and secure, that, notwithstanding the great weight it has to support, and the mobility with which it is indispensably endowed for the purposes of progression, its dislocation, under ordinary circumstances, is almost impossible.

The foot is placed at a right angle with the leg; it is prolonged anteriorly, and that, not by the length of the moveable phalanges of the toes, but by the increase of the tarsus and metatarsus: it is also broader than its analogue in the Ape tribe, generally; and the thumb, or great toe, placed on the same level with the others, is the longest and strongest of all, and cannot be brought to antagonize with them. The bone of the heel is of great size, particularly at its posterior projection, to which the tendons of the great muscles of the calf are firmly attached.

The position, then, of the skull, the character of the vertebral column, and of the pelvis, and also the great development of the lower limbs, and their bearing upon the feet, shew that the erect attitude is that, alone, which is capable of being naturally maintained by Man. But, again, an examination of the general characters exhibited in the osseous framework of the chest, and superior extremities, tends also to convince us, that there is, as far as even these are concerned, an insuperable barrier to the quadrupedal attitude. The great breadth of the chest in Man, compared with its antero-posterior depth, necessarily places the scapula in a dorsal situation, so that the glenoid cavity, for the reception of the head of the shoulder-bone, has an obliquely lateral aspect: it is very shallow; materially differing, in this point, from the deep acetabulum, or socket, for the reception of the head of the thigh-bone. Now, were Man to attempt the quadrupedal attitude, the head of the shoulder-bone (humerus) would be brought to bear, not against the centre of the shallow glenoid cavity, but against its sides, or edge; and, in this critical situation, the superincumbent weight would have to be sustained: but the lax structure of the shoulder-joint, allowing freedom of motion to the greatest possible extent; the distance to which the shoulders are thrown apart by the clavicles; the structure of the elbow-joint; the rotatory motion of the fore-arm on its own axis; the arrangement of the parts of the hand, in which the moveable phalanges are so largely developed, and the carpus, or solid part, reduced within so small a compass; the position of the hand, which, instead of being at right angles with the fore-arm, is continued from it in the same line, and, indeed, cannot, without pain, be brought into a right angle;—all these arrangements, while they tend to unfit the anterior extremity as an organ of support, admirably qualify it for the important and dignified purposes to which it is destined in the economy of our race.

Of all the lower Mammalia, the *Quadruman*a (and among them the *Orang* and *Chimpanzee*) approach, in the arrangement of their osseous framework, and, consequently, in their attitude, the nearest to Man; but, inasmuch as their structure differs from that of Man, in many essential particulars, so do these well-marked departures from the human type of organization indicate a corresponding difference in their natural attitude; which, conformably with their intermediate organization between the biped and quadruped, is neither horizontal nor erect, but oblique or diagonal. The *Ape* tribes, however, as will be explained more fully hereafter, are organized as *scansorial* (or climbing) Mammalia; and their tottering posture, when they attempt the erect attitude on the ground, contrasts very strikingly with their ease and activity among the branches of the forest.

The muscular forces, by which the bipedal progress, in the erect atti-

tude, is performed, are proportionate to their office: with the expansive pelvis, we find, also, the glutæi muscles assuming a figure and degree of development found in no other animal except Man. The mass which they form, not only braces the thigh-bone firmly, in its perpendicular bearing from the ilium, when he stands erect or walks,—not only gives firmness to the femur, in supporting the weight of the trunk,—but enables him to sit upright in a state of rest, while awake, the organs of the senses of sight, smell, and hearing still preserving their advantageous direction; but which direction, were he obliged to lie down like the quadrupedal brute, in order to repose, would be so prone, as to militate against the express uses to which Man, as an intellectual being, applies them. To such a being the advantages of an upright sitting posture (a posture not even allowed to the Simiæ) is self-evident. In the Simiæ the glutæi differ greatly in their arrangement from those of Man. In the former, the elongation of the os ilium renders the glutæus medius and minimus larger; while the muscle analogous to the glutæus maximus is the smallest of the three. The Carnivora and Rodentia exhibit the same proportional diminution of the glutæus maximus. “Solus homo,” writes Adrian Spigel, “ex omnibus animalibus commodè sedet; cui carnosæ et magnæ nates contigere, et pro subsellio, pulvinarique tomento repleto inserviunt, ut citra molestiam sedendo, cogitationibus rerum divinarum animum rectius applicare possit.”

The extensor muscles, and the flexor muscles of the knee, in lower animals, present, in their relative proportions, the converse to what is found in Man. In the lower animals, not only are the flexors of the knee stronger than in Man, but inserted so much lower down the tibia, as to retain the knee in a naturally bent condition; while the extensors are weaker than in Man, who requires them to be powerful, both to throw the leg forward and upward, in walking or running; also, to keep the tibia firm in standing, so that the knee-joint may not totter, or give way.

The muscles which lift the human heel are so large as to form prominent calves, a characteristic peculiar to Man; and which is in itself a sufficient proof that the legs are destined to support and move the whole machine.*

* Dr. Arnott has made some very interesting observations on the muscles which constitute the human calves. “The heel,” he says, “by projecting so far backward, is a long lever for the strong muscles which form the calf of the leg, and terminate in the tendo Achillis, to act by. These muscles, by drawing at the heel, lift the body, in standing on the toes, in walking, dancing, &c. In the Negro foot, the heel is so long as to be ugly in European estimation, and its great length rendering the effort of smaller muscles sufficient for the various purposes, the calf of the leg in the Negro is smaller in proportion than in other races of men. In a graceful human step, the heel is always raised before the foot is lifted from the ground, as if the foot were part of a wheel rolling forward, and the weight of the body rests, for a time, on the forepart of the foot and toes. The muscles forming the calf, lift the heel, by drawing at the tendo Achillis, and produce a bending of the foot in a corresponding degree. But where strong wooden shoes are used, or any shoe that will not yield nor allow this bending of the foot, the heel, in walking, is not raised at all, until the whole foot rises with it; so that the muscles of the calf are scarcely used, and, in consequence, soon dwindle in size, and almost disappear.

As respects the position of the heart, some striking differences are observable between Man and quadrupeds; and the final cause of such differences must certainly be ascribed to the destination of the former to an erect, as of the latter to a horizontal mode of progression. The form of the chest in Man, which may itself be taken as an index of his erect attitude, permits the heart to assume an oblique direction to the left side, and to rest on the diaphragm, to the tendinous expansion of which muscle the pericardium is firmly attached; but, in quadrupedal Mammalia, the heart is seated in the centre of the chest, supported by the sternum, while, between its investing membrane and the diaphragm, a considerable space intervenes.*

The arteries which supply the brain are so subdivided, in the generality of quadrupeds, as to prevent the blood from flowing with undue rapidity into that organ: in Man, however, no such provision exists for moderating its influx: in the horizontal mode of progression, therefore, it would be poured into his brain with such copiousness as to expose him constantly to the peril of apoplexy.

As a sequel to this general review of the human skeleton, with reference to its fitness and adaptation for the erect attitude, the modifications of parts presented by the osseous framework of the lower Mammalia, according to the scale they occupy in the chain of being, and the modes and purposes of their existence, have now to be considered. It may here be observed, however, that a complete system of comparative osteological anatomy is neither allowable by the nature or limits of this work: it will be sufficient that such an outline of the subject is given as may be of some value to the naturalist. It has been already said, that the skull and the vertebral column are the essential parts of the skeleton. The skull first demands attention.

The bones of the skull may be divided into two sections; those

Many of the English farm-servants wear heavy stiff shoes; and, in London, it surprises one to see the drivers of country wagons with fine robust persons in the upper part, but with legs that are fleshless spindles,—producing a gait at once awkward and unmanly. One regrets that, for the sake of a trifling saving, fair Nature should be thus deformed. The wives and sisters of those men, and their brothers who are otherwise employed, are not thus mis-shapen. An example of an opposite kind is seen in Paris, where, as there are no side-pavements in the streets, and the ladies consequently walk, almost constantly, on tiptoe, the great action of the muscles of the calf has given a conformation of the leg and foot, to match which the Parisian belles proudly challenge all the world. They are not aware, probably, that it is a defect in their city, to which the peculiarity of their form is in part owing.—*Elements of Physics*, pp. 212-13-14.

With regard to these otherwise excellent remarks, it is proper to observe, that the tiptoe mode of progression, although decidedly tending to a fine development of the calf, naturally produces, in the same ratio, an undue increase of breadth in the forepart of the foot; which, indeed, is conspicuously displayed in the Parisian females, as compared with the more plantigrade women of the British metropolis.

* Dr. Roget says, "Evidence is afforded of the human conformation being expressly adapted to the erect position of the body, by the position of the heart, as compared with quadrupeds." According to Mr. Lawrence, "the Orangs (S. Satyrus, Troglodytes, and Gibbon) have it placed as in Man, and the pericardium attached to the diaphragm; in other Simiæ," he adds, "the apex only is a little inclined to the left, and touches the muscle."

of the cranium, in a strict sense, and those of the face: the former encase the brain; the latter are situated anteriorly, and more or less below, forming various recesses for the lodgment of the organs of sight, smell, and taste.

As the skull encases the brain, it must be very evident that its shape and dimensions will greatly depend upon those of the cerebral mass it contains; and, as the relative volume of this may be taken as a test of the grade of intellect, the study of the skull of animals is pregnant with more than ordinary interest.

In the class to which this work is restricted, the skull is more or less arched, or domelike, in its contour. Commencing above the eyes, to the chambers of which it forms a projecting ledge and roof above, it sweeps round to its commencement, encircling the brain, and is pierced by certain apertures, or foramina, for the ingress of arteries, and the egress of veins and nerves. In Man, it consists of eight bones (at least in his adult condition), united to each other by the interlocking of their serrated edges, the lines of junction being technically

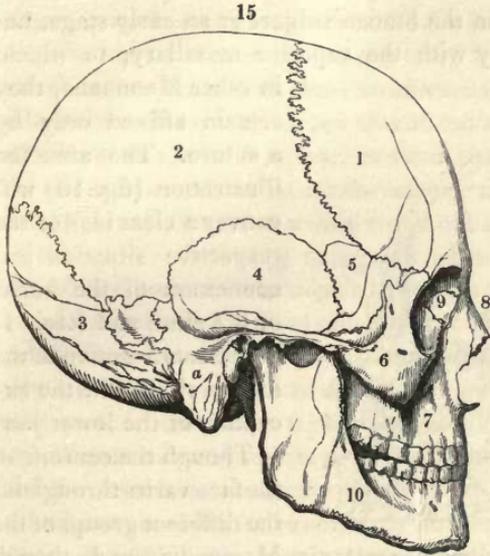


Fig. 15. Lateral View of the Human Skull.—1, frontal bone; 2, parietal bone; 3, occipital bone; 4, temporal bone; a, mastoid process of temporal bone; 5, sphenoid bone; 6, malar bone; 7, superior maxillary bone; 8, nasal bone; 9, lacrimal bone, or os unguis; 10, inferior maxillary bone.

termed sutures. The forehead is occupied by the frontal bone, which, in the human subject, consists of a single portion, as it does also in the Monkey tribes: in most Mammalia, however, it is divided by a mesial suture; such, indeed, is the case even with the human species, at an early stage of existence, but it is usually (not always) closed before maturity, so as to be obliterated; whilst in these lower animals it remains unconsolidated, except in certain cases, during life.

The sides and top of the head are formed by the two parietal bones, (one on each side,) joined together by the sagittal suture, and also to the frontal bone by the coronal suture. The temporal bones, and the wings of the sphenoid bone, also, enter into the lateral portions of the skull: the back part is formed by the greatest portion of the occipital bone; the base consists of the remainder of the occipital bone (and especially the portion termed its basilar process, anterior to the great fora-

men), and of the body of the sphenoid bone; which latter, together with the ethmoid, intervenes between the skull and the nasal cavities, and enters into the division and arrangements of these cavities.*

The face is situated anteriorly to the vault of the skull, and, in Man, below its frontal portion. It consists, in the human subject, of fourteen bones, viz., two nasal, two lachrymal, two superior maxillary, two malar, two palate, two turbinated bones, one vomer, one inferior maxillary. In the lower Mammalia, however, two additional bones may be reckoned, viz., the intermaxillary, in which are implanted the incisor teeth: these bones, indeed, exist separately in the human subject at an early stage, but soon become united indissolubly with the superior maxillary, to which,

in other Mammalia, they remain affixed only by a suture. The annexed illustration (fig. 16) will convey a clear idea of the respective situation and connexion of the bones of the skull and face. It represents a section of the human skull, with the exception of the lower jaw.

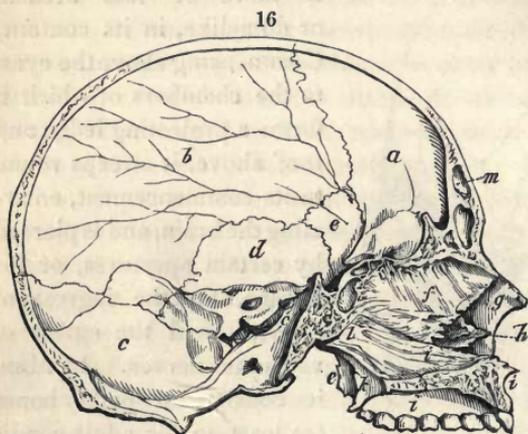


Fig. 16. Section of the Human Skull.—*a*, frontal bone; *b*, parietal bone; *c*, *c*, occipital bone; *d*, temporal bone; *e*, *e*, sphenoid bone; *f*, *f*, ethmoid bone; *g*, nasal bone; *h*, turbinate bone; *i*, *i*, superior maxillary bone; *k*, palate bone; *l*, vomer; *m*, frontal sinus.

Though the contour of the face varies throughout the different groups of the Mammalia, and though its relative situation and magnitude, with regard

to the cranium, are perpetually altered, still it is made up of the same aggregate of parts as in Man, however they may be modified in detail: they bear, also, the same general relationship among each other, and form the same hollows, or chambers, for the same organs of sense. The orbits of the eye, for example, in the human skull, are bounded within,

* In the lower Mammalia, the number of the distinct bones entering into the formation of the skull, varies, because certain of the bones which, in Man, become consolidated into single pieces, often, in the former, remain subdivided into their pristine elements through life: such is the case with the temporal and occipital bones. Hence Meckel observes, that "the number of bones which, in the adult and normal state, compose the skull of mammals, cannot be fixed by a general rule, because it is subject to variation; yet, it may be said never to exceed twenty-eight,—of which eleven are proper to the cranium, seventeen to the face." In the Rodentia, for example, the squamous portion of the temporal bone remains distinct from the petrous; and the tympanic bulla is often separate also. The occipital bone usually consists of a basilar, or occipital portion, and an upper, or squamous portion, which is sometimes unconsolidated; while, anterior to this, in many Rodentia, and other animals, an interparietal bone, of variable size and figure, intervenes between the posterior angles of the two parietals. The sphenoid bone is also divided into two portions,—an anterior and posterior: the posterior is formed of the body of the sphenoid and the *ala* majores; the anterior portion gives off the *ala* minores.

partly by the frontal bone, partly by the superior maxillary, and partly by the malar—also by the lachrymal, and partly by the sphenoid and ethmoid, and a process of the palate bone. The frontal bone forms the upper margin of the orbit; and a reflected plate, termed the orbital process, concave below, forms the roof of the recess within: the floor and internal margin are formed by the superior maxillary bone; the outer margin and side are formed, first, by the malar bone; and, more internally, by a portion of the wing of the sphenoid; the inner wall is formed by the lachrymal bone, and a plate of the ethmoid: the orbital plate of the palate bone is seated at the bottom of the orbit.

The recess, thus walled around, is (in Man) of a conical figure, with various foramina and fissures for the transmission of the optic nerve, and of the various nerves to the muscles of the eye, and to the face. At the inner angle of each orbit is a canal in the lachrymal bone, for the transmission of the tears, and leading into the nares: this lachrymal bone, which is small in Man, and altogether within the orbit, is much more developed in many quadrupeds, advancing externally, and encroaching upon the superior maxillary bone. This is seen, to a remarkable extent, in the Horse.

It is here to be observed, that the funnel-shaped orbits in the human skull have an anterior aspect, and are nearly parallel to each other, excepting that they slightly diverge as they proceed from within, so that the base, or external margin, of each is thrown somewhat obliquely outward; a peculiarity which, in the lower Mammalia, is carried much farther. In the Monkey tribes, the direction of the orbits, and their form, are nearly as in Man; the margin, however, of the frontal bone projects more decidedly, so as to constitute, in many, a bold superciliary ridge, the forehead being at the same time depressed to its level. In other Mammalia, however, as the Hare, the Deer, the Horse, &c., the orbits are, more or less, lateral, so that the eyes, instead of seeing only such objects as are in front, have a wide sphere of vision, comprehending at least three parts of the horizon, or of a circle drawn around. The design of Nature in this arrangement is very evident: the animals whose eyes are most completely lateral, are those whose food is placed under them, and whose structure unfits them for a life of rapine: quiet and timid, they have not, with eyes intent upon their victim, to keep up a persevering chase,—nor have they, by the concentrated fierceness of their look, to paralyze the awe-struck victim, and render it an easy prey; on the contrary, they themselves are the sufferers: ordained by Nature's law to become the food of the carnivorous, without weapons of resistance, or active defence, they have to maintain a continual watch. Hence, in order to preserve the race from extinction, one mode, at least, by which the design of Nature is accomplished, and it is one of passive defence, results from the wide scope permitted to their organs of vision,

which affords them timely notice of approaching danger. In these animals, the eyes are generally large, full, and protuberant. The eye of the Giraffe, for example, is remarkable for its beauty. It is ample, and beams with an expression of gentleness, in accordance with the creature's character: one of the most striking circumstances connected with it is its prominence; and, so much so is this the case, that the eye-ball is perfectly apparent to any one standing in a right line behind the animal, while the person, occupying such a position, is equally visible to the Giraffe. A native of the hills and plains of Africa, abounding in ferocious beasts of prey, among which the Lion is its most formidable enemy, the Giraffe takes in the horizon at a glance, almost without moving; and, thus enabled to discern an enemy at a considerable distance, he may browse at ease on the foliage of the mimosa.

The annexed sketch (fig. 17) represents a posterior view of the head of this singular and interesting animal; the lateral position and prominence of the eyes are very conspicuous.



The lateral, or semilateral aspect of the orbits, in the lower Mammalia, tends to place the fundus, or bottom, of one orbit in opposition to the fundus of the other; and this, the more completely, the more lateral their situation; so that, instead of forming nearly parallel conical cavities, as in Man and the Simiæ, they are so opposed, that a transverse line across the frontal bone traverses each in its natural direction.

Thus, while the margins are thrown apart, the orbits, at their fundus, more or less approach each other; the extent of the intervening space depending on the posterior dilatation, and the general magnitude of the nasal cavity. The distance between the eyes, or the margin of the orbits, varies, therefore, according to the breadth of the forehead, and the development of the nasal organs, and is often very considerable, while yet the fundus of each orbit, as in the Hare, may closely approximate. In the Horse, the distance between the orbits, from margin to margin across the skull, equals the distance of the occiput from a line drawn between them.

Though the orbits are widely separated in the Carnivora, their axis is much more obliquely anterior than in the Deer or Antelope; therefore the aspect of the eyes is far less lateral: in this respect, however, there is great variation throughout the different genera.

In many of the aquatic Mammalia, as the Beaver and Coipus, the orbits, widely separated, have their axis directed obliquely upward, so that the eyes appear as though placed almost on the upper surface of the skull—a situation advantageous to the animals while swimming, because it enables them to look upward, without the necessity of turning the head.

In Man and the *Quadrumana* alone do we find the orbits walled around, internally, so as to form isolated recesses. In some herbivorous quadrupeds, as the Deer, the Horse, &c., only the external ring, or margin, of the orbit, is complete. It is incomplete, however, in the Rodentia, as the Beaver, the Rat, the Hare, &c. The same observation applies, also, to the Carnivora, at least, as a general rule. In the Horse, the Deer, and the Antelope, the external angular process of the frontal bone joins an angle of the malar bone, so as to perfect the ring; but this ring stretches over a concavity, by which the orbit fully communicates with the temporal fossa, the wing of the sphenoid failing to complete the wall of separation. In the human skull, the large sphenomaxillary fissure* in the orbit, which opens into the temporal fossa, is the first step toward throwing the orbit and temporal fossa into one. In the Monkeys this fissure is less considerable, it advances less forward, and separates between the alveolar ridge of the superior maxillary bone and the pterygoid process of the sphenoid, including only a small portion of its wing. The orbits are, in fact, proportionally deeper in the Simiæ than in the human subject, and are separated from each other by a much narrower space, occupied by the nasal cavities.

In the human skull, the malar bone, carried backward, unites with a long process of the temporal bone (the zygomatic process), in order to form the zygomatic arch, beneath which passes the temporal muscle, to be inserted into the coronoid process of the lower jaw; and the lower edge of this arch gives rise to the masseter muscle, which also acts on the same lever. In Man, the zygomatic process of the malar bone is short, so that the arch is principally formed by the zygomatic process of the temporal bone; but, in many of the Mammalia, the reverse is the case. In the Monkey, the two branches, which form the arch, are nearly equal. In the Dog, the malar bone is reduced to a narrow strip, sending backward a long acute branch, which is overlaid by the corresponding branch of the temporal bone: in other animals the malar bone is reduced still more, and thrown more backward, a process of the superior maxillary bone taking its place; so that, in the form of a narrow slender slip, it constitutes the centre of the zygomatic arch, between the suborbital branch of the maxillary and the zygomatic branch of the temporal bone. This is seen in the Rat, and many other Rodentia; in the Hedgehog, Mole, and other Insectivora. In some of the Insectivora, as the genera *Centetes*, *Ericulus*, and *Echinops*, and in the great Ant-eater among the Edentata, it is absent; the zygomatic arch being incomplete. In the Antelope, Deer, and Horse, especially the latter, the malar bone is large,

* This fissure intervenes between the orbital plates of the sphenoid and the superior maxillary bones; but the malar and palate bones also enter into it; the former bounding it anteriorly, the latter posteriorly.

advances anteriorly, and sends back but a small zygomatic branch, the zygoma itself being greatly contracted.

With the extent and character of the zygomatic arch are connected, not only the position and expression of the eye, but also the habits and manners of the animal. In carnivorous animals, the force of whose jaws is very great, the volume of the temporal and masseter muscles is immense: the temporal muscles occupy the whole of the sides of the skull, beginning from the mesial line down the cranium, which in many, as in the Wolf, Hyæna, &c., is elevated into a strong ridge, for their firmer and more voluminous attachment. (See fig. 18, representing the zygomatic arch and temporal muscle of a carnivorous animal.) Now, as the space beneath the zygomatic arch is filled up by the temporal muscle

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passing beneath, it must be evident that the span and spring of the arch will be an index of the volume of this muscle, while its extent and strength will be in accordance with those of the masseter; at least, generally: for, in the Horse, a projecting ridge is carried forward from the zygoma, across the lower edge

of the malar bone, and for the space of nearly two inches on the maxillary bone, in order to allow of the development of this important muscle of mastication. In the Cow, this muscle is less developed than in the Horse, and there is no projecting ridge of the malar bone.

In Man the zygomatic arch is small, the temporal muscles are moderate, and the force of the jaws is comparatively limited. In the Ape tribe, the zygomatic arch is larger, and the temporal fossa deeper.

In the Elephant the zygomatic arch is of moderate stoutness, but spans a vast concavity, filled by temporal muscle of enormous volume.

In the Hippopotamus the zygomatic arch is short and strong, and stretches over a deep temporal fossa; this is also the case in the Horse: but, as already said, a spinous ridge runs from it anteriorly, for the more extensive attachment of the masseter. This arch is broad and strong in the Kangaroo. In the Chlamyphorus and the Armadillo it is slender and weak; but, at the same time, it affords an extensive line for the attachment of the masseter. The same form occurs in the Mole, in which the zygomatic arch assumes the appearance of a straight osseous thread.

In the Ruminantia the zygomatic arch is short, and the temporal fossa circumscribed; but the masseter is not confined to the zygoma, being also attached to the greater part of the side of the superior maxillary bone, beginning close below the orbit. In rodents the anterior part of this arch consists, as previously observed, of a branch, or sometimes (as in the Coipus) of a double branch, surrounding a large foramen, projecting from the superior maxillary bone; the malar bone, reduced

in its dimensions, occupies the centre, and the zygomatic process of the temporal bone forms the posterior part of the arch. The arch, in these animals, varies greatly in strength and form. In the spotted Cavy it is expanded to an extraordinary degree, but it is thin, and internally concave. In the Capybara, Coipus, and Beaver, it is very strong and extensive; as might be expected in animals capable of using their teeth so effectually. In the Squirrel it is of moderate strength; in the Rat it is slender; in the Hare it is strong, from its breadth, but is compressed, and forms the lower margin of the enormous orbit. Turning from these animals to the Carnivora, we find the zygomatic arch of great extent and stoutness, and consisting of a long process of the malar bone, overlaid by the usual process of the temporal bone, which is bold and strong: the zygoma, moreover, does not only take a simple arched sweep backward, but is arched upward also, by the bending down of each extremity, the line of anterior declination falling precisely on the centre of the lanary molar (carnassière), the point in which the force of the jaws is concentrated. It will be evident that the muscular fibres arising from the lower edge of this arch are straining, when in action, against that modification of form which enables inert bodies to bear the greatest weight, or application of power. In these animals, the ball of the eye, seated in an orbit exposed and open, is protected by ligamentous expansions, which, in a certain sense, isolate it, and its own muscular apparatus. It is, however, more immediately affected by the violent contraction of the temporal muscle, in ferocious, than in graminivorous Mammalia; and starts forward, whilst they rend the flesh of their victims, so as to produce an expression of the most implacable fury.

Proceeding from the orbits, or recesses, of the organs of vision, to the nasal cavity, it may be stated, that this cavity occupies the space partly between, and partly below, or before, the orbits. It is covered, externally, by the two nasal bones (consolidated, in the Monkeys, into one), and is divided, internally, by a longitudinal septum, or partition, formed by a vertical plate of the ethmoid bone and the vomer: the floor of this divided cavity consists of the palatal plates of the superior maxillary bones, and behind those, of the true palate bones; which, together, constitute the roof of the mouth. The nasal cavities open, anteriorly, by the two nostrils, a cartilaginous septum being continued from the osseous division within. Posteriorly, they open into the fauces, or throat, by two canals, termed posterior nares. A duct, also, from the inner angle of each orbit, leads into each nasal cavity, for the purpose of conveying the tears, or fluid, secreted to wash the eye: hence it is termed the ductus lachrymalis. The interior of the nasal cavities is filled with the turbinated processes of the ethmoid bone, and also with the two inferior spongy or turbinated bones, of which the shape can scarcely be described, otherwise than by

calling them sponge-like laminæ, irregularly convoluted. Over the walls of these cavities, and over these turbinated and spongy plates, a fine mucous membrane is spread, on which the minute and multitudinous fibres of the olfactory nerves ramify. In most animals the olfactory apparatus is far more extensively developed than in Man; on the sense of smell depends their selection or discovery of food: thus it ministers to their necessities,—but to their necessities alone. Though among the savage tribes of the human race, the sense of smell, from habitual exercise, as a consequence of an almost brute-like mode of life, may be more acute than in civilized races,—yet in Man it is less discriminative than in most other Mammalia. Nature does not bestow her gifts without designing to confer advantage; and, where none is to be gained, the endowment, which, if possessed, might be even injurious, is denied. Man does not depend, for his daily maintenance, on the perfection of this sense, which, to so many of the lower race, is of main importance. He can, indeed, distinguish and relish the grateful odour of flowers, the summer scents that fill the air with fragrance, and the perfume of gums and spices: he is affected with disgust by the noisome effluvia of other objects, but he cannot, like the hound, track the footsteps of the distant quarry; nor, like the Buffalo or Rhinoceros, perceive, by his power of smell, the approach of the Lion, or other enemies. The sense of smell ministers less to the animal necessities in Man than in the brute, but more to the intellectual faculties: modified, as he possesses it, it becomes an agent in the acquisition of knowledge, and is a source of pleasure or disgust, unconnected with the mere supplies of life.

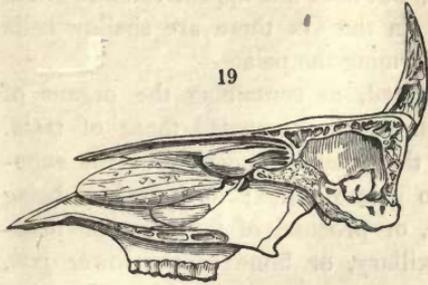
It is here to be observed, that, besides the true nasal cavities, which have already been pointed out, there are connected with them other cells, or cavities, lined by a continuation of the same membrane, but of a thinner texture, and supplied by a finer mesh of blood-vessels. Two of these cavities are in the frontal bone (or one in each frontal bone where that bone is double), above the orbits; they are termed the frontal sinuses. One occurs in each superior maxillary bone, below the eye, and is termed the antrum Highmoreanum (cavern of Highmore); and two of inconsiderable size exist in the body of the sphenoid. In Man the frontal sinuses are of small extent, and are usually defined by a slight projection of the bone, to be perceived above the inner angle of each eye, on the edge of the forehead.

In the Ape tribe, notwithstanding the strong superciliary ridge, which gives such a peculiar and sinister expression to the countenance, these sinuses are obliterated.* In many Mammalia, however, they are of large extent, and occupy the whole of the forehead and crown, giving an appearance of greater development to the anterior part of the brain than

* At least the Author has been able to detect no trace of them, even by making a section of the bone.

is truly warranted. Though large and extensive in carnivorous animals, they are ordinarily far more so in the graminivorous races. In some varieties of the Goat, the skull, if regarded without reference to the frontal sinuses, would appear to have a prominent forehead, the index of a developed brain; but the prominence is deceptive, being merely that of the tabular covering of these sinuses, which are upwards of an inch in depth;

divided from each other, and again subdivided by very thin partitions; while, at the same time, they extend not only over the whole front of the skull, but are continued, into the osseous core of the horns,* for fully three parts of its length. The same arrangement of the frontal sinuses prevails, also, in the Ox. (See fig. 19, the section



of a skull of the Ox, in which the extent of these sinuses is displayed).

Of all quadrupeds, however, there is none which has the frontal sinuses developed to the great extent which is found in the Elephant: it is from these that the forehead in this animal acquires its remarkable advancement and elevation. Divided into numerous cells of an irregular structure, they occupy the front and top of the skull; and, from their great depth, give the head a bold and imposing appearance, which is altogether fallacious. But, though the external table of the frontal bone (here single), by which they are covered, is thin, and easily broken, there is no probability of killing the Elephant by aiming at its forehead; for the true cavity of the skull, occupied by the brain, is of comparatively small extent, and seated far back,—a situation produced not only by the enormous extent of the frontal sinuses, but also resulting from the space taken up by the alveolar processes, in which the roots of the ponderous tusks are so deeply imbedded. It was from ignorance of these facts that so great a difficulty occurred in destroying the Elephant at Exeter 'Change, a few years since; the painful details of which are, no doubt, fresh in the memory of most of our readers. An Elephant-hunter would certainly have killed the animal at a single shot. The annexed sketch (fig. 20) represents the developed state



The annexed sketch (fig. 20) represents the developed state

* The osseous core, or support, of the horny sheath in the Ox, Antelope, Sheep, and Goat, is a mere process of the frontal bone.

of the frontal sinuses, and the situation of the cranial cavity, of the Asiatic Elephant.

With respect to the antrum Highmorianum, or maxillary sinus, this cavity, which communicates laterally with that of the nose, is of moderate size in Man, and is seated above the sockets of the three last molar teeth: in the Simiæ it is nearly, if not quite, obliterated. It is of moderate size in the Ox, Goat, and other ruminants; but does not appear to exist in the Carnivora, and many other animals. In the Ox there are shallow cells between the two tables of the bones forming the palate.

The last facial recess to be noticed, as containing the organs of one of the senses, is the mouth, in which are seated those of taste. It is covered, or roofed above, by the palatal processes of the superior maxillary bone, and by the two palate bones; its boundary being circumscribed by the alveolar ridge, or process, of the superior maxillary bone, and by the inferior maxillary, or bone of the lower jaw, including also the teeth.

In Mammalia, generally, from the Simiæ downward, we find two additional bones, separating between the superior maxillary bones, and containing the upper incisor teeth: these two bones are termed the intermaxillary, and their shape and size are subject to great variation. Though not found separate in the human subject, when adult, or even when very young, they nevertheless exist distinct at an early period of his existence; but become ankylosed to the maxillary, even before birth: in other Mammalia, however, they retain their distinctiveness. It is in these bones that the tusks (improperly so named) of the Elephant are imbedded. The first tooth on each side, in the true maxillary bones, is the canine,—at least, where such a tooth is afforded. The lower jaw in Man, consists of a single bone, and it is the same in the Simiæ and Pachydermata; but in most of the Mammalia the lower jaw permanently consists of two elongated portions, united by suture in front, where it presents a retreating angle more or less acute: the space of union between them is termed the symphysis of the lower jaw, and the lower incisor teeth are placed half on one side of it, and half on the other.

In one respect, this important bone, the lower jaw, which takes so large a part in determining the contour and expression of the face, exhibits a character in the human subject to be found in no other animal, viz., that projection at the anterior part, or angle, termed the chin, without which the human face would lose all its dignity, and approximate to the muzzle of the brute. A full and well-formed chin, is one of the points which, in their statues of heroes and gods, the ancients delineated with admirable felicity.

In Mammalia the lower jaw, of all the bones of the head and face, is alone independently moveable. There is a smooth space, usually more

or less concave, on the under surface, at the root of each zygomatic process of the temporal bone, to which its condyles, or articulating processes, are elaborately adapted: thus, the jaw moves upon the cranium. The extent of motion, depending on modifications of the articulating surface, which the lower jaw possesses, differs materially in different tribes of Mammalia; but ever harmonizes with the structure of the teeth; and, consequently, has reference to the nature of the food, and the general economy of the species. Hence, let the comparative anatomist examine only the characters presented by this articulation, and he will be able to sketch a broad outline of the habits and manners of the animal. In some, as, for example, the Ox and Sheep, a free lateral motion of the lower jaw being necessary, its condyle is adapted to, and works upon, a wide, and even somewhat convex surface: in others, the condyle is tightly fitted into a deep concavity, with an elevated rim before and behind, which prevents the slightest movement of the jaw from side to side, restricting its action to a mere scissor-like opening and shutting: such is the case in the ferocious Carnivora. In others, again, there is an intermediate state of freedom: but, on this part of the subject, there will be occasion to enlarge hereafter.

Within the recess formed, as described, by the bones of the jaws and of the palate, is seated the tongue, the chief organ of taste, abundantly supplied with gustatory nerves: it serves, besides, by its muscular action and sense of feeling, to direct the food between the teeth; and, after mastication, to propel it, by pressure against the palate, into the fauces, or back of the mouth, whence it passes down the œsophagus, by means of the action of the muscular fibres of that tube, into the stomach. The mouth receives a copious supply of saliva from the parotid and sublingual glands, and is thus kept sufficiently moist; a state requisite to the exercise of the sense of taste in full perfection, no less than to the muscular use of the tongue: we here say nothing of the necessity of this fluid being mixed with the food we swallow. It is in the mouth, then, that the first preparation of our food for assimilation takes place, and nature has wisely ordained, that, with this important duty, should be connected a sensation of pleasure derived from the taste of agreeable viands. The sense of taste is closely allied to that of smell; both receive impressions from the odorous particles of bodies: one from their volatile atoms mixed with the air, the other from the bodies themselves only, when in contact with the organ. The tongue, in Man, is covered with soft papillæ, invested with a thin cuticle, and appearing like the pile of velvet. In the Cat tribe the papillæ are horny, sharp, and retroverted: the tongue of the Ox is villous towards its anterior part; but the minute degrees of difference, in the character of the surface of the tongue, need not be here particularized.

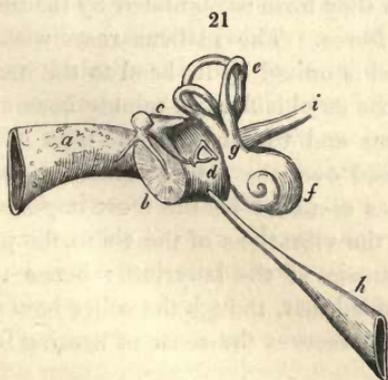
The sense of taste aids that of smell in the choice of food, and, among the lower mammals, coinciding with their natural instincts, it is one of the tests, according to which they receive or reject whatever is submitted to it; the disagreeable being hurtful,—the agreeable, except in rare cases, innocent and proper. Man has not these instincts, or, if he have, it is during the helplessness of infancy only; his like or dislike of certain viands is, to a great extent, the result of habit. The Greenlander relishes train oil and half-putrid fish, or the rank flesh of the Whale, from which we should turn with disgust.

So far, then, from the foregoing observations, may be understood the nature of those recesses of the face, in which are seated the organs of sight, smell, and taste. With regard to the organs of hearing, they are contained in certain cavities of the temporal bone, of a curious and intricate arrangement, which cannot be altogether passed over without some explanatory notice. In Man, it may be premised, the temporal bone consists of two portions; viz., the squamous and the petrous portion: the squamous portion is, in shape, somewhat like an oyster-shell, and conjoins with the parietal and a portion of the sphenoid, to form the lateral wall of the skull; the petrous portion, an irregular mass of bone, enters into the base of the skull, and is hollowed, to contain the organs of hearing: in addition to the petrous portion, may be noticed, the mastoid portion, or process, as it is termed, which is also filled with cells communicating with the internal ear. At an early period of existence these parts are all distinct, but they afterwards become consolidated. In many of the lower mammals, however, the temporal bone remains permanently divided into its primitive elements.

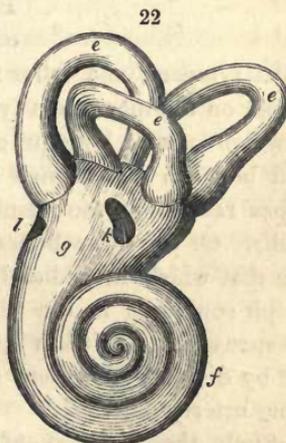
The ear consists of an external cartilaginous organ, or concha, the shape and form of which need not be now particularized, and of an internal apparatus. From the external ear, or concha, a funnel-shaped canal, termed the meatus auditorius, leads into the internal chambers; it curves gently inward, till its course is stopped by a membrane extended across it, and separating it from the cavity beyond: this membrane, from its resemblance to the parchment stretched over a drum, is called the membrana tympani; the cavity beyond being called the tympanum. The membrana tympani consists of two films of delicate cuticle, continued from the lining of the meatus auditorius on one side, and of the tympanum on the other, with minute radiating muscular fibres between them: by means of this fine muscular apparatus, its tension can be varied, according to the strength or character of the vibrations of the atmosphere; and, as these fibres are inserted into the extremity of the first of a curious series of little bones, their action, determined by the stimulus they receive from the atmospheric vibrations, adjusts these bones in an according ratio.

The tympanum is an irregular cavity filled with air, and has three re-

markable openings: one is termed the Eustachian tube, and it leads to the back of the posterior nares: its commencement is osseous, but it is continued by a cartilage. The use of this tube is twofold: in the first place, it serves, like the hole in the side of a drum, for the necessary purpose of establishing a communication between the tympanum and the atmosphere, without which the due vibration of the membrana tympani could not be produced; in the second place, it assists in the conveyance of atmospheric vibrations to the internal ear: hence persons hard of hearing, as it is expressed, or persons listening very attentively to a distant or slight noise, keep the mouth moderately open. When the Eustachian tube is stopped up, by the inflammation of its lining membrane, from cold or other causes, distinctness of hearing is materially affected. With the tympanum, on the side opposite the Eustachian tube, the cells of the mastoid process immediately communicate, and may be regarded as an appendix to that cavity. At the extremity of the tympanum are two other orifices, namely, the fenestra ovalis, and the fenestra rotunda (the oval and the round windows), between which the bone is rounded and prominent, forming what is termed the promontory. These orifices lead to a maze of cells and tubes, termed the labyrinth: this labyrinth is composed of the vestibule, the cochlea, and the semicircular canals. The vestibule opens posteriorly, by several holes, into the semicircular canals, and by one anteriorly into the cochlea. The semicircular canals are three in number—a superior, a horizontal, and a vertical canal. The cochlea, so called from its resemblance to a spiral shell, consists of a tube revolving spirally, to the extent of two turns and a half, round a central pillar, or modiolus. The fenestra ovalis, above referred to, leads from the tympanum to the vestibule, and the fenestra rotunda to the cochlea. Figs. 21 and 22 present



Internal ear:—*a*, mentus auditorius; *b*, tympanic membrane; *c*, the chain of small bones communicating between the tympanum and the fenestra ovalis; *d*, cavity of the tympanum; *e*, semicircular canals; *f*, cochlea; *g*, vestibule, composing the labyrinth; *h*, Eustachian tube; *i*, auditory nerve, entering at the back of the vestibule.



An enlarged view of the semicircular canals, vestibule, and cochlea, composing the labyrinth:—*e*, *e*, *e*, the three semicircular canals; *f*, the cochlea; *g*, the vestibule; *k*, the fenestra ovalis; *l*, the fenestra rotunda.

views of the internal ear, by which the foregoing description may be more clearly understood. The curious cavities of the labyrinth are all lined with a most delicate membrane, on which the minute filaments of the auditory nerve (portio mollis of the seventh pair) are ramified, and are also filled with a peculiar fluid, termed the water of Cotunnus, the aqua labyrinthi, or perilymph. Within the vestibule and the semicircular canals, but not extending into the cochlea, is a continuous sac of delicate membrane, floating in the perilymph, and assuming nearly the form of the parts through which it is extended: it is united to the vestibule by nervous filaments, which ramify upon it, and it contains a fluid, termed by Blainville, "*la vitrine auditive*," from its resemblance to the vitreous humour of the eye. The vestibular portion of this curious sac, or series of membranous inner tubes, is composed of two cavities communicating with each other (one termed utriculus, the other sacculus), each containing a small mass of white calcareous matter, resembling chalk, suspended in the vitreous fluid, by the intermedium of minute nervous filaments. The use of these bodies is unknown: they are, however, always present, and are larger and harder in aquatic than in terrestrial Mammalia; and it cannot be doubted but that they serve some important office.

It yet remains to describe the series of small bones alluded to, the first of which is connected with the membrana tympani. These bones serve as the vibratory conductor between that membrane and the more interior parts of the labyrinth (fig. 23): they are four in number, and are

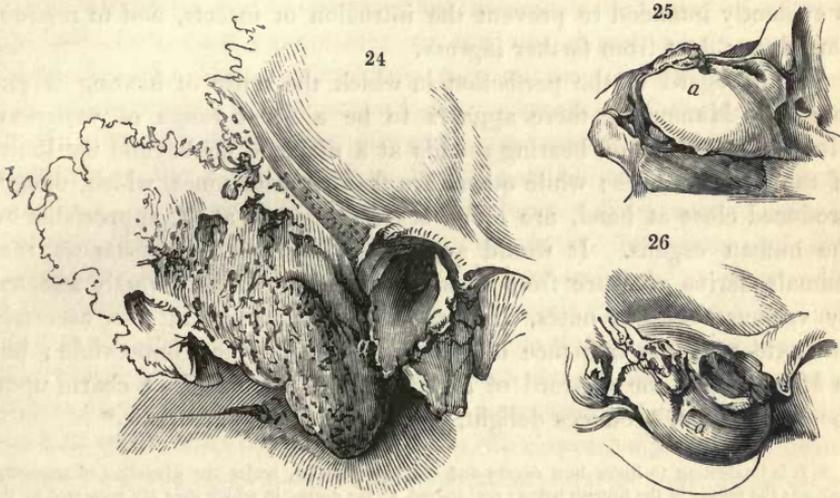


termed, from their shape, malleus, or hammer (A); incus, or anvil (B); os orbiculare, or spherical bone (C); and stapes, or stirrup (D). Each is susceptible of motion, and the tension of the chain they form is regulated by the mem-

brana tympani, and other muscular fibres. The malleus rests with its handle on the membrana tympani, and is united by its head to the incus; of which latter a long process joins the os orbiculare, a minute bone situated between this branch of the incus and the stapes; the base of the stapes rests upon the membrane spread over the orifice termed fenestra ovalis. Of all these bones the stapes seems to be the most important: it is that which immediately imparts the vibrations of the air to the perilymph contained in the winding channels of the labyrinth: hence it is indispensable, and it has been ascertained that, though the other bones be lost by disease, this, alone remaining, preserves the sense of hearing from being utterly destroyed.

Such, then, is a sketch of the auditory apparatus in Man. In the lower Mammalia it is essentially the same; but the mastoid process very often ceases to fulfil the same office as in Man, and is merely a simple

process, even where present, but is often so degenerate as not to be distinguished; while, to compensate for its loss, a large tympanic bulla, or cavity, convex externally, thin and hollow, is superadded: this bulla being, in fact, an enlargement of the tympanum, for the reception of a greater volume of air to be acted upon by vibrations of the atmosphere, and thus to fulfil more thoroughly the office of a drum. The tympanic bulla is beautifully developed in the Rat, and numerous rodents,—in the Cat, Dog, and other Carnivora. Fig. 24 represents the mastoid process in Man, and figs. 25 and 26 the tympanic bulla in the Cat.



24.—*a*, Mastoid process of the human skull. 25.—*a*, Basal view of the tympanic bulla of the Cat. 26.—*a*, A nearly lateral view of the same.

The form of the concha, or external ear, differs remarkably in different Mammalia, and in all (where present) it is far more moveable than in Man, or the Simiæ, which, in the form of the ear, resemble him the nearest. The use of this part, in collecting and condensing the undulations of the atmosphere, is evident; hence we observe, that the Ox, or Horse, while listening, turns the ears in different directions, the better to receive the atmospheric vibrations flowing from various quarters. In the more timid and defenceless of the Mammalia, the external ear is often large, and the sense of hearing extremely acute: we find this to be the case with the Hare, the Chinchilla, and many other rodents, and with the Deer and Antelope. In aquatic Mammalia, as the Whale, Dolphin, &c., there are no external ears, and the passage leading to the tympanum is a cartilaginous tube, narrow and winding, with a minute external aperture, capable of being firmly closed—a structure evidently intended as a preventive to the entrance of water. In the Seal this passage makes a cir-

cular turn; and in the *Ornithorhynchus*, in which the osseous orifice of the internal ear opens with a basal, or downward aspect, and is, moreover, very minute, the cartilaginous canal winds round the temporal bone, and its earless external orifice is capable of being contracted or dilated at pleasure. The *Hippopotamus* possesses the power of closing the external orifice of the *meatus auditorius* by means of a muscular apparatus, in order to exclude the entrance of water while below its surface; and the *Water-shrew*, the *Mole*, and other diving and burrowing animals, have the same power. In *Man*, and other *Mammalia*, the wax, as it is termed, secreted by small glands on the lining membrane of the *meatus auditorius*, is evidently intended to prevent the intrusion of insects, and to restrain particles of dust from farther ingress.

With regard to the perfection in which the sense of hearing is enjoyed by *Mammalia*, there appears to be a great range of variation. Many are capable of hearing sounds at a distance far beyond the limits of the human senses; while others are familiar with tones, which, though produced close at hand, are either scarcely, or not at all, appreciable by the human organs. It would appear, from many circumstances, that animals derive pleasure from musical sounds, and are diversly affected by various tones, or notes, produced within their hearing: to ascertain the extent of the influence of such a cause, is almost impossible; but in *Man* alone "the concord of sweet sounds," acting like a charm upon the imagination, produces delight, and ever-changing emotions.*

* It is interesting to know how severe and constant practice, under the discipline of necessity, sharpens the senses in the human being: not, indeed, to the degree in which they are possessed by the brute, which depends solely upon them for the acquisition of food and the avoiding of danger; but to an extent surprising to the natives of civilized countries, where such a mode of exercising them is never needed. We all know how practice improves the ear in the discrimination of musical notes, and from this may judge what it will do for the other senses.

The *Calmucks*, says *Pallas*, who, in his frequent intercourse with the *Nomadic* tribes of *Asia*, had most excellent opportunities of observing the powers of their external senses, "have a fine nose, a good ear, and an extremely acute eye. On their journeys and military expeditions they often smell out a fire, or a camp, and thus procure quarters for the night, or obtain booty. Many of them can tell, by smelling at the hole of a fox, or other animal, whether the creature be there or not. By lying flat, and putting their ear to the ground, they can catch, at a great distance, the noise of horses, of a flock, or of a single strayed animal. But nothing is so surprising as the perfection of their eyes, and the extraordinary distance at which they often perceive, from inconsiderable heights, small objects, such as the rising dust caused by cattle or horsemen; more especially as the undulation of the boundless steppes, or plains, and the vapours which rise from and float upon them, in warm weather, render things very obscure. In the expedition which the *Torgot* *Vice-Chan* *Ubaschi* led against the *Kubanians*, the *Calmuck* force would certainly have missed the enemy, if a common *Calmuck* had not perceived, at the estimated distance of thirty *versts*, the smoke and dust of the hostile army, and pointed it out to other equally experienced eyes; when the commander, *Colonel Kischmskoi*, could discern nothing with a good glass. They pursue lost or stolen cattle, by the track, for miles over deserts. *Kirgises*, or even *Russians*, in the wild parts of the empire, are equally able to follow and discriminate tracks by the eye. This, indeed, is not difficult on soft ground, or over snow; but it requires great practice and skill to choose the right, out of several intermingled traces, to follow it over loose sand or snow, not to lose it in marshes or deep grass, but rather to judge, from the direction of the grass, or from the depth of the print, in snow or sand, how long it has been made."—*PALLAS, Samm. Hist. Nach.* Th. 1. pp. 100, 101.

The *Hottentots*, according to *Barrow*, "by the quickness of their eye, will discover *Deer*, and other sorts of game, when very far distant; and they are equally expert in watching a *Bee* to its nest. They

We find, then, that, of the recesses for the organs of the senses, those of hearing are placed exclusively in the cranium; those of sight, between the cranium and the face; while those of smell and taste belong to the face exclusively. And here it may not be out of place to inquire into the relative proportion which obtains between the face and the cranium; and the results attendant upon the preponderance of either portion.

The face being entirely devoted to the organs of smell and taste, it must be very evident, that the more these organs are developed the more volume will the face acquire, and the greater will be its proportion to the cranium: hence, in all animals conspicuous for smell or taste, or in which the jaws are instruments for the seizing or taking up of food, the facial part greatly preponderates, and the animal nature outweighs the intellectual. Man, in the development of the cerebral hemispheres, and, consequently, in the proportionate expansion of the cranium to the face, exceeds every other mammal: not only so, but, which is more important, in the amplitude of its frontal portion, corresponding to the magnitude of the anterior lobes of the brain. The nearer animals approach Man, in the development of the brain, the nearer do they approximate to the standard of intellectual excellence; and, consequently, of elevation in the scale of being: but, as animals differ much from each other in the proportions which obtain between the cranium and the face, and, indeed, as different races of the human family also present certain degrees of variation, physiologists have attempted several methods, by which to arrive at an exact knowledge of the respective proportion of the two parts, justly regarding it as a point of interest and importance. Among these methods, the most simple, but one which, as regards the human race, is by no means satisfactory, and, as it respects the lower Mammalia, not always applicable, is the employment of the facial angle,

no sooner hear the humming of the insect, than they squat themselves on the ground, and, having caught it with the eye, pursue it to an incredible distance."—(BARROW, *Travels in Southern Africa*, vol. i. p. 160.) The following anecdote is related, by the same writer, of a Hottentot, who, being unwell, was left behind, on a journey: "He had fallen asleep," says our author, "about the middle of the day, and had not awakened till night. Though very dark, and unacquainted with a single step of our route, he had found us by following the track of the wagon. At this sort of business a Hottentot is exceedingly clever. There is not an animal among the numbers that range the wilds of Africa, if he be at all acquainted with it, the print of whose foot he cannot distinguish. The print of any of his companions' feet, he would single out among a thousand."—*Ibid.* p. 370.

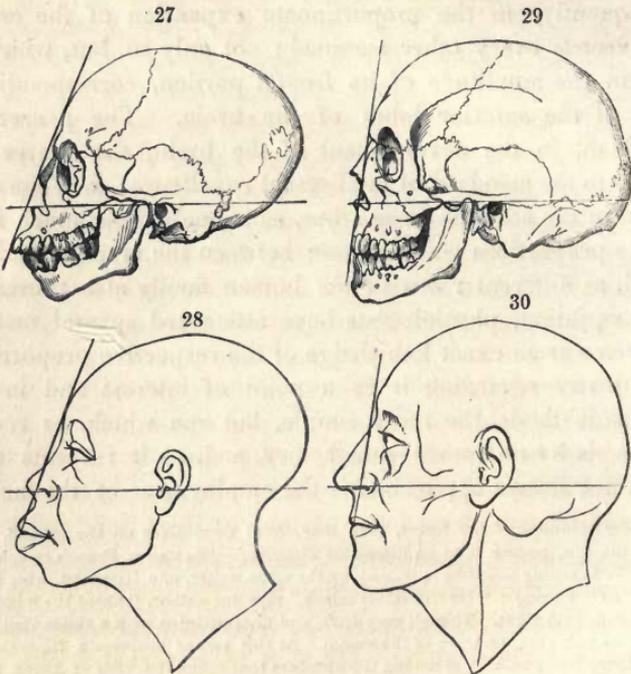
Turnbull says, speaking of the New Hollanders, "the quickness of their eye and ear is equally singular; they can hear, and distinguish objects which would totally escape an European. This circumstance renders them very acceptable guides to our sportsmen in the woods, as they never fail to point out the game before any European can discover it."—TURNBULL, *Voyage round the World*, 2nd ed. p. 92.

In reference to a native of New Zealand, named Moyhanger, who sailed with him to England, Savage states, "It was worthy of remark how much his sight and hearing were superior to [those of] other persons on board the ship: the sound of a distant gun was distinctly heard, or a strange sail readily discernible, by Moyhanger, when no other man on board could hear or perceive them."—SAVAGE, *Some Account of New Zealand*, p. 101.

Cruise, again, speaking of some New Zealanders, who were with him, at sea, in the Dromedary, says, "So acute was their sight, that though there were very good glasses on board, they were almost always the first to discover a new object."—CRUISE, *Journal of a Ten Months' Residence in N. Zealand*. London, 1823, p. 18.

originally proposed by Camper. The mode of ascertaining this angle is, by drawing a line from the most prominent part of the forehead to the edge of the upper incisors, and then by marking a basilar line from the external aperture of the ears to the lower edge of the aperture of the nostrils, so as to bisect the previous line: the angle, thus formed, is termed the facial angle, which Camper states to be fifty-eight degrees in the young Orang, seventy in the young Negro, and eighty degrees in the European; the acuteness of the facial angle being supposed to be in proportion to the inferiority of the subject, in the scale of mental development, and *vice versa*.

The following figures of the skull and head of a young Negro (figs. 27 and 28), and of an ordinary European (figs. 29 and 30), are from Camper, and illustrate the application of the facial angle.

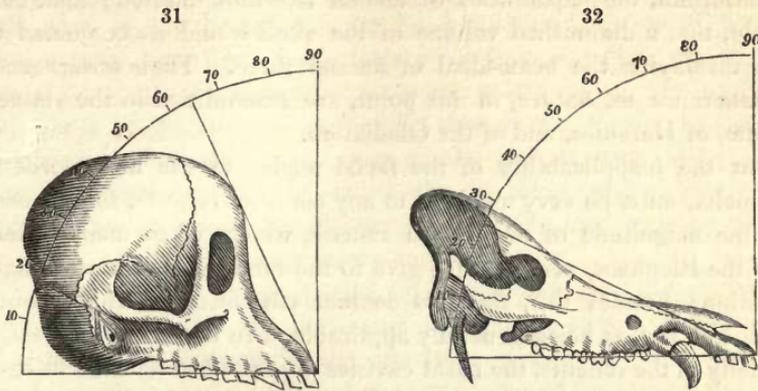


27, 28.—The skull and facial outline of a young Negro.

29, 30.—The skull and facial outline of an ordinary European.

As, however, from the varying position of the auditory foramen, and also of the jaws, with respect to the cranium, the angle thus formed fails as a test, Cuvier proposed, by way of amendment, that a basilar line be drawn parallel to the floor of the nostrils; the angle formed with which, by a facial line drawn from the anterior convexity of the forehead to the greatest prominence of the alveoli, whether the point of contact be external or not, he states to be sixty-seven degrees in the young Orang, seventy degrees in the adult Negro, eighty-five degrees in the adult European, and ninety degrees in the European child.

The subjoined figures (31 and 32) shew Cuvier's mode of ascertaining the facial angle. They represent the skull of a young Orang, and the skull of the Hog.

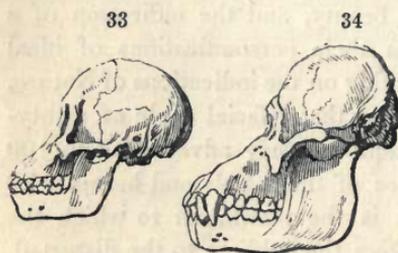


A well-developed skull and forehead, and an expanded intellect, have been regarded as co-existent in every age: a forehead "villanous low" is Shakspeare's expression, with reference to the Ape (see *Tempest*); and in the *Two Gentlemen of Verona*, Julia, drawing a comparison betwixt herself and Silvia, says "Ay, but her forehead's low, and mine's as high." Again, if we turn to the statues of antiquity, we find that the unrivalled artists of Greece regarded an advanced forehead as one of the characteristics of dignity and beauty, and the indication of a refined and exalted nature. Hence, in their personifications of ideal sublimity, with the boldness of genius, acting on the indications of Nature, they overstepped her boundary, and, feeling that a facial angle of eighty-five would fail in embodying their conceptions, they advanced it to 100 degrees,—and thus impressed the statues of their gods and heroes with an air of superhuman grandeur. This is the maximum to which the facial line can be raised without falling from the sublime to the distorted. "If the facial line," says Camper, "be more advanced, the head appears monstrous and hydrocephalic. But, it is remarkable that the most ancient Greek artists have adopted precisely this maximum, while the Romans have been contented with an angle of ninety-five degrees, which is not so agreeable. The two extremes, then, of the human facial angle, are seventy degrees and 100 degrees: they comprise all the gradations, from the Negro to the sublime beauty of the ancient Greek. If we descend below seventy degrees we have an Orang; if still lower, a Dog; then a Bird," &c. The ancient standard of beauty, however, "does not exist in nature, but is purely imaginary, and what Winckelman calls the beau-ideal."

It was, however, only in their personifications of mental pre-eminence

that the ancients exhibited an overshadowing forehead; for their tact and discrimination had led them to perceive that, in proportion to the extraordinary development of the muscular powers, are the powers of the sensorium, the capabilities of mental exertion, limited; and, consequently, that a diminished volume of the skull would be conjoined with limbs displaying the beau-ideal of animal force. Their observance of, and adherence to, nature, in this point, are exemplified in the statues of *Athletæ*, of *Hercules*, and of the *Gladiators*.

But the inapplicability of the facial angle, to the lower orders of *Mammalia*, must be very manifest to any one who reflects, for a moment, upon the magnitude of the frontal sinuses, which, in so many instances (as in the *Elephant*, see fig. 20), give to the forehead an air of deceptive projection: besides this, there is another circumstance which militates against this test as being generally applicable. In numerous animals, and especially in the rodents, the nasal cavities are raised so much, and occupy so large a space, that the cranium falls, as it were, behind them, without the slightest anterior elevation; so that it would be impossible to determine through what points the facial line should pass. Nor is this all; for even where it is applicable, it is not a sure test, inasmuch as it is subject to great alteration during the progress of the animal from infancy to maturity. In the Ape tribe, and especially in the *Orang-outan* (*Simia Satyrus*, Linn.), this circumstance is peculiarly striking. The young



Skull of young Orang.

Skull of adult Orang.

Orang-outan is remarkable for a well-developed forehead, to which the face bears such a just proportion, and is so situated, as to invest the whole with a character and expression closely approaching that of a little *Negro*; but, as maturity advances, the bones of the face develop amazingly; the jaws shoot forward, acquire prodigious size, and are furnished with large teeth; the forehead flattens and

falls back; the cranium, as the face enlarges, gradually assuming a more backward position, and the contour of the whole becoming deteriorated and brutalized. Of the extent, to which this change in the *Orang-outan* is carried, the annexed sketches (figs. 33 and 34) will convey a better idea than mere verbal description.

After all, as a test, by which to determine the relative proportion which the face bears to the cranium, the facial angle is altogether insufficient: a much more correct and satisfactory mode has, therefore, been proposed, which consists in making a longitudinal vertical section of the whole head, and measuring the respective areas which the skull and face occupy, the lower jaw being excluded. (See fig. 16, for a

section of the human skull; and figs. 19 and 20, for sections of the skull of the Ox and Elephant.) In the adult European, the area of a section of a skull is almost four times that of the face; in the Negro, according to Cuvier, the comparative area of the face exceeds, by about a fifth, that of the European. In the Ape tribe, the area of the skull averages little more than double that of the face, and often not so much. In most Carnivora the respective areas are nearly equal. In the Rodentia the area of the face nearly doubles that of the skull. In the ruminants and Pachydermata the area of the face is from three to four times as extensive as that of the skull. In the Cetacea there is great variation; and the elongated slender form of the face makes it difficult to ascertain the relative proportions very correctly.

Another test has been proposed for determining the intellectual grade of an animal; namely, by measuring the relative extent of the anterior and posterior development of the cranium, on each side of a line drawn over the skull, from the orifice of one ear to that of the other; the degree of intellect being, as it is assumed, in proportion to the amplitude of the anterior section. This test, however, is utterly fallacious; for the position of the auditory foramen varies with regard to the cranium, irrespective of the volume of the latter, and of the magnitude of the anterior lobes of the brain. The compass of the zygomatic arch, for example, in the Dog tribe, throws the orifice of the ear close to the edge of the vertical occipital bone; and the same obtains in the Kangaroo: therefore the Dog and Kangaroo, having the greatest proportionate volume of cranium, anterior to a line drawn from ear to ear, ought to be more intelligent than the Orang,—or even Man; and certainly equal in intelligence to each other; whereas the Kangaroo is among the most stupid of Mammalia, while the Dog is remarkable for sagacity. This part of our subject may be dismissed by reiterating the observation, that the only test of intellectual superiority is to be found in the development and perfection of the brain itself—that of Man being the standard; and that all attempts at obtaining a satisfactory result, from the application of lines and measures, have proved futile and abortive.

The position of the skull, the situation of the foramen magnum (or orifice, through which the medulla oblongata emerges into the vertebral canal), and of the articulating condyles on each side of this foramen, by which it is connected with the spinal column, next demand attention.

It need not be observed, that, with the position of the head, and, consequently, the situation of the articulating condyles of the occipital bone, are connected certain modifications of the general frame, adapting it for the upright, oblique, or horizontal attitude. Now, the situation of these condyles varies, from being basal, or nearly so, in Man, to a completely posterior situation in a line parallel to that of the projecting muzzle in

the Whale: in the one case the skull rests upon the vertebral column, in the other it projects in a straight line from it; and, between these two extremes, there are several gradations, the shape and characters of the occipital bone varying in proportion.

In Man the occipital bone is convex exteriorly, and, sweeping under the cranial cavity, forms the greatest portion of its base; but in the lower Mammalia, as the Cat, Dog, Horse, &c., it rather forms its posterior wall, descending abruptly, and at an acute angle, from its union with the parietal bones, its cuneiform process (anterior to the foramen magnum) alone, in union with the sphenoid, forming the narrow floor of the cranial cavity, which is not carried back, as in Man and the Simiæ, beyond the foramen magnum. On each side of this foramen are the condyles,—but not precisely on each side of it; they are more or less anterior to it, obliquely pointing towards each other, so as nearly to touch in front. In Man, who, of all animals, can be said to possess a face (in the restricted sense of the word) in contradistinction to what we term a muzzle, the condyles have a basal situation, and form points, upon which the skull is balanced, having a situation nearly central, between the back of the occiput, and the anterior part of the superior maxillary bone: they constitute the antero-lateral margin of the foramen magnum; and are elongated, and rise in the middle like a bridge, their posterior end being about the centre of the foramen: but the centre of the foramen magnum is not the exact centre of gravity. In various skulls of the human subject (European), which have been purposely measured, drawing a line, from the alveolar processes of the two middle incisor teeth, to the posterior part of the occiput, this point has been found to vary from half an inch to an inch, and rather more, nearer the occiput than the facial point of measurement.* As, then, the

* Daubenton says, the human skull is so well placed, as regards equilibrium, that were the vertical line of the body and neck prolonged, upward, it would pass through the summit of the cranium (*Mémoires, &c.*, p. 568): and, in another part of his article, he speaks of the human head as being placed in equilibrio, as on a pivot (p. 570). Cuvier says, the position of the two condyles, upon which the head rests, is such, that they nearly bisect a line drawn from the most projecting part of the occiput to the incisor teeth: the consequence of this disposition, he adds, is, that, in the vertical attitude, the head is in equilibrio upon the spine (*Leçons, &c.* i. 225): and, again, the head, in an upright position, is in a state of equilibrio on the trunk, its articulation being strictly central in reference to its own bulk. Virey observes, in the white man, and especially in the European, the occipital aperture is directly under the cranium, so that the head is posited in equilibrio on the atlas (*Dict. des Sciences Méd.* vol. xxi. p. 194). Cloquet says, this opening in man looks downward, and is found nearly in the centre of the head (?) which is in equilibrio on the vertebral column (*Anat. de l'Homme*, vol. i. p. 117): and Abernethy states, “that the condyles are placed so exactly parallel to the centre of gravity, that when we sit upright, and go to sleep in that posture, the weight of the head has a tendency to preponderate equally, in every direction, as we see in those who are dozing in a carriage: nay, their heads sometimes,” he adds, “revolve in a circle, like the head of Harlequin on the stage” (*Phys. Lect.* p. 115). Mr. Lawrence, however, insists, that the head is not placed in a state of perfect equilibrium, in the vertical altitude on the spine; the parts in front of the column not exactly counterbalancing those behind it. “The occipital condyles,” he says, “are manifestly nearer to the occipital tuberosity than to the most prominent part of the jaws, and thus the greater share of the weight is in front of the joint. Place the occipital condyles on any point of support, and the head will incline forward, unless it be held in equilibrio by a force applied behind. The preponderance is greater when the lower jaw is added; and it is still further increased by the accession of the tongue,

ring of the first vertebra fits the margin of the foramen, to the back part of which a process of the second, to be described hereafter, is attached, the rest following, one below another, there will be a slight tendency of the skull to fall forward (as it does when we sleep sitting upright, the muscles being then relaxed), requiring a proportionate degree of muscular effort to counteract it. In the Ape tribe the foramen magnum, and, consequently, the condyles, are placed far more backward than in the human subject. The skull of an adult Monkey, purposely examined, measuring from the fore-teeth to the occiput four inches and a half, has the condyles only one inch from the posterior margin of the latter. In younger examples, owing to the imperfect development of the upper jaw, the distance from the fore-teeth to the condyles is comparatively less: in all, however, it is very considerable, so as to destroy even an approach towards an equipoise of the skull on the vertebral column. In the adult Orang, the measurement from the alveolar process of the front teeth to the posterior edge of the occipital condyle is $6\frac{3}{4}$ inches, and from the posterior edge of the condyle to a vertical line, parallel with the extent of the occiput, less than two inches. In the adult (female) Chimpanzee, the same admeasurements are respectively $5\frac{3}{4}$ and $1\frac{7}{8}$, or nearly two inches. When we turn to the skulls of animals of other orders, we find that the condyles have retired to the extreme posterior limits of the cranium, and that their aspect is partly basal, partly posterior, the head being suspended from the end of the neck, whether this be carried horizontal, or, as in the Camel, vertical; the weight of the whole head and face being anterior to the first vertebra. Hence, as in the Ox, where the head is ponderous, and the neck, in order to allow of grazing, necessarily long, the spinous processes of the cervical and dorsal vertebræ are of vast size and strength, and not only serve for the attachment of voluminous muscles of enormous power, but also for the insertion of a strong elastic ligament (ligamentum nuchæ), which proceeds along them from the back of the skull, the strain of which it materially serves to support. In the neck of the Bull we see a fine example of vast power, nor less so in the neck of the Wapiti deer, which wields his antlers, weighing from forty to sixty pounds, with

muscles, and other soft parts. This inclination of the head forward is counteracted, in the living body, by the extensor muscles; and their constant exertion is necessary for maintaining the head in equilibrio on the vertebral column. Whenever their action is suspended, as in the case of a person falling asleep, in the erect attitude, with the head unsupported, that part, abandoned to the force of gravity, immediately nods forward" (*Lect.* pp. 175-6-7). Richerand says, the articulation of the head to the vertebral column being nearer to the occiput than to the cranium, and not corresponding to its centre of gravity, its own weight is sufficient to make it fall on the forepart of the chest (*Elémens de Phys.* p. 407). And again: though the articulation of the head to the cervical column, does not correspond either to its centre of magnitude, or to its centre of gravity, and though it is nearer to the occiput than to the chin, its distance from the latter is much smaller than in the Monkey, and other animals (*Ibid.* p. 411): Magendie also fortifies the assertion of Mr. Lawrence, by stating, that the point of support being nearer to the occiput than to the anterior part of the face, the head tends, by its weight, to fall forward, but is maintained in equilibrio by the action of those muscles which are attached to its posterior part (*Elémens de Phys.* i. 362).

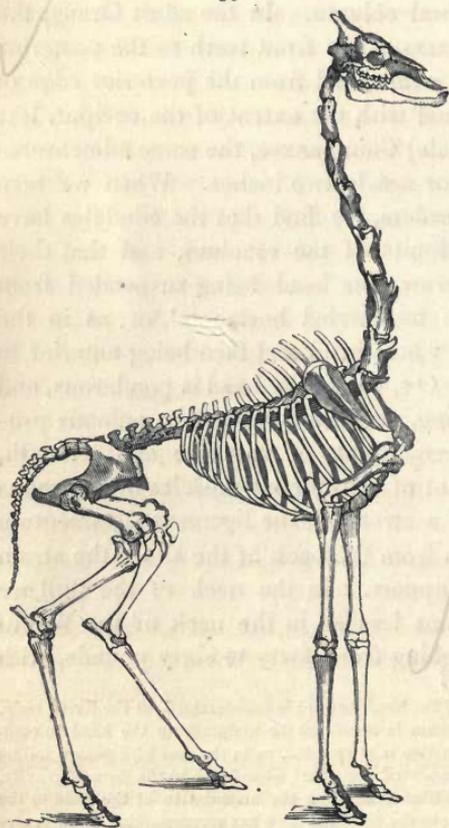
35

Cervical vertebræ
of the Whale.

prodigious force and rapidity. In the Cetacea, or Whale tribe, however, distinguished by the enormous size and weight of their head, which is carried in a continuous line from the body, (the contour of this approximating to that of a fish), nature pursues a different method: here the independent mobility of the head, inasmuch as it is not needed, is circumscribed to the utmost; and it may be said that there is no neck, the vertebræ (see fig. 35) composing it being consolidated together, and the whole reduced into a compass consistent, indeed, with strength, but not with flexibility: yet is their number usually seven, as in other Mammalia.

It is curious to compare such a structure with that exhibited by the neck

36



Skeleton of the Giraffe.

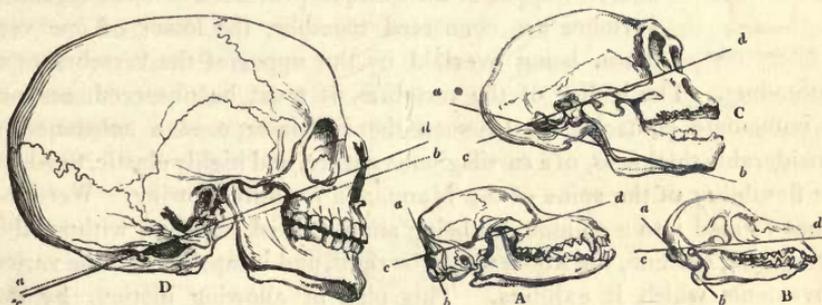
of the Giraffe, elongated and swan-like, and surmounted by its small and graceful head (see fig. 36); but in each case the necessities of the animal are admirably provided for, and the habits and economy of each are in accordance with its organization. And so it is with Man. His skull, resting on the vertebral column, requires no voluminous muscles to support its weight: he has neither to graze the meadow, nor browse upon the foliage of the trees, nor dart through the waves; neither does he seize his prey like the Lion. The muscles of the neck, therefore, are comparatively feeble and small, and are adapted solely for giving to the head its true degree of motion in various directions: they, however, harmonize with the general contour of the body, and in the athletic are marked and developed. As, to Man alone is given the "os sublime," so alone in him has the neck that peculiar form, or "tour-

ture," which, while it adds so much to the air of dominion impressed upon the human figure, is accompanied by a variety of minuter differences, seized upon most happily by the ancients, as characteristic of the demigod, the philosopher, and the gladiator. To feel and understand this, the

reader has only to compare the statues of female beauty with those of Hercules, and these, again, with an Apollo or Antinous.

As we recede from the human subject, whose skull rests nearly poised on the vertebral column, and in whom the plane of the foramen magnum is nearly horizontal, or, rather, directed somewhat obliquely upward towards the face, we find the plane of the foramen magnum to alter materially in its direction, becoming more and more vertical, and directed obliquely upward and backward. In many of the Ape tribe, it is nearly horizontal, or, if oblique, its obliquity is in a contrary direction to that of the plane in the human skull: in the Dog, Cat, &c., its obliquity is still greater; till, at length, in some animals, and among them the Cetacea, it becomes completely vertical. The diversities observable in the plane of this foramen, the degree of which influences, as will be perceived, the position of the head, with regard to the spine, are aptly illustrated by Daubenton's occipital angle. This angle is formed by the intersection of a line, *a, b*, drawn, in the direction of the foramen, with another, *c, d*, drawn from its posterior edge to the lower margin of the orbit. See the annexed sketches (fig. 37).

37



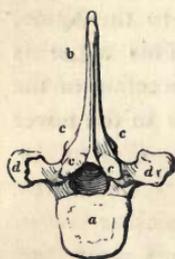
Illustrations of the difference of degree in the occipital angle.

The angle thus given amounts, in the Dog, A, to sixty-two degrees; in the Lemur, B, to forty-seven degrees; in the Orang, C, to about thirty-seven degrees; but in Man, D, to no more than three.—(See Daubenton, in *Mem. Acad. Sc. Paris.*)

A consideration of the skull leads to that of the vertebral column; a pile of bones, articulated together, of no less interest than importance, constructed, so as to give grace and flexibility to the body, and yet preserve from injury the medulla spinalis, enclosed in a continuous canal: its design is both unique and beautiful. The mode of union subsisting between its separate bones is so contrived, that, while the column, as a whole, possesses considerable freedom of motion, the individual mobility of each is very limited: but, to understand the mechanism of the spine

clearly, it will be best to examine, singly, one of the bones of which it consists. Each vertebra, then, has a main portion, termed its body, usually of a compressed circular, or oval form, having an anterior and posterior flattened, or slightly concave, surface, by which it is united to the body of the one preceding it, and also to the body of the next in rotation. Sometimes, however, the body is elongated (as in the cervical vertebræ of the Giraffe), and, instead of having a flat anterior and posterior articulating surface, has a convex articulating surface anteriorly, and a concave one posteriorly, in order to effect a ball and socket mode of articulation with the one preceding and the one succeeding it. To the body *a* (fig. 38), certain processes, or projections, of considerable magnitude, are appended, which bound, posteriorly, a large

38



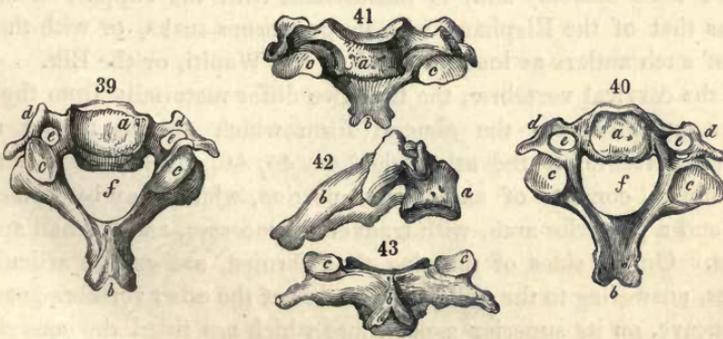
One of the vertebræ.

aperture, forming, when the vertebral column is not taken to pieces, a canal for the reception of the spinal chord. Of these processes, one, *b*, is termed the spinous; four are termed the oblique, *c, c, c, c*; and two the transverse, *d, d*: *a*, represents one of the articulating surfaces of the body of the vertebra. When in their proper situation, the flattened bodies being in apposition, the two lower and two upper of the oblique processes of each adjoining vertebra are connected together, the lower of one vertebra, being overlaid by the upper of the vertebra next succeeding. The bodies of the vertebræ, it must be observed, are not in immediate contact; for between them is interposed a substance of considerable thickness, of a cartilaginous nature, and highly elastic, to which the flexibility of the spine of the Mammalia is entirely owing. Were the bones formed into a column, by being simply fitted together, without this intervening cushion, the whole would be rigid, and incapable of those varied movements which it exhibits. This plan of allowing motion, by the interposition of thick elastic cushions, is, in the vertebral column, attended with one singular and most important advantage; viz., that while the whole column may be bent forward, backward, or laterally, into arches of various degrees of flexion, each separate bone has, in itself, but a very limited sphere of mobility, whence it is impossible for the relative position of any two to be so abruptly and decidedly altered as to produce an acute angle in the column—a mode of flexure, which could not take place without injury to the medulla spinalis enclosed in the canal, which has been already spoken of.

The true vertebral column is divided into several portions: the cervical, or that of the neck; the dorsal, or that of the back; the lumbar, or that of the loins; and the sacral, which is consolidated, and joins the pelvis: by these appellations are designated the separate vertebræ of each of these divisions.

Besides the cervical, dorsal, lumbar, and sacral vertebræ, there are those supplemental rudimentary vertebræ, termed coccygal or caudal, which constitute the tail: these usually have no distinct body and processes, nor any aperture for the transmission of the spinal chord; but are simply elongated bones, placed end to end.

In general, though not always, the cervical vertebræ are shorter and smaller than the dorsal or the lumbar; but their breadth is considerable, owing to the amplitude of the transverse processes, which are bifurcated, and which (if not in all, at least in the greater number of the vertebræ,) are perforated at their base, for the transmission of the cervical vein and artery. In Man, and many other animals, as the Kangaroos, various Pachydermata and Rodentia, the foramen, thus formed, exists in all the seven cervical vertebræ: in others, on the contrary, as the Elephant, the Rhinoceros, the Hog, the Horse, most ruminants, and the Quadrumana, it does not exist in the seventh vertebra. In the Tamanoir, according to Meckel, it is absent in the second, third, fourth, and seventh vertebræ, while it is distinct in the others. In the Giraffe, the perforations for the arteries are large; they are present in the seventh, as well as in the rest of the cervical vertebræ; but they are situated above the transverse processes in the side of the bodies of the vertebræ: and Professor Owen observes, that, although this position of the arterial foramina is somewhat peculiar, yet that, in this respect, the Giraffe comes nearer to the horned ruminants than to the long-necked Camelidæ. The following figures (39, 40, 41, 42, 43), represent one of the cervical vertebræ of Man, in different aspects.



Figs. 39 to 43. A cervical vertebra in different aspects.

Fig. 39, Superior view. 40, Inferior. 41, Anterior. 42, Lateral. 43, Posterior.—*a*, the body of the vertebra; *b*, the spinous process, bifurcate at its extremity; *c*, *c*, the oblique processes; *d*, *d*, the forked, or branched, transverse processes; *e*, *e*, the cervical foramina; *f*, the spinal canal. (The same letters refer to the same part in all the above figures.)

In all Mammalia, from Man downward, the number of cervical vertebræ is seven,—this rule, however, is not without an exception. Some

Cetacea are said to have only six, and the three-toed Sloth, or Ai,* has nine. Mr. Bell, indeed (see his valuable paper in the *Transactions of the Zoological Society*, part i., 1834), regards the eighth and ninth vertebræ in this animal as assignable rather to the dorsal than the cervical division of the vertebral column, in consequence of their having a small bony appendage, considered to be a rudimentary rib, attached to an articular surface on each transverse process. The appendages of the eighth vertebra are very minute, being only four-tenths of an inch long; in the ninth they are six lines in length, and nearly two in breadth. Meckel, who was acquainted with the existence of these appendages in the ninth only, hints at the possibility of this vertebra being dorsal. It is, nevertheless, to be remarked, that the cervical foramen exists in both these supernumerary vertebræ.

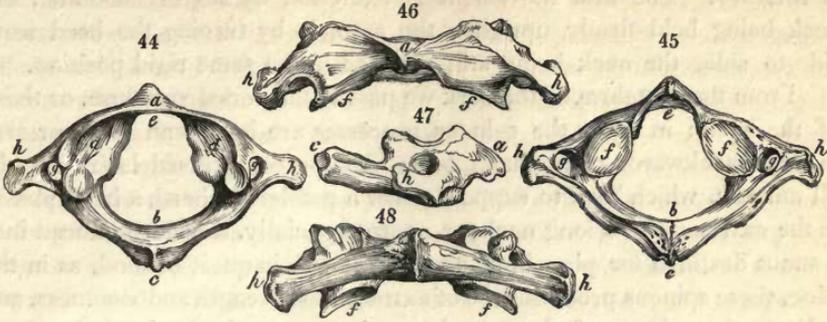
That the number of the vertebræ of the neck, in all the mammiferous animals, with the above exceptions, should not exceed seven, is very remarkable, when we compare the long neck of the Giraffe with the short neck of the Elephant, or call to mind the contour of the Whale-tribe, where this part forms no distinguishable appearance, but is lost in the unwieldy fish-like figure of the body: but this difference in the length of the neck of Mammalia depends upon the form of the vertebræ, and not upon their number. In the cetaceous animals they are (as before stated) not only very thin, but ankylosed, or ossified together, so as to admit neither of flexion nor of rotatory motion; in the Giraffe, on the contrary, whose pliant neck towers among the foliage of the trees, they are elongated to an extraordinary degree.† This elongation, we need scarcely add, is inconsistent with the support of such a skull as that of the Elephant, with its ponderous tusks, or with the presence of such antlers as load the head of the Wapiti, or the Elk.

Of the cervical vertebræ, the first two differ materially from the rest, and are exceptions to the general form which obtains among them. The first vertebra, or the atlas (figs. 44, 45, 46, 47, 48), as it is fancifully named, consists of an anterior portion, which may be termed its body, and a posterior arch, with transverse processes, and a small spinous process. On the sides of the ring thus formed, are certain articulating surfaces, answering to the oblique processes of the other vertebræ, namely, two concave, on its superior aspect, into which are fitted the condyles of the occipital bone, and two on its inferior aspect, for the reception of the

* Meckel found eight cervical vertebræ in a skeleton of the *Bradypus Torquatus*, in the Paris Museum.—See *Traité Général d'Anatomie Comparée*, p. 397 and 430, where reference is also made to the Ai.

† With respect to the cervical vertebræ of the Giraffe, Professor Owen observes, "that they are not only remarkable for their great length, but also, as has been recently shewn by Dr. Blainville, for the ball and socket form of the articulations of their bodies; the convexity being on the anterior extremity, and the concavity posteriorly, agreeing, in this particular, with the vertebræ of the Camel."—*Proc Zool. Soc.*, 1838, p. 21.

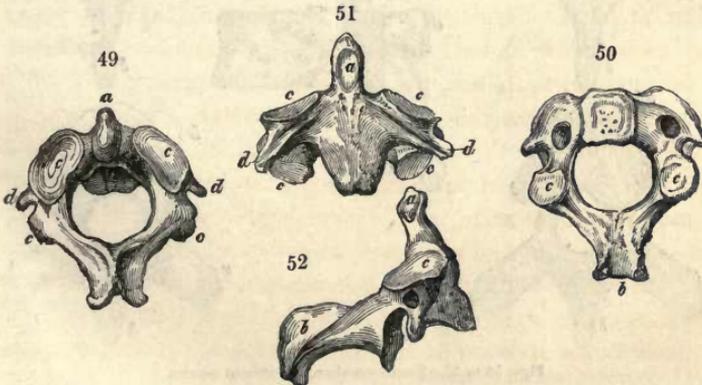
superior oblique processes of the vertebra next succeeding. On the inner aspect of the body is a smooth surface, to which is fitted a process



Figs. 44 to 48.—Atlas, in different aspects.

Fig. 44, Superior. 45, Inferior. 46, Anterior. 47, Lateral. 48, Posterior.—*a*, the body of the atlas; *b*, its posterior arch; *c*, the small spinous process; *d, d*, the articulating cavity of the superior oblique processes, for the reception of the condyles of the occipital bone; *e*, the smooth inner surface, for the reception of the odontoid process of the axis; *f, f*, the inferior oblique processes, or articulating surfaces, by which the atlas is united to the superior oblique processes of the axis; *g, g*, the cervical foramina; *h, h*, the transverse processes. (The same letters refer to the same part in all the above figures.)

(termed odontoid, or tooth-like) arising from the next vertebra, called the axis, or vertebra dentata (figs. 49, 50, 51, 52). The transverse processes are simple, and larger than those of the other cervical vertebræ. The odontoid process, which constitutes the main distinguishing feature between the second vertebra and the remaining five of the neck, arises from the upper surface of the body of the bone, and proceeds upward within the narrow body of the atlas, where it is firmly secured by ligaments, so contrived as to prevent its slipping, or pressing against the medulla spin-



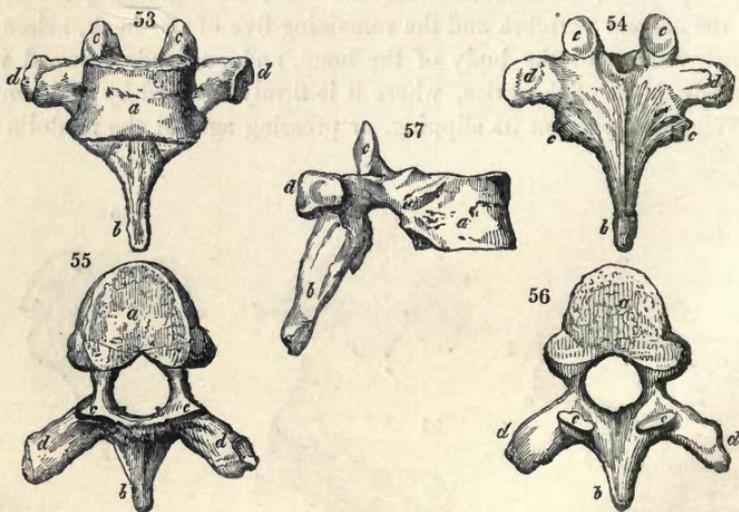
Figs. 49 to 52.—Axis, in different aspects.

Fig. 49, Superior view. 50, Inferior. 51, Anterior. 52, Lateral.—*a*, odontoid process arising from the body of the bone; *b*, spinous process; *c, c*, the oblique processes, superior and inferior; *d, d*, the transverse processes. (The same letters refer to the same part in all the above figures.)

alis, while the atlas revolves upon it as a kind of axis. The motion allowed to the head, by the articulation of the skull upon the first cervical

vertebra, is slightly backward and forward; whilst the mechanism of the vertebra dentata limits the motion of the atlas upon it to one which is rotatory. The first movement is exhibited by slightly nodding, the neck being held firmly upright; the second, by turning the head from side to side, the neck being still retained in the same rigid position.

From the vertebræ of the neck we pass to the dorsal vertebræ, or those of the back: in these the spinous processes are long, and more or less inclined backward, their shape being flat, or compressed laterally. In all animals, which have to support either a ponderous head, a head placed at the extremity of a long neck, or, more especially, a head produced into a snout destined for ploughing up the ground in quest of food, as in the Hog, these spinous processes are of extraordinary length and stoutness, and indicate the volume of the muscles acting upon the back of the skull, the transverse occipital ridge of which is, accordingly, more or less prominent. To the top of each of these processes the ligamentum nuchæ attaches itself, as it passes along the spine. It is to the dorsal vertebræ that the ribs are articulated: each rib has its head fitted into a depression formed by the bodies of two vertebræ, so that every dorsal vertebra (except the last) has on each side two ribs, partially united to its body; while each rib is farther united, by a tubercle, at the point where it forms an acute arch, to the transverse process of the lower vertebra, or



Figs. 53 to 57.—Dorsal vertebræ, in different aspects.

Fig. 53, Anterior. 54, Posterior. 55, Superior. 56, Inferior. 57, Lateral.—*a*, body; *b*, spinous process; *c*, *c*, oblique processes; *d*, *d*, transverse processes. (The same letters refer to the same part in all the above figures.)

that which is the lowermost of the two, to which its head is affixed. As exceptions to this mode of union, it may be observed, that the last ribs are, in many instances, affixed to single vertebræ, and to the bodies of them alone. In the Cetacea, the ribs, at least the anterior ribs, are at-

tached by their head to the body of one vertebra, and by their tubercle to the transverse process of the succeeding vertebra, while the posterior ribs are attached, exclusively, to the extremity of the transverse processes. In the Monotremata the ribs are solely attached to the bodies of the vertebræ. The mobility of the ribs is much influenced by the modifications of their union with the vertebræ, their freedom being in proportion to the simplicity of the attachment.

The ribs may thus be considered as part of the spinal column; not, indeed, as essentials, but as accessories. They vary in number, in form, in length, and in volume, in different Mammalia: in all, however, they describe an arch, and terminate in a cartilaginous, or, sometimes, osseous continuation, by which the anterior (the number being subject to variation) are attached to the sternum, a long, flat, narrow bone, often permanently divided into several parts, and forming the front of the chest. Those ribs which do not join the sternum, their cartilaginous terminations falling short, and ending in the muscular parieties, or sides of the chest, are termed false, in contradistinction to the others, which are termed true.

The following is a table, which the student may find of some use, and which he may enlarge, according to his own observations.

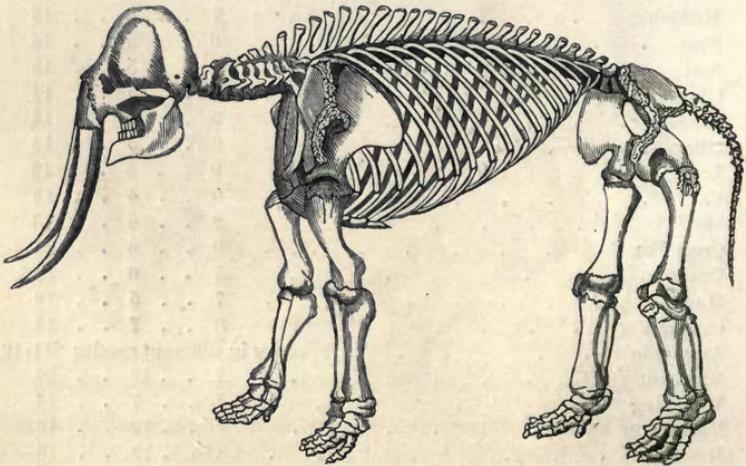
A TABLE OF THE NUMBER OF THE RIBS OF MAMMALIA.

	True.	False.	Total on each side.
Man on each side	7	5	12
Orang-outan	7	5	12
Chimpanzee	7	6	13
Black Ape (Macacus niger)	8	4	12
Kalong (Pteropus)	7	6	13
Bat	7	5	12
Mole	8	5	13
Hedgehog	7	8	15
Bear	9	5	14
Seal	10	5	15
Glutton	9	5	14
Raccoon	9	5	14
Otter	9	5	14
Lion	9	4	13
Cat	9	4	13
Wolf	9	4	13
Cross Fox	9	4	13
Opossum	7	6	13
Hare	7	5	12
Guinea Pig	6	7	13
Armadillo	varies in different species		11-12
Elephant	7	13	20
Wild Hog	7	7	14
Rhinoceros	7	12	19
Horse	8	10	18
Dromedary	7	5	12
Giraffe	8	6	14
Ox	8	5	13

		True.	False.	Total on each side.
Stag	on each side	8	5	13
Dolphin		6	7	13
Porpoise		6	7	13
Ornithorhynchus		6	11	17
Echidna		6	9	15

And here it may be observed, that the human thorax, or chest, is of much greater breadth than depth, while that of quadrupeds is laterally compressed; hence, their fore limbs more closely approximate, and, consequently, afford a much more efficient support to the anterior part of the trunk than they would, if as widely separated as in Man: on the other hand, the great transverse dimension of the human thorax necessarily demands a corresponding distance between the shoulders, by which the arms enjoy greater freedom of motion than in quadrupedal Mammalia; while, at the same time, the anterior preponderance of the trunk is diminished, so as to harmonize with the structure of other parts of the frame, by which Man is adapted for a vertical attitude. In this position the weight of the abdominal viscera falls chiefly upon the pelvis; but, in quadrupedal Mammalia, the case is very different; and, therefore, in order to sustain the viscera, the body being in a horizontal position, the sternum, compared with that of Man, is much elongated, and the ribs are, for the same purpose, not only often more numerous than in the human skeleton, but more nearly approach the pelvis; so that, together, they contribute to the support of the abdominal viscera, and this, more particularly in the Ruminantia and Pachydermata, as is well exemplified in the skeleton of the Elephant (fig. 58).

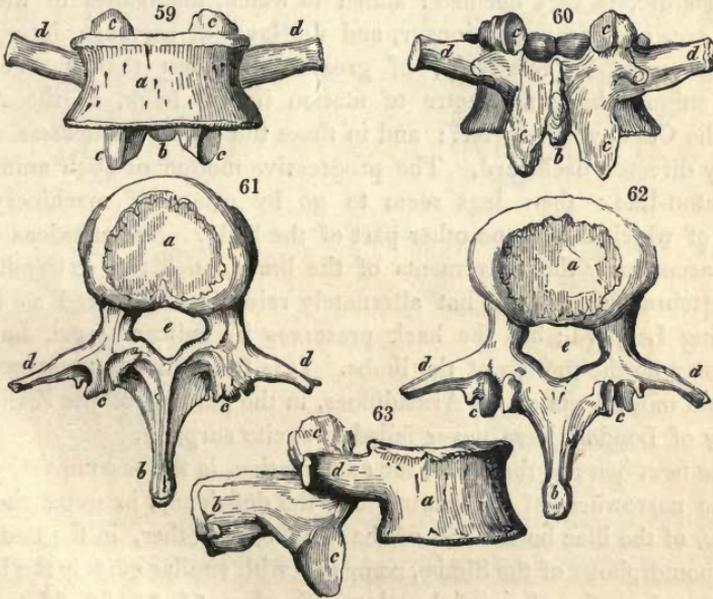
58



The third division of the vertebral column begins with the vertebra succeeding the one to which the last false rib is articulated, and ends at

the sacrum, or sacral portion of the column. The vertebræ, included in this division, are termed lumbar; and they may be at once distinguished, especially in the human subject, by their superior size, and the great development of the transverse processes (see human skeletons, figs. 12, 13, 14), indicating the volume of the lumbar muscles. In the Horse, the Ox, the Antelope, and especially in the Porpoise, Whale, and other Cetacea, the development of the transverse processes is both conspicuous and characteristic.

With respect to the spinous processes of the lumbar vertebræ, they are less elongated than those of the dorsal, and especially of the anterior dorsal vertebræ; and, in general, their direction is opposite. The spinous processes of the dorsal vertebræ point obliquely backward, those of the lumbar vertebræ obliquely forward; at least, as a general rule: whence it would seem to follow, that, at the point of junction between the dorsal and the lumbar portions of the vertebral column, the spinous processes of each part must meet in abrupt opposition. This is not precisely the case; for, if it were, the centre of motion in the spinal column would necessarily lie between two vertebræ, and the flexure would be acute. There is, however, a transition from the posterior-oblique bearing of the spinous processes of the dorsal to the anterior-



Figs. 59 to 63. Lumbar vertebræ, in different aspects.

Fig. 59, Anterior. 60, Posterior. 61, Superior. 62, Inferior. 63, Lateral.—*a*, body; *b*, spinous process; *c*, *c*, oblique processes; *d*, *d*, transverse processes; *e*, spinal canal. (The same letters refer to the same part in all the above figures.)

oblique bearing of those of the lumbar vertebræ; the processes of the lower dorsal and those of the superior (or anterior) lumbar vertebræ

gradually assuming a horizontal direction in Man, or a vertical direction in quadrupedal Mammalia ; so that, instead of being confined to one point, the centre of motion is diffused over the space of the three or four last dorsal, and two or three first lumbar vertebræ, an abruptly acute curve being thus avoided.

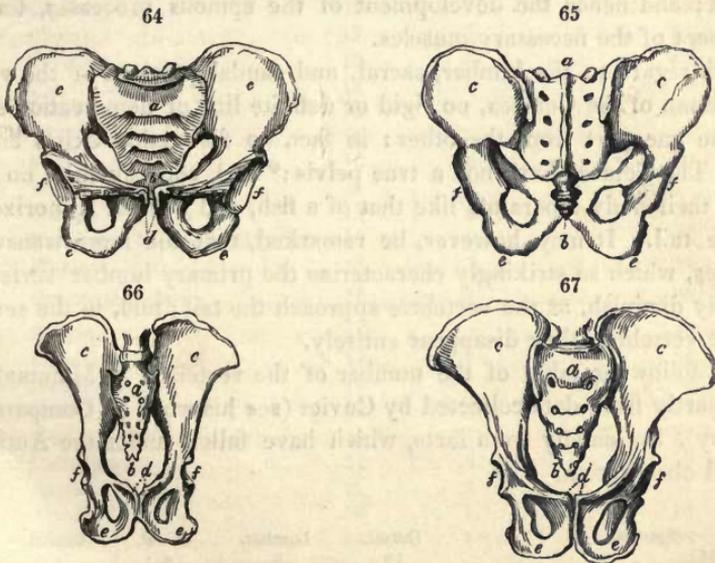
Professor Owen observes, that "the relation which the structure of the vertebral column bears to the mode of progression of a quadruped is extremely interesting, and enables us to judge, in some degree, from the spine alone, of the locomotive faculties of a fossil species." If we attend to the progressive motion of any heavy animal, as the Ox, we shall find the flexibility of the vertebral column (at least of its dorsal and lumbar portions) to be very restricted, and its centre of motion indefinite : it seems destitute of that suppleness which we see so marked in the Weasel, or the Cat. Now, if the dorsal and lumbar vertebræ be examined, they will be found short, and with only a thin layer of elastic cartilage intervening between their bodies ; while their large, strong, spinous processes have no point between them, to which they definitely converge. In animals endowed with great flexibility of body, as the Cat, the Leopard, &c., this converging point is clearly marked, and the oblique bearing, in a direction opposing that of the dorsal and lumbar vertebræ, is very decided : added to which, the bodies of the vertebræ are, comparatively, longer, and the layer of cartilage, interposing between each, is, relatively, of greater thickness than in the Ox. Some animals have no centre of motion in the back, as the Armadillo, the Chlamyphorus, &c. ; and in these the spinous processes are all equally directed backward. The progressive motion of such animals is automaton-like : their legs seem to go by means of machinery, the action of which affects no other part of the body. No inflexions of the spine accompany the movements of the limbs : the two extremities of the vertebral column are not alternately raised and lowered as in the bounding Leopard ; but the back preserves its uniform level, however rapid may be the motion of the limbs. It is from this circumstance that the rapid movements of the Armadilloes, in the gardens of the Zoological Society of London, have never failed to excite surprise.

The next part of the spine, for examination, is the sacrum.

The narrowness of the sacrum, and the deficiency, in expansion and volume, of the iliac bones, and of the pelvis altogether, in the two most anthropomorphous of the Simiæ, compared with similar parts in the human subject, are worthy of especial notice. (See figs. 64, 65, 66, 67.)

The os sacrum (*a*), or that solid portion of the vertebral column which is regarded as its fourth division, is, in the human species, somewhat triangular in shape ; concave on its inner aspect, and convex at its back : it originally consisted of five distinct vertebræ : at an early period, how-

ever, these portions become ossified, or consolidated, into one mass, but which permanently retains the marks of its previous separation. In man it is broad at its upper part, and becomes narrower as it proceeds; but in the lower Mammalia it is much narrower above, and does not assume a form so decidedly triangular. The os sacrum unites with the iliac, or haunch bones, to form the pelvis (or basin-like cavity, to the sides of which, externally, the thigh-bones are articulated), and is continued by the additional vertebræ, called the coccygæ, or caudal, which have been previously alluded to. In quadrupedal Mammalia the os sacrum, no longer required to enter into part of a widely expanded pelvis, loses that breadth and solidity, by which it is so characterized in the human subject. Even in the Chimpanzee and Orang its lateral diameter is very much diminished (figs. 66 and 67) in comparison with that of the human subject (figs. 64 and 65); but, among the lower Mammalia, it appears merely as two or three of the last lumbar vertebræ consolidated together, and continued (especially in animals furnished with a tail organized for any particular purpose, as the Beaver or Kangaroo,) by the caudal vertebræ, amply developed for some distance.



Figs. 64, 65. Anterior and posterior view of the human pelvis. 66. Anterior view of the pelvis of the Chimpanzee. 67. Anterior view of the pelvis of the Orang.—*a*, os sacrum; *b*, the coccygæ, composed of caudal or coccygæ vertebræ, varying in number in different Mammalia; *c*, *c*, iliac bones; *d*, pubic bones; *e*, *e*, ischiatic bones; *f*, *f*, acetabulum, or socket, for the reception of the head of the thigh bone. (The same letters refer to the same part in all the above figures.)

In the human subject the coccyx consists of four caudal or coccygæ vertebræ, which, however, often unite into one undivided portion. In most Mammalia, their number is far greater: they consist, with the exception of the first few, of long bones, dilated at each extremity by the rudiments

of the transverse processes, and united, end to end, like the joints of the fingers, decreasing as they proceed; but without any canal for the prolongation of the spinal chord. In some, however, they assume a more important character, and constitute the framework of an organ intimately connected with the peculiar economy of the species. In the Sapajou Monkeys of South America, for example, which have the tail adapted for grasping, and by which they are assisted in their progress among the branches, there is, at the base of each of the caudal vertebræ, on its under surface, two processes, between which the tendons of vigorous muscles of flexion are continued.

The Beaver is another example in point. Using its broad scaly tail as a paddle and rudder, the action being an up-and-down stroke, as in the Porpoise and Whale, the transverse processes, accordingly, are not only *not* obliterated, but remarkably broad and large, indicative of the development of the muscles by which the tail is influenced. The Porcupine also may be adduced. In this animal the transverse processes of each caudal vertebra are less remarkable than the spinous: the tail is covered with a forest of quills, which are capable of being strongly agitated; and hence the development of the spinous processes, for the attachment of the necessary muscles.

With regard to the lumbar, sacral, and caudal portions of the vertebral column of the Cetacea, no rigid or definite line of demarcation separates the one part from the other: in fact, no distinction exists among them. The Cetacea have not a true pelvis;* and, consequently, no hind limbs: their body tapers off like that of a fish, and ends in a horizontal fish-like tail. It may, however, be remarked, that the large transverse processes, which so strikingly characterize the primary lumbar vertebræ, gradually diminish, as the vertebræ approach the tail; and, in the several ultimate vertebræ, they disappear entirely.

The following table of the number of the vertebræ in Mammalia is taken, partly from data collected by Cuvier (see his work on Comparative Anatomy), but chiefly from facts, which have fallen under the Author's personal observation.

Species.	Dorsal.	Lumbar.	Sacral.	Caudal.
Man	12	5	5	4
Orang-outan	12	4	5	3
Chimpanzee	13	4 . . . . .	. . . . .	7 } sacral and caudal.
Hoolock Gibbon	13	5	4	3
Capuchin Monkey	12	7	3	21
Patas	12	7	3	?
Proboscis Monkey	12	7	3	23
Bonnet Monkey	12	7	3	20

* The rudiments of the pelvic bones may be detected in the Cetacea, but nothing more.

Species.	Dorsal.	Lumbar.	Sacral.	Caudal.
Mandrill Baboon	12	7	3	13
Chameck Spider Monkey	14	4	3	32
Black-fronted Lemur	12	7	3	20
Vespertilio murinus	11	5	4	12
Vespertilio noctula	12	7	3	6
Rhinolophus Ferrum equinum	12	6	3	12
Galeopithecus Temminckii	13	6	5	16
Hedgehog	15	7	4	12
Tenrec	18	6	3	14
Shrew	12	7	3	17
Mole	13	6	7	11
Polar Bear	13	6	7	11
Brown Bear	14	6	5	?
Badger	15	5	3	16
Glutton	16	5	3	18
Suricate	14	6	3	12
Kinkajou	14	6	2	28
Racoon	14	7	3	20
Enhydra	14	6	2	19
Marten	14	6	3	18
Weasel	14	6	3	14
Civet	13	6	3	20
Lion	13	7	3	25
Tiger	13	7	4	19
Chetah	13	7	3	21
Couguar	13	7	3	22
Cat	13	7	3	22
Fennec	13	7	2	20 imperfect.
Wolf	13	7	3	19
Fox	13	7	3	20
Hyæna	16	4	2	?
Maugés Dasyurus	13	6	2	16
Kangaroo (M. Bennettii)	13	6	2	24
Wombat	15	4	5	11
Ornithorhynchus	17	2		20 {sacral and caudal.
Echidna	15	4		15 ditto.
Lagotis (Cuvieri)	12	7	2	26
Porcupine	14	5	4	8
Hare	12	7	4	20
Rabbit	12	7	2	20
Cælogenus	14	5	3	10
Agouti	12	8	4	7
Acouchi	13	7	4	16
Beaver	14	7	3	23
Flying Squirrel (Pteromys ni- tidus	12	8	3	27
Marmot	13	7	6	22
Field Mouse, Arv. agrestis	13	6	1	19
Arvicola riparia	13	6	1	23
Capromys (Fournieri)	16	7	5	20
Black Rat	13	6	4	32
Water Rat	13	7	3	23
Mouse	12	7	4	24
Chinchilla	13	6	3	22

Species.	Dorsal.	Lumbar.	Sacral.	Caudal.
Ant-eater	15	3	5	30
Pangolin	15	5	3	28
Weasel-headed Armadillo	11	3	{one consoli- dated body.}	15
Chlamyphorus	11	3	ditto	11 imperfect.
Elephant	20	3	4	24
Wild Hog	14	5	4	20
Tapir	20	4	3	12
Collared Peccary	14	5	4	6
Rhinoceros	19	3	4	22
Hippopotamus	15	4	7	14
Duyong	18 . . . . .	. . . . .	. . . . .	33 { lumbar, sacral, and caudal.
Camel	12	7	4	17
Dromedary	12	7	4	18
Stag	13	6	3	11
Giraffe	14	5	4	18
Gazelle	13	5	5	11
Sheep	13	6	4	15
Ox	13	6	4	16
Horse	18	6	2	17
Quagga	18	6	7	18
Seal, <i>Phoca vitulina</i>	15	5	2	12
Dolphin	13 }	Total number sixty-six.		
Porpoise	13 }			

Thus far the more essential parts of the skeleton have been considered in a general point of view: those parts which every mammiferous animal must possess, and which, modified as they may be in the several groups of which this class consists, still retain so striking a resemblance to each other, as to leave us in no doubt with respect to the unity of the plan upon which they were modelled and arranged. Those less essential parts of the skeleton, the extremities, or limbs, now demand attention; and though here the same unity of design prevails, yet so great a dissimilarity, as regards their particular conformation, exists among Mammalia, from Man downward—to so great a degree of modification are they subject, so different are the uses to which nature appropriates them, that, at first, their structural relationship is not very cognizable. Upon examination, however, it is found that this relationship does exist, though it is not equally palpable in every instance. The modifications of parts, moreover, do not proceed in a regularly progressive order, as we advance along the chain of being: the alterations are, as it would appear, fluctuating, and depend upon the purposes for which the organs are especially designed,—whether as graspers, wings, scrapers, simple columnar supports, instruments of destruction, or paddles. Multiform, therefore, are the changes which exist, and great is the range of variation, among the organs of locomotion, in the Mammalia, from Man, through the terrestrial and aquatic quadrupeds, to the ocean-born Cetacea, in which

the fore limbs are changed into oars, and every trace of hind limbs has disappeared. To follow out, thoroughly, this part of the subject, while yet limiting the observations on it to the class under review, would occupy more space than the plan of this work will admit. It is, however, so interesting, and so important a topic, that it would be unpardonable not to present something like a general outline of its principal features.

In all Mammalia, excepting the Cetacea, there are four limbs;—in pairs, two anterior and two posterior;—and in all, Man excepted, these limbs are organs of locomotion; not, perhaps, of locomotion exclusively, for, in many, the anterior pair, and, in some, both pairs, are constructed for grasping and retaining; and in others, again, the fore limbs are employed as weapons, with which to strike: but these are not the sole purposes to which the organs in question are destined; on the contrary, though the Monkey may seize with his hand, or grasp with his foot, though the Squirrel may hold the fruit on which it is feeding, or the Lion dash the Antelope to the ground with the stroke of his paw, still, in these cases, and in every other, all the limbs are, in the strictest sense, organs of locomotion. Not so in Man. Of the four limbs with which he is endowed, the posterior, or lower pair, alone, are agents of progression; the anterior, or upper pair, being free; and this freedom is connected with Man's attitude, his upright bearing, his exalted intellect, and his rank in creation. Thus, while the four limbs of brutes are simple organs of locomotion, or, at most, are endowed with the mere power of grasping or seizing—a power only occasionally exerted—while they are all required to take a servile part in transporting the body from one location to another, the arms of Man are free: their form, their proportions, their parts, their situation, all accord with this exemption from bondage.

When the arm of Man is alluded to, in a general sense, every part, into which the anterior extremity is divided, is included in that term; the whole, indeed, constitutes the organ, and no portion is independent of another. It is usual, however, and convenient, to divide it into the shoulder, the true arm, and the hand by which it is terminated: of these parts the hand is the first which demands consideration, for, because the hand is what it is, the remainder of the extremity is modelled as we find it; the arm is adapted to the hand,—the hand is essential to Man. Without the hand, the arm would be useless; and without the arm, the uses of the hand would be very circumscribed. To the arm and the hand, then, as the type of the anterior extremity in the lower Mammalia,—as exhibiting the most complete degree of development in all their parts, and that for duties and services of the most important nature to the most important of all animals, considerable

attention is due. The human hand, in every age, has excited the attention of the reflecting and the wise, and has been often and forcibly referred to, as direct proof of consummate art, and design, in the creation of our frame. Let us contemplate, for a moment, the uses to which it is applied, and the extent of its power, as a means of acquiring knowledge, in order that its vast importance may be properly estimated. In the first place, then, it is the grand organ of touch, or tact; the instrument, by means of which we gain an acquaintance with more of the physical properties of matter than through any other organ of sense. Without it, the eye would never, perhaps, duly learn to appreciate, correctly, many of the external properties of matter, the forms, the relative size, the distance, or the position of bodies; and it is the touch which aids, regulates, and corrects the conclusions deduced from the ideas gained through the medium of sight. It is a coadjutor to the eye, though the eye, in its turn, aids the hand: for example, touch will not inform us of the colour of any object—colour is an impression upon the organ of vision alone; but touch gives us its hardness or softness, its lightness or weight, its warmth and texture, its smoothness or roughness; thus, one organ aiding the other, we gain a knowledge which neither, alone, would communicate; and the one, taught, as it were, by the other, will, independently, communicate a degree of information respecting qualities, which the other can alone appreciate. Such is the association of ideas, that the sight of a feather brings to mind its softness, its lightness, its warmth, and elasticity, though the sight only recognises colour and form; but experience has taught, that, with such a form and colour, these properties, cognizable by touch alone, are always conjoined.

The faculty which we commonly denominate the sense of touch, and which, though generally diffused over the whole surface of the body, is refined to a keener perceptibility, a more exquisite delicacy, in the hand, depends upon the mesh of nerves, with which this organ is abundantly supplied: it is upon the pulpy tips of the fingers that this tissue of nervous papillæ especially prevails, and that the highest degree of tact resides. Hence it is by the application of the tips to bodies, that the most distinct impressions are received. The discriminating sensibility which resides in the human hand, and in that alone—constituting an important sense which ministers to the mind,—being a faculty not needed, at least in high perfection, by the lower orders in the scale, is wisely denied where its possession would be out of harmony. In fact, the brute can hardly be said to possess it at all; for even those tribes, the Simiæ, for example, which, as far as external configuration goes, approach the nearest to Man, resort but little to its aid; they evidently do not possess it as Man does; and, if they did, it would be

of little use. Knowledge is not their sphere; their wants, desires, and pleasures are corporeal, not intellectual.

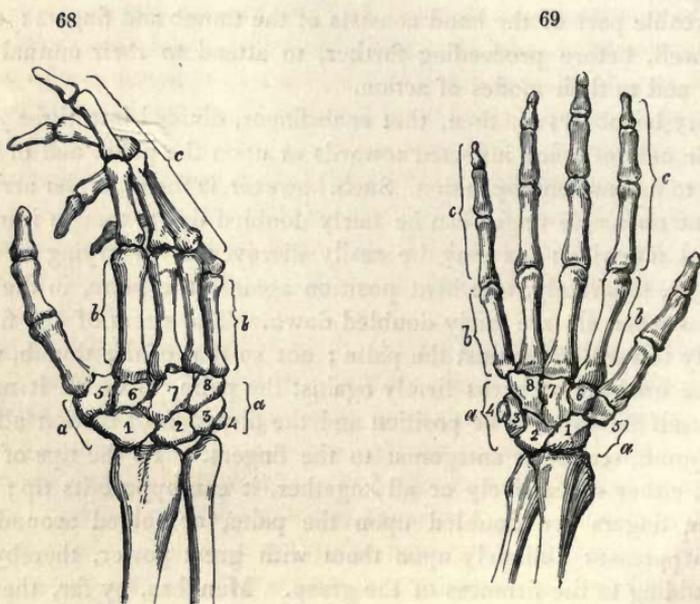
It need scarcely be observed that, under the term, hand, is included the part from the joint of the wrist to the point of the fingers. Its general outline, the fingers being closed, approaches an oval: at the back part it is inclined to be convex; on the inner aspect, or palm, concave: it is divided into a solid basal, and a digital, portion, comprehending the fingers.

The solid part of the human hand consists of the carpus, or wrist, and an anterior portion termed the metacarpus. The metacarpus is that upon which the fingers are immediately based. The convexity of the external aspect of this solid portion, and its palmar concavity, have been mentioned above; this concavity, which certainly results, in the first instance, from the arrangement of the bones, is rendered more apparent, in consequence of the adductor muscles of the thumb and first finger forming an elevation on one side, and the flexor muscles of the little finger an elevation on the other, so as to bound a central depression. The moveable part of the hand consists of the thumb and fingers: and it will be well, before proceeding farther, to attend to their mutual relationship, and to their modes of action.

It may be observed, then, that each finger, divided into three joints, is capable only of being inflected towards or upon the palm, and of being returned to its horizontal position. Such, however, is the muscular arrangement, that no single finger can be fairly doubled down, though it admits of partial inflexion; as may be easily discovered, by trying to bring each finger, separately, to a bent position against the palm, in the same manner as when all are fairly doubled down. The stress of the fingers is directly toward or against the palm; not so that of the thumb, which cannot be brought to press firmly against the palm, to which it merely applies itself laterally. The position and the direction of motion allotted to the thumb, render it antagonist to the fingers. To the tips of each of these, either successively or all together, it can oppose its tip; and, when the fingers are doubled upon the palm, or folded around any object, it presses obliquely upon them with great power, thereby materially adding to the firmness of the grasp. Man has, by far, the most perfect thumb; that of the Ape being so short as to oppose, with difficulty, the tips of the fingers: in some of the Simiæ, as will be seen hereafter, this member is even wanting, or in a rudimentary condition; and in none of them is it fairly opposable to the fingers.

It has been often asked, why the fingers are of unequal length? a question involving much in the answer. Ease and facility, in the ever-varying and multitudinous performances which the fingers are called upon to execute, are of the first consideration; and to this point has Nature

attended, not only in their arrangement, but in the inequality of their length; the advantage of which is forcibly perceived in all our nicer and more delicate manipulations. In numberless instances the graduated length of the fingers is of the utmost service; for, without such an inequality, they would continually interfere with each other, and their action would be clumsy and constrained. When, however, the fingers are folded upon the palm, the tips are brought to a level; as, also, in grasping a ball; not so when we grasp other bodies in the common way: yet, in holding the fencing foil, we, in some degree, make them correspond; but it is in an oblique direction, resulting from the peculiar manner in which the hilt is held; the first finger being less closed than the second, the second than the third, and so on. In this oblique manner, which combines firmness with ease, we often hold various objects, as the table-knife, the poker, &c. The fingers in the annexed sketch (fig. 68), which is a back view of the osseous framework of the hand, are thus bent. Fig. 69 exhibits a palmar view of the hand.



Two views of the human hand.

Fig. 68. Posterior view. 69 Palmar view.—*a, a*, carpus; *b, b*, the metacarpus; *c, c*, the phalanges of the fingers. (The same letters and figures refer to the same part in both the above illustrations.)

The bones of the carpus, or wrist, are small, very irregular, and angular in their figure, wedged together, and bound in their respective places by ligaments.

Anatomists commonly divide the carpal bones of the human hand

into two rows,—a basal and an anterior,—each containing four. All the bones of the basal row, excepting one (the little os pisiforme), are connected with the fore-arm, at the moveable articulation of the wrist. The basal row consists of—the os scaphoides (1); the os lunare (2); the os cuneiforme (3); the os pisiforme (4). The anterior row contains—the trapezium (5); the os trapezoides (6); the os magnum (7); the os unciforme (8).

The os scaphoides, or scaphoid bone, so called from its fancied resemblance to a hollow oblong vessel, or boat (*Σκάφη*, vas oblongum, or *Σκαφος*, fossa), is united to the radius of the fore-arm on one part, and to several of the carpal bones on the other; and, among them, to the os lunare, so termed from the crescent shape of that side which is in contact with the scaphoid bone: it is, also, articulated to the radius. The os cuneiforme, or wedge-shaped bone, is in apposition with the extremity of the other bone of the fore-arm, termed the ulna; and has, on its internal surface, the fourth bone of the basal row, viz., the os pisiforme. This little bone derives its name from its resemblance, in figure, to a pea. The tendon of that muscle of the wrist, called flexor carpi ulnaris, is inserted into it, and it gives rise to a muscle for drawing down the little finger, termed abductor minimi digiti. Of the anterior row, the first in order is the os trapezium, having four unequal sides at its back part, whence it has obtained its name. It rests upon the scaphoid bone, and, in a pulley-like depression, receives the head of the first or metacarpal bone of the thumb. To the trapezium succeeds the os trapezoides, so called from the irregularly quadrangular figure of its back part: it sustains the first metacarpal bone, viz., that of the first finger. The next is the os magnum, or large bone of the wrist: it sustains the second metacarpal bone, and rests on the scaphoid and lunar bones. The last is the os unciforme, or hooked bone, which obtains its name from a thin, broad, excavated projection, standing toward the palm, and affording, in its sulcus, both a channel, or passage, and a protection to the tendons of certain muscles of the fore-arm, which draw down the fingers: it rests upon the os lunare and os cuneiforme, and supports the two last metacarpal bones, viz., those of the third and little fingers. The metacarpal bones are based upon the carpus, on which they have an obscure and limited motion. Their number, of course, corresponds with those of the four fingers and the thumb: they are, in shape, long and round, enlarging into heads at each extremity, where they are in contact with each other, a space intervening between the bodies: in these spaces are lodged certain small muscles, termed interossei, passing along, from the carpus to the fingers.

The orderly disposition of the bones of the fingers, each into three rows, has suggested their appellation of phalanges, or phalangeal bones, in allusion to the martial phalanx of the Greeks. The first phalangeal

bone of each finger is united to its corresponding metacarpal, by a simple articulation, which only admits of the hinge-like motion of flexion and return. To this first row succeeds a second, consisting of smaller bones, but of a like character and mode of articulation. Next follows the third row, consisting of still smaller bones, similarly articulated, but less independent, and more limited in the degree of motion allotted to them.

Little or no difference characterizes the bones of each finger, separately viewed, excepting that of relative magnitude. Those of the middle finger, as it is termed, being the longest and largest; those of the fore finger, next in thickness, but not in length, the bones of the third finger being rather longer: the little finger has the shortest and most slender bones.

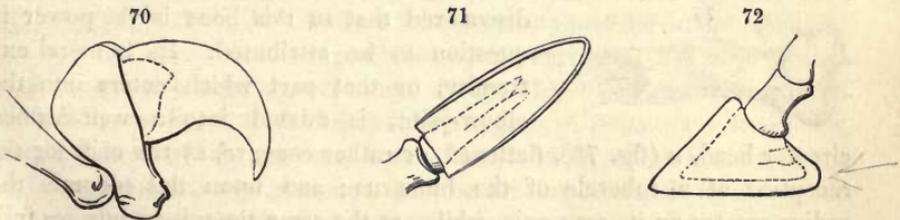
The thumb is situated obliquely, with respect to the fingers; i. e. neither directly opposite to, nor on the same plane with them, but is capable of being brought to antagonize with all or each separately. This counteracting agency, which the thumb maintains against the fingers, requires that its bones should be thick and strong, in proportion to their length: they are two in number, excluding the metacarpal bone, which is articulated with the trapezium of the carpus, the union being such as to allow of a more free (but still limited) action than is possessed by the metacarpal bone of any of the fingers; a degree of motion needful, inasmuch as, without it, the thumb could not act the part of an antagonist to the fingers with requisite facility. The first true phalangeal bone of the thumb is stout and short, with a large base hollowed into an oblong cavity, in order to its resting securely upon its metacarpal bone; the joint, thus formed, is especially strong and well knit; but more confined, and less expeditious, than hinge-like joints in general. The ultimate bone of the thumb proceeds, also, from a basal portion, of great extent, hollowed into two concavities, for the reception of two pulley-like projections of the bone, to which it is articulated. The hinge of this joint, thus contrived, is very secure, while it possesses tolerable freedom.

This elaborate mechanism is provided with a system of muscles fully adequate to its active employment, in the various simple and combined movements of which it is organically susceptible. The hand, therefore, while possessing sufficient solidity for the performance of such of its offices as require considerable strength and powers of resistance, is enabled, by its wonderful mobility, to execute an endless multitude of the most precise and delicate operations; to modify its shape according to the differences of form in external objects, and to move upon and feel them, at a number of different points, with degrees of pressure infinitely variable.

As an organ of touch, the perfection of the human hand is owing, in a great measure, to its admirable structure as an instrument of prehension. Other parts of the surface of the body are capable of receiving impres-

sions of temperature, or mere contact ; but the hand, alone, is qualified for ascertaining, strictly, the size, figure, consistency, and general character of objects, by the test of touch. Its palmar surface is exquisitely sensitive in every part, and particularly so at the tips of the fingers, where the nervous papillæ are not only much developed and exposed, but, according to some authors, positively erectile, if excited. The pulpy parts, beneath, form adipose cushions, supported by the nails, which, from their powers of resistance, manifestly tend to improve the mechanism of the organ, by rendering the tips of the fingers capable of being closely pressed upon external objects.

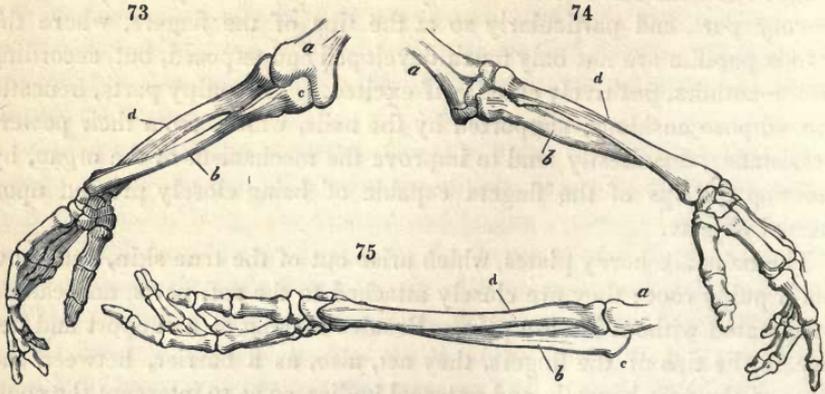
The nails are horny plates, which arise out of the true skin, and grow from a pulpy root : they are closely attached to the soft parts, and cannot be separated without intense pain. Besides serving as a support and defence to the tips of the fingers, they act, also, as a barrier, between the nerves of the part beneath, and external bodies, so as to intercept the communication of definite impressions to those nerves, in order that the nervous energy may be the more fully concentrated on the part appropriated to touch, and that the impressions there received may be vivid and unmixed. Man uses the nails neither as weapons of offence, nor as scrapers for turning up the earth, nor as hooks with which to climb or cling. In most of the lower animals, however, these parts are of great importance in the economy of their habits and modes of life, and are accordingly modified through a variety of gradations. In the Lion, or Tiger, the claws are fashioned into cutting-hooks (fig. 70), sheathing the last joint of the toes, and



capable of being protruded or retracted at pleasure. In the Armadillo and Mole they assume a scraper-like form, and are hard and firm (fig. 71, nail of the Mole). In the Horse they form a hoof, or sheath, to the extremity of the limbs (fig. 72) : yet, in every instance, they are only modifications of the same organ,—the thin, rounded, delicate nail, which forms so elegant and appropriate a finish to the finger of the human hand.

As is the hand so must be the arm : that is, the structure and capabilities of this organ will influence the mechanism of every part connected with it ; and where it enjoys the highest sensibility and freedom, and is the depository of a sense ministering to the mind, there must the arm be so fashioned as to enable it to fulfil every purpose for which it was intended.

The hand is united to the fore-arm, consisting of two bones,—the one called the radius, the other the ulna (figs. 73, 74, 75).



Figs. 73, 74, 75. Three views of the human fore-arm and hand.—*a*, The lower part of the humerus, entering into the elbow-joint; *b*, the ulna, of which the protuberance, *c*, at its upper end, advancing upon the humerus, as distinctly shewn in figs. 73 and 75, is termed the olecranon; *d*, the radius. (The same letters refer to the same part in all the above figures.)

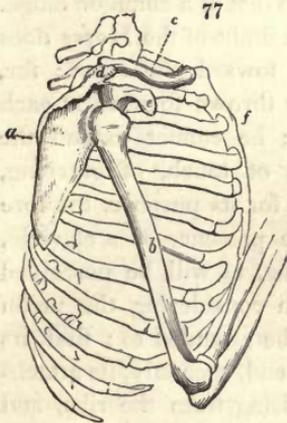
The hand is more immediately, though not exclusively, connected with the carpal extremity of the radius; and this articulation, thus formed, is free and flexible: the movements, however, which this articulation allows to the hand, are merely up and down, and, to a certain degree, from side to side. But the hand is capable of pronation and supination (that is, of being turned round, so as to present, alternately, the back part, and the palm, uppermost). On examining the radius, it will be



discovered that to this bone is the power in question to be attributed. Its humeral extremity, or that part which enters into the elbow-joint, is dilated into a well-defined circular head, *a* (fig. 76), flattened, or rather concave, at the end, for the reception of a tubercle of the humerus; and upon this tubercle the radius rotates on its own axis, while, at the same time, it is duly secured to the ulna, *b* (figs. 73, 74, and 75), by ligaments. The ulna (the olecranon process of which, *c*, figs. 73 and 75, forms the point of the elbow on which we lean) is very strongly united to the humerus, a deep semi-circular depression receiving the head of that bone, and the articulation being strictly hinge-like. When, therefore, we bend the elbow-joint, the radius and ulna move together; but, when we revolve the hand upon itself, the radius rotates; its rotation, at the humeral end, being simply round its axis: while, at the carpal end, it moves in a sort of cycloid, with respect to the carpal end of the ulna. The hand, and, indeed, the whole of the arm, derive a rotatory power, also, from the nature of the shoulder-joint, which allows the head of the humerus to play freely in the glenoid

cavity of the scapula ; as will be best understood by referring to the annexed figure (77).

The bones which enter into the formation of the shoulder, consist of the humerus, or single bone of the arm, the scapula, and the clavicle. The humerus, at its lower extremity, is articulated with the radius and ulna, the mechanism of the elbow-joint resulting from their peculiar union. The upper extremity of this long cylindrical bone is moulded into a round head, standing obliquely backward : this head is received into a very shallow cavity (called the glenoid cavity) in the anterior angle of the scapula, *a* (fig. 77) ; and is retained in its situation by ligaments, which allow to the articulation the greatest liberty.



Lateral view of the osseous framework of the human chest and shoulder, shewing, *a*, the scapula ; *b*, the humerus ; *c*, the clavicle ; *d*, the acromion process of the scapula ; *e*, the coracoid process of the scapula ; *f*, the sternum.

Of all the joints in the human frame, that of the shoulder is by far the most free ; and this freedom is necessary, in order that Man may use his hands without any impediment. He can rotate the arm from the shoulder, describing a large circle with the hand : he can, in like manner, raise the arm or depress it, thrust it forward or draw it backward, at will ; but this extent of motion, which handed animals alone enjoy, depends not only upon the nature of the connexion of the humerus with the scapula, but upon the character of the scapula, and the mode of its union with the body. The point or tip of the human shoulder is produced by the extremity of a large process

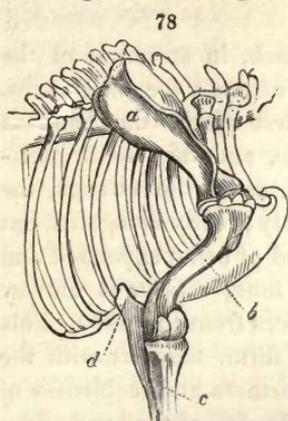
of the scapula, termed the acromion, *d* (fig. 77), overhanging the joint. From this process, *d*, to the top of the sternum, *f*, proceeds a long bone, shaped something like the italic letter *f*, termed the collar-bone, or clavicle (*clavicula*), *c*. Its presence is of great importance : it keeps the shoulders at a proper distance, and apart from the sides of the chest, preventing the muscular stress, which is perpetually exercised upon the arm, as a lever, from drawing it inward. It may be taken as a rule, that all animals which freely use the hand either for holding, digging, climbing, or flying, and, consequently, have the fore-arm in a greater or less degree capable of revolving, possess the clavicle more or less developed. In many animals it is much stronger than in Man, as, for example, in the Echidna, the Mole, the Chlamyphorus, the Armadillo, &c. In these creatures, whose anterior limbs are expressly formed for digging, and are, besides, endowed with extraordinary power, the clavicle is thick and rugged, with bold processes, for the better attachment of voluminous muscles, which act upon the arm ; and it is capable of enduring the utmost stress. In the

Monkey the clavicle nearly resembles that of Man: in the Bat, the Kangaroo, &c. it is also perfect; but, in the feline tribe, which strike their prey, but can hardly be said to use the arm, it is rudimentary, and is neither attached to the scapula nor to the sternum, but is concealed between the muscles. In the canine race, it is at its lowest stage of imperfection.

In the ruminant, and pachydermatous orders, the clavicle does not exist: their fore limbs are merely organs of support and progression. The forearm is neither rotatory nor ends even in an approximation to a hand; hence the motion of the shoulder is accordingly limited to that of a common hinge. The direction of the muscular stress upon the fore limbs of the Horse does not tend to draw them inward, that is, closer toward the chest; for, being organs of mere progression, they are only thrown forward at each step. The Horse cannot whirl the arm round; he cannot extend the limb in every direction; his foot is no organ of touch, of grasping, of burrowing, or of flying. Admirably adapted for its purpose, the fore limb of the Horse requires no clavicle; nay, the presence of a clavicle, in such an animal, would be a palpable misfortune, as will be perceived when the scapula is more fully examined. In considering the union of the scapula with the trunk, two points are to be attended to: first, its connexion to the sternum by means of a clavicle; and, secondly, its attachment to the ribs, by means of the muscles arising from the ribs, and inserted into it. In all Mammalia, whether the clavicle exist or not, the scapula is bound to the ribs by muscles; but where the clavicle is wanting, as in the Horse, Deer, Elephant, &c., this is the sole mode by which it is attached to the trunk. By these muscles, the scapula, destitute of a clavicular union with the rest of the osseous framework, can be placed, at once, in the most favourable position, and retained there with surprising firmness, or altered with the greatest rapidity. In propelling themselves, the Horse and similar quadrupeds plunge forward in such a manner as to let the weight of the body fall on the anterior limbs: hence, if the shoulder were locked to the chest by a clavicle, this bone would be immediately fractured, or dislocated, by the violence of the concussions; but these concussions are expended upon the elastic muscles, binding the scapula to the chest, and which yield and recover themselves alternately. Here, then, the presence of a clavicle would be a positive disadvantage.

There is, however, another circumstance, which also tends to counteract the effects of a shock upon the shoulder; viz., the diffusion of the concussion through the whole limb. And this leads to a consideration of the position of the bones of the limb with respect to each other; for, were they to bear perpendicularly on each other, not even the muscles which attach the scapula to the chest could well support the jar. The

position of the scapula in Man, and in those of the lower Mammalia which possess a perfect clavicle, is almost flat on the dorsal aspect of the ribs, its long or acute angle having a posterior direction. This will be easily



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Osseous framework of the chest and shoulder of the Horse.—*a*, The scapula; *b*, the humerus; *c*, the radius; *d*, the olecranon of the ulna, which is consolidated with the radius.

understood by a reference to the previous sketch (fig. 77); but, in the Horse, it occupies a different position (fig. 78).

In the first place, the aspect of the scapula in the horse is more lateral, being almost horizontal, obliquely verging inward; while, with respect to the humerus, it inclines backward at a considerable angle. The humerus itself is not perpendicular: on the contrary, it sweeps obliquely backward as it proceeds, and forms, at its union with the ulna and radius, another angle. The angles, which the different portions of the osseous framework of the limb make with each other, tend to diffuse the shock; each, by a recoil, lessening the violence of the concussion—a

concussion which, were the bones placed perpendicularly below each other, so as to form a straight columnar support, would not only injure the bones themselves, but jar the whole frame. While considering the angle, which the bones of the limbs (for the same principle will be found in the hinder extremities) naturally present, with respect to each other, it may be observed, that rapidity and suddenness of action, and hence velocity of motion, are immediately connected with it. It is, in fact, the obliquity of the bones of the limbs, with respect to each other, which gives to the Deer and the Antelope that springiness and elasticity—that power of instantaneously bounding, so characteristic of the race—that facility, which they display, of leaping, or starting away, without apparent effort, or the necessity of previously bringing the limbs into a position for the first impulsive movement. When, however, the limb has to support an enormous weight, pressing directly down upon it, this decidedly angular arrangement of its bones is no longer admissible. Hence the almost perpendicular bearing of the massive bones of which the limb of the Elephant is constructed—a limb, which may be compared to the gnarled stem of some old oak, heavy and clumsy, but admirably in keeping with the unwieldy bulk it supports.

A more explicit survey of the comparative structure of the anterior limbs of the Mammalia, and the analogue of the human hand, as it is modified through various groups—from the paw of the Monkey, to the solipedous foot of the Horse, the bisulcate foot of the Ox, or the paddle of the Whale,—may be next attempted. It has been seen how the hand and arm of Man harmonize; and the way, in which the clavicle becomes

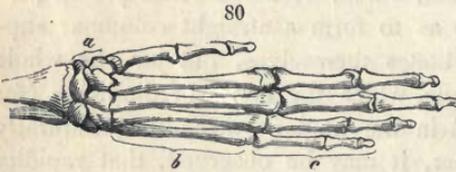
an index of the extent of freedom possessed by the arm, has been explained: it remains to shew with what structural modifications of the carpus, metacarpus, and phalanges, its presence is consonant, and with what it is incompatible.

Among all the lower Mammalia, none approach, in structure of the hand and arm, so near to Man as the *Quadrumana*: the differences, however, are many and important. In the first place, the hand is longer, in proportion to its breadth, than in Man, and this, more particularly in some groups than in others, in which, as in the *Orangs*, the *Gibbons*, and *Semnopithec*i, the fingers are not only greatly elongated, but the palm, instead of being expanded and concave on its inner aspect, is narrow and flat, and tapers from the wrist. This modification of form, together with the comparative shortness and feebleness of



the thumb, is exhibited in the annexed sketch (fig. 79) of the hand of the *Orang*.

Confining our observations to the osseous structure of the hand, it is at once obvious, that the carpus, in the *Simiæ*, occupies a very circumscribed space, compared with the analogous part of the human hand: the first step toward the contraction of the carpus is here taken; nevertheless, with certain



Hand of the *Orang*.—*a*, carpus; *b*, metacarpus; *c*, phalanges.

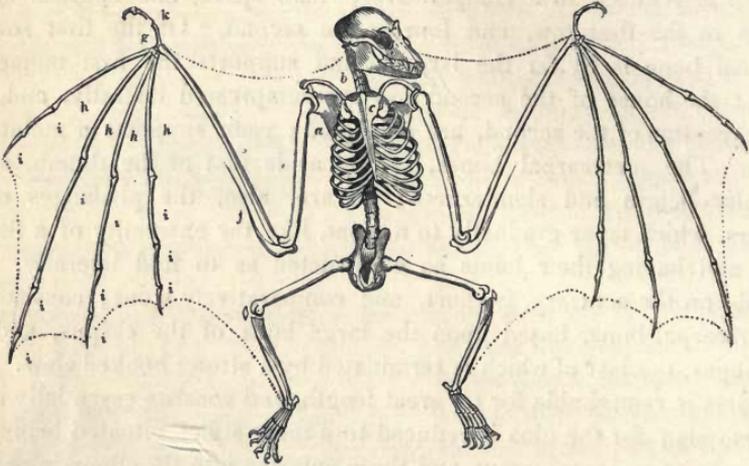
exceptions, as in the hand of the *Orang* (fig. 80), the number of bones in the carpus exceeds, by one, that in the human carpus—the second row having five, instead of four, distinct bones; the first row, four, as in Man. The elongation of the metacarpal bones of the fingers is also remarkable, while the metacarpal bone, and the two phalanges of the thumb altogether, only extend to the termination of the metacarpal bone of the first finger. In some of the *Simiæ* this degradation of the thumb is carried much farther, the part being, if not absolutely wanting, reduced to a mere rudiment. Compared with the hands of Man, those of the *Simiæ* are rude and imperfect instruments: constructed as tree-climbing organs, they are incapable of the manipulations which the human hand executes with the utmost facility; notwithstanding, they adequately serve the wants of these animals, and harmonize with their general economy. It is, therefore, in accordance with their arboreal habits, that the hinder graspers of the *Simiæ* are as hand-like as the anterior, perhaps more so: for, in these latter organs, the thumb is far more developed; never, indeed, becoming rudimentary, even in those instances in which it is the most reduced in the anterior graspers.

The ulna, and the radius, in the fore-arm of the Simiæ, resemble those of Man; excepting that the radius is the stoutest of the two: the humerus is long and slender; and the clavicle has a less decided flexure than in the human subject.

The hands, then, of the Simiæ are rude imitations of those of Man, organized as instruments of climbing. In the Cheiroptera, or Bats, a wing-handed race, which emulate the bird in traversing the regions of the air, the modification of the hand is such as to fit it for an organ of flight: the carpus is reduced to a comparatively small space, and consists of two bones in the first row, and four in the second. Of the first row the internal bone is by far the largest, and supports the first metacarpal bone; the bones of the second row are compressed laterally, and, with the exception of the second, are elongated; each supports a metacarpal bone. The metacarpal bones, setting aside that of the thumb, are of singular length and slenderness; as are, also, the phalanges of the fingers, which taper gradually to a point, like the extremity of a fishing-rod, and having their joints so constructed as to fold laterally. The thumb, on the contrary, is short, and comparatively stout; consisting of a metacarpal bone, based upon the large bone of the carpus, and two phalanges, the last of which is terminated by a strong hooked claw. The fore-arm is remarkable for its great length, and consists essentially of the radius only; for the ulna is reduced to a mere stylet, situated behind the radius at its commencement, and there entering into the elbow-joint: free at this part, it often merges, at its apical portion, into the radius;—its degree of development, however, varies in different species; and in some, as the common Bat, it can scarcely be said to exist. In the Flying Lemur, or Colugo (*Galeopithecus*), a similar modification of the ulna is found. In this animal, the ulna, though more developed than in the Bats, is still rudimentary: it is separated superiorly from the radius, for about a third of its length, whence it insensibly blends with the radius, and terminates before reaching its extremity. The humerus in the Bats is long, with a round voluminous head; the clavicles are large, as are also the scapulæ, the acromion processes of which are long, and directed forward. Over the anterior extremities of the Bat, thus modified (fig. 81), is stretched a semi-transparent membrane, which encloses the fingers, leaving the thumb almost free: it embraces the whole of the arm, and thence extends to the hinder limbs, and often between the latter, so as to include the tail. This membranous wing, to which the bones act as stretchers, is capable of being folded up while the animal is at rest; on the ground the Bat shuffles itself along awkwardly, but can climb about the rugged bark of a tree, or the wires of a cage, with considerable facility, using the strong claw of its thumb, and its hinder feet (the toes of which are also furnished with hooked claws), in its progressive motions. The use of the wings, or of

the hands and arms, as an apparatus of flight, supposes great power in the muscles by which they are governed: hence the length and strength of the clavicles, and the size of the scapulæ, and of the keel, which, as in birds, runs down the sternum, for the attachment of voluminous muscles, destined to work the expansive organs of flight. It is a curious circumstance, that the membranous wings of these animals (and the expanded membranous ears of many of them), are the seat of a most refined degree

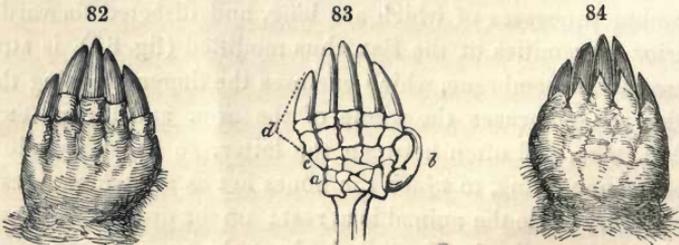
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Skeleton of a Bat.—*a*, scapula; *b*, clavicle; *c*, sternum, with its elevated keel; *d*, humerus; *e*, radius; *f*, ulna; *g*, carpus; *h*, metacarpal bones; *i*, phalanges of fingers; *k*, the thumb.

of sensibility: they are supplied abundantly with nerves; and, as experiments prove, are capable of appreciating the vibrations of the atmosphere, its currents, and its quiescence, to such a nicety, that, if the eyes of a Bat be covered, it directs its course, avoiding obstacles in its way, and threading the intricacies of obstructed passages, apparently with as much facility as though its sight were in perfect exercise.

The spade-like hand of the Mole (figs. 82, 83, 84,) affords another



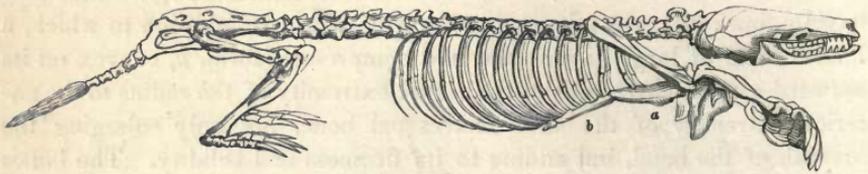
example of the modifications of this organ for an especial purpose. Its anterior extremities are admirably adapted for the mining operations in which it employs its existence. The first thing that strikes us is the

strength, breadth, and solidity of the hands ; the shortness of the fingers ; and the size and robustness of the nails, which are concave below, and terminate in an acute point. As organs of excavation, they cannot be exceeded ; and it will be found, that the whole of the anterior limbs, and the arrangement of the osseous framework generally, are in perfect harmony. The carpus, *a*, of fig. 83, which represents the bones of the Mole's hand, is short, but broad, and consists of eleven bones : the first row having four ; the second, or anterior row, six. In addition to which, a lateral bone of large dimensions, and compressed form, *b*, convex on its outward aspect, extends from the carpal extremity of the radius to the anterior extremity of the first metacarpal bone, not only enlarging the breadth of the hand, but adding to its firmness and solidity. The bones of the first row are the scaphoid, the semilunar, a large pisiform, and a cuneiform bone. The number, in the anterior row, depends upon a supernumerary bone between the scaphoid, the great, and the cuneiform bones ; and a small bone placed on the radial side of the trapezium. The metacarpal bones, *c*, are short and thick, as are the phalanges of the fingers, *d*, except the terminal phalanges, which are long, and sheathed with powerful nails : these last phalanges, only, can be folded down towards the palm, and, indeed, are alone free. The fore-arm consists of the ulna and radius. The ulna is large and flat : its superior extremity, or olecranon, is greatly developed, and of remarkable breadth, in order to afford a full and secure attachment to the voluminous extensor muscles of the fore-arm : the radius is placed at the inside of the ulna, in accordance with the outward tournure of the hand. The humerus, instead of being a long bone, is a thick, square, irregular mass, presenting bold projections for the attachment of muscles, and especially those of rotation. The clavicles, like the humerus, differ from those in all other Mammalia, and are short square bones, with a very remarkable peculiarity in their articulation. They are joined, as usual, to the sternum, by a large articulating surface ; but they are also united, by a moveable articulation, to the greater portion of the head of the humerus ; this junction being strengthened, anteriorly, by a strong ligament. It is by a ligament only that they are connected with the scapulæ : these bones (the scapulæ) are remarkable for their length and narrowness ; their acromion process, also, which is considerable, does not advance to unite immediately with the clavicle.

The following sketch (fig. 85) represents the skeleton of the Mole. The anterior limbs are thrown as far forward as possible ; for it is to a projecting portion, *a*, of the sternum, *b*, which advances from the chest, that the clavicles are affixed. Down this advanced portion, a keel, like that on the sternum of birds, is continued, for the attachment of the enormous pectoral muscles, which are inserted into the

humerus, as far as possible from its union with the scapula: therefore their action is to bring the arm backward, the palms of the hands being turned obliquely outward. The muscles of the scapulæ are distinguished rather for length than volume:—length imparts rapidity of motion; volume gives power. The muscles of the scapulæ are elevators of

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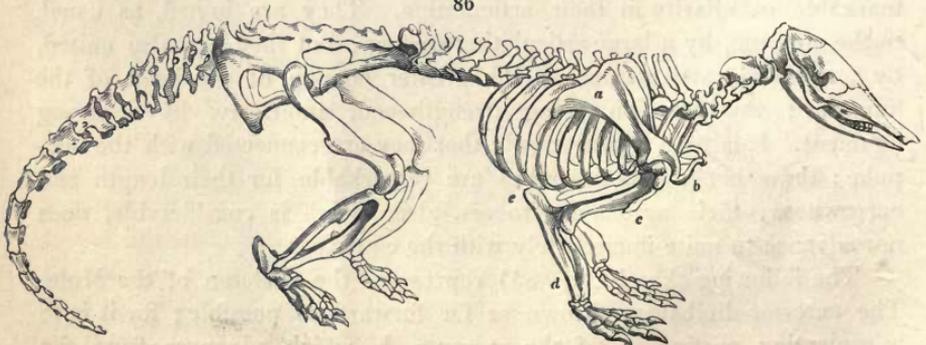
Skeleton of the Mole.

the humerus; and the nature of their duty does not so much require power as celerity, in order that the action of burrowing may proceed with the least lapse of time between each stroke. A glance at the skeleton of this animal is sufficient to shew, that its whole power is concentrated in the anterior extremities, and, in this respect, it exceeds all other burrowing animals.

A comparison of the limbs of the Mole with those of other animals of similar habits, will be interesting. From these, the Armadillo, one of the Edentata, may be selected. This animal, not, indeed, a miner *par excellence*, like the Mole, is yet a burrower in the earth, excavating deep retreats for itself, in which it passes a great portion of its existence: unlike the Mole, however, it does not follow its prey under ground, but comes abroad to feed.

The general strength and solidity of the bones, composing the skeleton of the Armadillo (fig. 86), cannot fail to excite attention; while those

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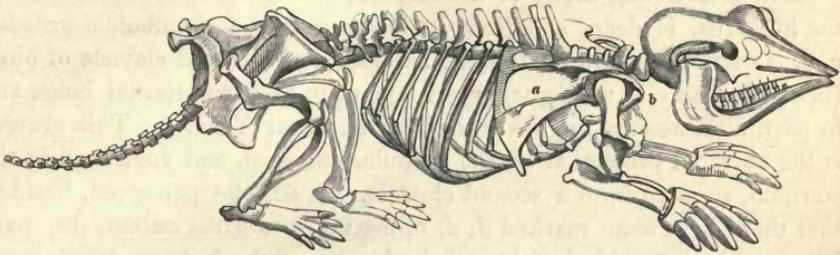


Skeleton of the Nine-banded Armadillo.

of the fore limbs display, very admirably, the characteristics which denote its habits and modes of life. The expansive convex scapula, *a*, with a

double spinous ridge, indicating great muscular development; the strong clavicle, *b*; the short, thick humerus, *c*, with its rugged tuberosities; the stout fore-arm, *d*; the hook-like olecranon, *e*, of the ulna; the firmly knit union of the bones of the carpus (differing in number, in different species), with those of the fore-arm, and with each other; the strength of the well-armed fingers; and the compact and solid structure of the whole hand, indicate the purpose for which it is especially designed. Nor is this

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Skeleton of the Chlamyphorus.

indication less evident in the Chlamyphorus (fig. 87); an animal which, while it approaches, in some points of its structure, to the Mole, displays a still more decided affinity to the Armadillo. The scapula, *a*, is here, also, spacious, with a double spinous projection; the clavicles, *b*, distinct, and largely developed; the bones of the arm prodigiously thick and irregular; the hands stout and short; and the fingers enveloped in large spatulate nails. It is somewhat remarkable that, though the clavicle is so perfect in the Armadillo, and in most of the Edentata, as the Sloth, Ant-eaters, &c., it is not found in the Great Ant-eater (*Myrmecophaga jubata*), nor in the Pangolins (*Manis*); though the hands of these animals, armed with claws of immense size, are expressly adapted for digging. In the Ornithorhynchus and the Echidna, the bones of the arm and shoulder are very remarkable; an approximation, in the structure of the

latter, to that of birds, and, still more, that of Lizards, being very apparent. The scapula, in the annexed representation of the chest and shoulder of the Echidna (fig. 88), is large and strong, its shape somewhat resembling that of a Turkish cimeter, being indented with a semilunar hollow on its posterior margin: it is concave on its external surface, so that it does not adapt itself to the arch of the ribs. The sternum consists of four portions, exclusive of a bone conjoined to its anterior extremity, termed, by Cuvier, the Y-shaped bone, *a, a*; from its resem-

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Chest of the Echidna.

bleness, by Cuvier, the Y-shaped bone, *a, a*; from its resem-

blance to that letter. This he regards as analogous to the *os furcatum*, or merrythought, in birds; which, in the Adjutant, the Pelican, and one or two more, is, indeed, ossified at its apex to the anterior point of the keel of the sternum, and, in others, united by cartilage. Now, it is incontestable that the two transverse portions of this bone are real clavicles: they are united to a process of the scapula, analogous to the acromion in Man and other animals; and their evident office is to keep the shoulders firmly apart.

The articulating cavity of the scapula, *b*, which receives the head of the humerus, is deep, and from its lower margin a rhomboidal process, *c, c*, is carried out, which, like the accessory, or coracoid clavicle of birds (being, indeed, its analogue), rests upon the first true sternal bone, and in part, also, against the lower limb of the letter-Y-bone. This process is the coracoid projection of the scapula, enlarged, and continued to the sternum, so as to form a second clavicle. It will be perceived, besides, that there is a bone marked *d, d*, filling up, to a great extent, the space between the coracoid clavicle and the handle of the Y-bone, which latter it passes over. This portion occurs, but in a cartilaginous state, in the Lizards; and, indeed, it is partially cartilaginous in these lowest of the Mammalia.

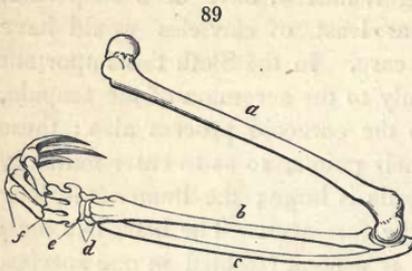
On referring to the arm of the Echidna, in the preceding sketch, the great strength and solidity of the humerus, with its bold projections, and the large size of the radius and ulna, will appear very remarkable, justifying an opinion expressed by Lieutenant Breton, that there is no quadruped which possesses equal comparative powers.* The bones of the hand, or paw, are solid, and compacted together, insomuch that the huge claws seem to be the only indications of a digital division. The carpus is broad and short, and composed of eight bones, irregular in their figure, but fitted admirably together; the metacarpal bones are as broad as long; the phalangeal bones are short and thick, except the last on each finger, which supports the nail. It is, at once, evident, that the organ, thus fashioned, is expressly adapted for digging and excavating the solid earth. The arm and hand of the Ornithorhynchus, though very powerful, are more slightly made; and the fingers, which are longer and more distinct, are connected together by webs, adapting the hand as an oar, in conformity with the aquatic habits of the animal. Nevertheless, it is a burrowing organ; but the Ornithorhynchus makes its deep galleries in the soft soil which composes the banks of rivers and stagnant waters. It has been observed, that the Pangolins, and Great Ant-eater, have no clavicles—a circumstance which limits the action of the arms to one kind of motion. These animals have immense power, and use

* See *Zoological Proceedings* for 1834, p. 23.

their hoof-like claws with great effect in demolishing ant-hills, built of indurated earth, in order to obtain the insects on which they feed: hence the bones of the anterior limbs indicate, in their solidity, and the abrupt spines and projections covering their surface, the vast force of the muscles which act upon them. It might, indeed, have been suspected, that, in these animals, some trace, at least, of clavicles would have appeared: such, however, is not the case. In the Sloth this important bone, the clavicle, is articulated not only to the acromion of the scapula, which is remarkably elongated, but to the coracoid process also; these two processes absolutely meeting at their points, so as to enter mutually into union with that bone. The scapula is large; the humerus is long and slender, as are also the bones of the fore-arm. The hand is a most extraordinary piece of mechanism: it is a hook (trebled in one species, and doubled in another);—a hook for clinging to the branches of the forest, on the underside of which the Sloth habitually lives, suspended with the back downward. In this manner it proceeds (like a fly on the ceiling) with great rapidity. To have given the Sloth a grasping hand would have been futile; because no voluntary muscles could endure a perpetuity of action, which must necessarily be continued without interruption, as well during the repose, as during the exertions, or progression, of the animal. To avoid this, the hand (and the same observation applies to the hinder extremities) is so constituted, as to act mechanically as a hook. Externally, the skin envelops every part, except the enormous claws; and these claws, of an arched figure, have a tendency inward, viz., towards the palm or sole; insomuch that, when the animal is removed from its branch, and placed on the ground, where it is absolutely helpless, these claws fold down close upon the palm, requiring the action of the extensor muscles to restore them to their usual state, which is one of flexion, at right angles with the palm. Now, it is well to observe, that the inward contraction of these claws is not the result of muscular action, but occasioned by the simple elastic action of ligaments destined to effect it; whilst to unclosethem requires voluntary muscular exertion. The wisdom of this curious and beautiful arrangement is evident. The Sloth lives suspended, and the flexion of its hooks, and the security of its hold, are effected by the elasticity of these guardian ligaments, which, like spiral springs, are ever in operation, counteracting the tendency of the body's weight to unclosethem. Fig. 89 represents the arm and hand of the Sloth (Aī); in this species the carpus, *d*, is composed of six bones;* four in the first row, two in the second: the scaphoid is the largest. The bones of the metacarpus, *e*, are all consolidated together at their base, and, with the anterior carpal bones; they consist of three large bones, on which rest

* In the carpus of the Unau there are seven bones.

the phalanges of the three fingers; and two rudimentary lateral bones, of which the outermost is extremely small. The fingers consist of the ordinary number of phalanges, *f*: of these the first row is short, and consolidated with the metacarpal bones; the second phalangeal row is



Arm and Hand of the Sloth.—*a*, humerus; *b*, radius; *c*, ulna; *d*, carpus; *e*, metacarpus; *f*, phalanges.

elongated, as are also the ungual phalanges: these latter are greatly compressed and curved; and the pulley-like articulation, formed between each and the preceding phalangeal bone, is very deep and narrow, so as to produce the utmost firmness. Nature has aimed at rigid, unyielding strength, and has obtained the result she wished. The long arms of the Sloth being thus furnished

with hooks, it can reach to a distant branch, and there fix itself with facility; or, while clinging to one branch, can draw towards itself another, loaded with buds, fruits, or leaves, which offer a grateful repast.

Turning to the Rodentia, with a view to the general structure of the hand and arm, the osseous framework of these parts is more perfect, as might be expected, than in most of the lower Mammalia. The Squirrel, and the Beaver, and others of this order, use the arm with great facility, and are able to hold their food between their paws while they nibble it with their teeth: they have no opposable thumb, but the fingers are usually free; and the hand of many of them, especially of such as climb, bears a great similarity to that of the Marmozet Monkeys of America.* The fore-arm is endowed with the liberty of pronation and supination (though in some, as the Porcupine and Agouti, for instance, this power is limited); and the majority of this species, as far as the author has had an opportunity of examining, have a tolerably perfect clavicle. In the Cavies and the Porcupines it is most rudimentary; the first row of carpal bones usually consisting of three; in the Hares of four: the second, or anterior row, usually of five, sometimes of four. The metacarpus generally consists of an inner small bone, supporting the phalanges of a minute thumb; and of four long bones, of which the two middle extend beyond the rest. As habits and modes of life differ so greatly among the Rodentia, the development and form of the phalanges are accordingly modified.

Passing from the Rodentia to the truly carnivorous races—of which the feline group may be regarded as the type—it may be stated, that, with a corresponding restriction in the movement of the shoulder and

* A Squirrel sitting up, engaged in devouring a nut, its favourite food, holds the fruit between the rudimentary thumbs of the paws brought together, and not between the fingers, as might be supposed.

fore-arm, and a conformable degeneracy in the structure of the hand, the clavicle is either totally deficient, or, at most, exists but in a rudimentary state, compared with it, as in the Ape and other Mammalia. In the Dog, indeed, whose paws are far removed from hands, the clavicle is extremely small; and in the Hyæna (an animal decidedly related to the Civets) it is still more rudimentary, being a minute slender bone lodged between the muscles. In the feline group, however, where the arm is a weapon of destruction, and is, consequently, endowed with a certain degree of freedom, the clavicle is rather more developed; yet in the Lion it is scarcely two inches in length, and is neither joined to the scapula nor sternum.

The arm and paw of one of the larger of the feline animals is an object deserving the most profound consideration, and appealing to our mind, in the strongest manner, as a proof of design. The strength and solidity of the bones, the dense, voluminous, and strongly marked muscles, are at once apparent. The Lion's arm, stripped of the skin, is, indeed, a fine display of the *beau ideal* of active, but irresistible power. Descending to minutæ, one of the first things to be noticed is a perforation at the lower part of the humerus near the joint, through which the humeral artery passes, on its way to the fore-arm, instead of running round the bone, above the articulation of the elbow, as is the ordinary course. Some anatomists have supposed, that this passage of the artery, through the perforation in question, is a provision for the security of the vessel against injury, to which it might be peculiarly liable in feline animals, which habitually use their arms with great violence and energy. How this effect can result from such a cause, is not very apparent; nor does it seem at all clear, that there is any necessity for an especial mode of giving protection to this artery. Besides, the fact is, that this foramen occurs, not only in the humerus of the feline race, but among many other Mammalia also. In the *Quadrumana* it is occasionally found, especially in the *Marmozets* and the *Lemurs*: in the *Mole*, the *Chrysochloris*, the *Racoon*, the *Badger*, the *Hedgehog*, the *common Seal*, the *Opossum*, the *Kangaroo*, and the *Wombat*, it is also met with; as well as in many of the *Rodentia*; the *Gerboas*, *Squirrels*, *Marmots*, &c. The *Edentata*, with the exception of the three-toed *Sloth*, and the *Megatherium* (an extinct animal, known only in a fossil state), exhibit it in a very remarkable manner; and none more so than the *Ornithorhynchus* and *Echidna*. In the *Cetacea*, the *Pachydermata*, the *Ruminantia*, and in *Man*, the humerus is not perforated, and the artery passes round the bone. It would appear, that the passage of the artery, through a foramen of the humerus, results, simply, from the extensive development of the inferior extremity of that bone—a development, which gradually takes place with the progress of ossification, but which, far

from throwing the artery out of its original course, close to the body of the bone, on the contrary, encircles it. For a long time this extension of the humerus would be in a state of cartilage, and still longer only partially ossified, being united to the body of the humerus, by an intervening layer of cartilage; till, at length, some time after birth, or when the animal is on the eve of maturity, the whole would become one solid mass, with a perforation for the artery, not disturbed, by this process, from its original direct and nearest route to the fore-arm: so that the purpose, in the present case, would be to secure as undeviating a way as possible, for an artery conveying blood to large and powerful muscles, the energy of which depends on a full uninterrupted stream of the vital fluid.

To return, however, to the feline race, it may be observed, that the fore-arm enjoys a limited degree of pronation and supination, as might be expected in animals of their habits and manners, with which the paw is an engine of destruction. The bones of this organ are remarkable for their hardness: those of the carpus (five in the anterior row, four in the basal row) are strongly locked together: the metacarpal bones, and the phalanges of the fingers, are well knit, and almost as solid as ivory. The thumb (if it may so be called) is, however, in a mere rudimentary condition, as in the Dog; being of little or no importance. The paw is not, indeed, an instrument endowed with delicacy of touch, or with the power of grasping: it is a weapon armed with talons, which terminate, or sheath, the last bone of every finger: these talons are strong, hooked, and sharp, and are, moreover, kept habitually retracted, within a sort of hood, or sheath; so that they are not only concealed, but also prevented from touching the ground, as do the claws of the Dog and Wolf, which are thereby rendered blunt, and incapable of inflicting serious injury. The Lion, the Tiger, the Panther, and the Leopard, take their prey by surprise. Endowed with the sense of sight in high perfection, and capable of seeing by night as well as by day, they creep cautiously and silently toward their victim, crouching, as they proceed, behind any available covert, till the fatal moment arrives, when, with a bound and roar, they hurl their victim to the earth, lacerated by the blow, to which their weight, and the concentrated energy of their muscular powers, give an irresistible impetus. Looking at the formidable paw of one of these animals, it is found to be firm,

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sinewy, and flexible; its efficiency cannot be mistaken. Two circumstances require especial notice—it is padded with an elastic cushion below, and its talons are not visible. The foot of the Lion is padded on the sole with a springy cushion of granular fat, two inches in thickness; and a similar, but smaller cushion is placed under each toe; and other feline animals are similarly provided (fig. 90). The object of this is, first, to render the tread so noiseless,

that the quick ears of the timid prey may not catch the foot-fall of the prowler ; and, secondly, that the concussion produced by the impetuosity of the bound, and which, in spite of the angle made by the bones of the limb, with respect to each other, would, to a certain extent, still be felt, may be farther broken, so that neither the shoulder nor the spine may receive a shock from the violence of the plunge—an act, in which the whole of the muscular energy is concentrated. These pads, moreover, give a certain springiness and elasticity to the tread, facilitating the usual movements of this and similar animals, which consist of a succession of easy bounding steps, and, at the same time, so raising the tips of the toes, as to throw the sheathed talons upward, and prevent their being worn, or blunted, against the ground. This will be easily understood by consulting the annexed sketches. We see, in the first (fig. 91), the talon retracted into its sheath ; so that its point is barely visible amidst the fur ; which, indeed, must be parted a little to discover it at all : while, in this state, the pad effectually prevents its being brought into contact with stones, or the inequalities of rugged and uneven ground.

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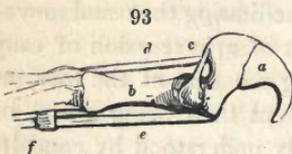


Figs. 91, 92. A toe of the Lion's paw, with the claw sheathed and unsheathed.

But this talon can be unsheathed and thrown forward in a moment, as in the figure (92). This effort is voluntary ; not so the return of the weapon to its scabbard. In the Sloth, as already noticed, the tendency of its hooks, governed by an elastic ligament, is to press toward the palm : but here, an elastic ligament so acts, that the talon rolls back on its hinge, resuming its retracted condition, the counteracting effort being suspended. The talon encases the last phalangeal bone of the toe : this bone is so articulated to the next, by a rolling, hinge-like joint, on which it freely works, as to pass down by its outer side (which is flattened off in order to remove every obstruction), and thus gain a more ample sweep of retraction. This action is effected by a ligament which passes from the upper arch of the last phalangeal bone, obliquely downward to a sesamoid bone, placed on the next bone near the joint, to which it is firmly bound.* The action of this elastic spring is

* Sesamoid bones are rather to be regarded as a deposition of bony matter, in parts disposed to its reception, as ligament, cartilage, &c., than as intrinsic portions of the skeleton : they are larger and more numerous in the hands and feet of such as take laborious exercise.

counteracted by that of the flexor muscles, voluntarily or instinctively exerted on a tendon of great size and power, running beneath the bones of the toe, and inserted into the base of the claw-bone at its anterior part, like the string of a pulley. In the very act of striking with violence, these flexor muscles are strongly contracted, brace up the tendon, and throw out the talon, which, when the act is over, returns into its sheath. The following sketches, representing the claw protruded and retracted,



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will convey an idea of this exquisite piece of mechanical contrivance (figs. 93, 94):—*a*, is the claw-bone, or last phalangeal bone, joined to *b*, the penultimate: *c*, is the oblique elastic ligament, which rolls the claw-bone back, assisted by tendons, *d*, of the extensor muscles of the paw seated on the fore-arm, which also share in this work; the muscles relaxing involuntarily when the flexors contract, and resuming, on the relaxation of the flexors, their habitual tension: *e*, is the strong tendon of the flexor muscles, bound down at *f*, so as to be kept firmly along the under side of the bone.

Thus far has been sketched a cursory outline of the modifications to which the analogue of the human hand is subject; and hitherto it has preserved a resemblance, more or less faint, to its great prototype. But its leading peculiarities have yet to be considered, as exhibited in what may be termed the unclaviculated races—those which not only have no clavicle, but the construction of whose shoulder does not possibly admit of it. Many animals, which have paws divided into rude fingers, and which use the paw and arm with some degree of facility—as the Bear, the Coati, the Paradoxurus, the Hyæna—either do not possess it, or

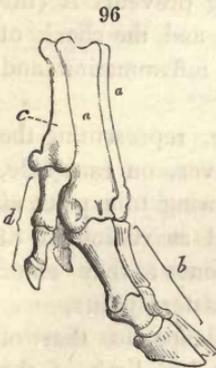
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have it in the merest rudimentary condition: still they may possess this bone; its presence would not be an incongruity; and the anatomist can only determine the fact by investigation: but here the whole construction and use of the limb forbid it, militate against it, and give the conviction, that its presence would be an evil. With the impossibility of the existence of the clavicle are associated two kinds of limbs: the one, a hoofed, prop-like organ of progression; the other, a simple, paddle-like instrument, for propelling a fish-like body through the water: the first is seen in the Pachydermata and the Ruminantia; the second, in the Cetacea and Seals.

A sketch is annexed of the fore limb of the Elephant (fig. 95). The general massiveness of the bones, and their almost perpendicular bearing on each other, are not now to be considered; nor

is it needful to linger over the scapula and the humerus. But our attention is arrested by the bones of the fore-arm, which, in the solidungulous group, and in the ruminants, offer a conformation very unlike what has hitherto been noticed; inasmuch as they generally constitute only a single bone. In the Elephant, however, the Rhinoceros, the Hog, the Tapir, and the Hippopotamus, the radius, *a*, and the ulna, *b*, are perfect; the former bone assuming an anterior position to its associate. The carpus, *c*, consists of short, thick, solid bones (eight in number in the Elephant), with which are articulated those of the metacarpus, five in number in the Elephant, and four in the Hog, the Tapir, and the Hippopotamus, corresponding to the number of the toes. In the Elephant, Tapir, and Hippopotamus, the toes are very short, and almost buried in the skin: in all, they are sheathed at their extremity with hoofs, or hoof-like nails. It is on these hoofs, which tip the last bone of the toes, that the Hog rests; the remaining bones (that is, the other phalangeal bones—the carpal and the metacarpal) bearing nearly perpendicularly upon this point.



Lateral view of the bones of the foot of the Hog.

Fig. 96 represents the foot of the Hog: *a, a*, the two large middle metacarpal bones; *b*, the phalanges, following them; *c*, the small lateral metacarpal bone, to which another on the opposite side corresponds; *d*, the phalanges of the small lateral toe, those on the opposite side being only partially seen.

By way of contrast, the fore limb of the Horse, a solidungulous animal, that is, in which the digits are all consolidated into one, may be next noticed. Here the fore-arm, *a* (fig. 97), consists of a single bone; made up, it is true, of an ulna and radius; but the ulna is only to be traced in the olecranon process, *b*, shewing itself as a fixed appendix to the radius, *c*. The carpus, *d*, consists of seven bones (four in the first row, three in the second): to these succeeds a long metacarpal bone, in one solid piece, known by the name of the canon bone, *e*; and to this succeed three phalangeal bones, *f*, forming one digit: the first is termed the pastern; the next, the coronet, or crown bone (both often termed pastern bones); and the last, the coffin bone, which is enclosed in a hoof



Fore limb of the Horse.

of thick, firm horn: on this the Horse treads, and with an elastic step; a circumstance resulting from the oblique position of the bones of the leg and foot, but especially from the yielding of the pastern, its elasticity

being provided for by a ligament, which passes down the back of the canon bone, and along the pastern, to the coffin bone. The expansibility of the hoof must not be overlooked; it is essential to a free and safe step, but is too often irreparably injured by the mode of shoeing usually pursued by farriers. Under the coffin bone, and to which it forms a sort of sole, is a part called the frog, consisting of an elastic fatty cushion, covered by a triangular elevation of horn; at each step the frog yields beneath the superincumbent pressure, and, swelling out laterally, expands the heels of the hoof. This frog ought always to touch the ground: it does so naturally; and, where bad shoeing prevents it (the crust of the hoof bearing all the weight of the body, and the shock of every step, as the animal trots along a hard road), inflammation and disease ensue.

It has been said that the canon bone of the Horse, representing the metacarpus, consists of a single piece: there is, however, on each side, at its inferior extremity, a slender styloid bone, narrowing to a point as it proceeds upward. These bones must be regarded as rudiments of two additional metacarpal bones: they enter into the construction of the pastern joints.

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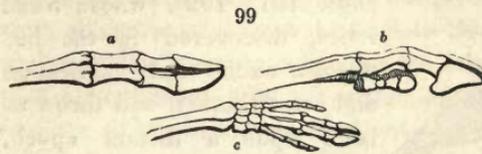
Fore limb of the Giraffe.

With a general resemblance to that of the solid-hoofed animal, the fore limb of the ruminant is distinguished by peculiar characters. The radius, *a*, and ulna, *b*, though consolidated together, are here plainly distinguishable, a deep furrow separating between them. In the fore limb of the Giraffe (fig. 98), the Deer, and of some Gazelles, this furrow opens into a fissure, *c*, *d*, both at the upper and lower end of the bones: in the Ox and Sheep, the superior fissure is alone perfect; in the Camel there is none. The metacarpus, *e*, consists of two rows of bones, at what is commonly called the knee: the first row containing four; the second, two, or (as in the Camel) three. The metacarpal bone (canon, or shank bone) is single; furrowed, however, throughout its whole length—a circumstance indicating that it existed in two portions, at an

early period, before ossification was complete.

All ruminants have a cloven foot; that is, they have two toes, each consisting of three phalangeal portions: the first is united to the extremity of the canon bone by a hinge-like articulation; the last is cased with a hoof. In the Hog, it will be observed that there are four distinct toes;

the outer toe on each side being, indeed, shorter than the two middle ones, but quite as perfect. The ruminant has two toes only; it is truly cloven-footed: still, at the extremity of the canon bone, will be often found the vestiges of a lateral toe on each side, both in the skeleton and in the living animal: it consists of a sort of spur, or rudimentary hoof, supported by one or two little osseous stylets. This circumstance has led some to object to Cuvier's assertion, that, wherever we see the track of a cloven hoof, we may be sure that a ruminating animal has passed: be-



cause it may be fancied that the Hog is as much a cloven-footed, or bisulcate animal, as the Deer. Fig. 99 represents two truly cloven feet, *a*, *b*, compared with the foot of the Hog, *c*.

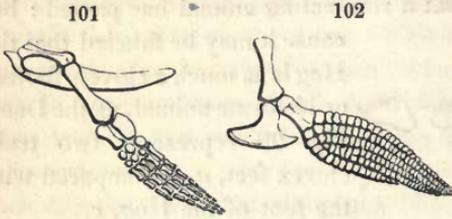
From terrestrial Mammalia, let us turn to those which inhabit the ocean, and plough their way through its rolling waters—the mighty Cetacea, as the Grampus, and the Whale; animals destitute of hinder limbs, and in which the pair, analogous to the anterior limbs of other mammals, are reduced to the condition of paddles, being utterly destitute of the slightest power of prehension.



The annexed sketch (fig. 100) shews the hand and arm as exemplified in the paddle of the Dolphin. In the living animal the bones of the hand are imbedded in a cellular tissue, the whole being invested with a covering of skin; so that the phalanges of the fingers are agglutinated together, and neither enjoy, nor need, anything like independent motion: the organ is, in fact, a mere paddle, or oar; yet it has to be worked, with vigour and celerity, in a medium far denser than air. Hence the large expanse of the scapula, *a*, for the attachment of voluminous muscles, and the thick and solid structure of every bone. The humerus, *b*, is short and massive, as are, also, the bones of the fore-arm, viz., the radius, *c*, and ulna, *d*; the carpal bones, *e*, form two rows, and are succeeded by those of the metacarpus, *f*, which are flattened in shape, and usually five in number. The number of the fingers, *g*, is the same as that of the metacarpal bones; but they vary, both in their respective lengths, and in the number of phalangeal portions of which they respectively consist. Ordinarily, the portion analogous to the thumb is composed of two phalanges; sometimes, however, as in the Dolphin, of only one. The phalanges in the fingers of the common Whale, are, four for the second and third, five for the middle finger. In the common Dolphin the middle finger consists of five phalanges; the second and

fourth of four phalanges : but these may, perhaps, vary ; for Cuvier assigns nine to the second, and five to the third finger. In one species of Dolphin the second finger has been found to consist of eleven, and the third of eight phalanges ; the thumb (or its analogue) of three, and each of the two other fingers of two.

The structure of the flat paddle of the Cetacea will bring to mind the similar organs possessed by those strange extinct reptiles, the Plesiosaurus and the Ichthyosaurus

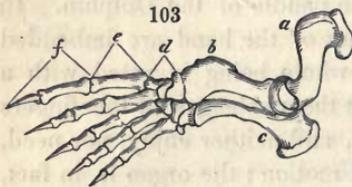


Paddle of the Plesiosaurus. Paddle of the Ichthyosaurus.

(figs. 101, 102), whose fossil relics, discovered in the lias deposit, excite our admiration and astonishment, and throw us back upon a distant epoch, when the land and the waters teemed with races which have

long disappeared from the face of the globe.

In their organization for an aquatic mode of life, the Seal tribe approach the Cetacea. They possess, however, a posterior, as well as an anterior pair of limbs ; and, though the absence of clavicles limits the freedom of the short humerus, they can crawl along the shore, or scramble up the ledges of rocks, or icebergs.



Paddle of Seal :—*a*, humerus ; *b*, radius ; *c*, ulna ; *d*, carpus ; *e*, metacarpus ; *f*, phalanges.

The illustration (fig. 103) represents the osseous structure of the paddle, or flipper, of the Seal. The carpal portion, *d*, is broad, but so compressed as to occupy but a trifling space between the bones of the fore-arm, *b* and *c*, and those of the metacarpus, *e*. The metacarpal bones, *e*, five in number, are large, and decrease

gradually from the first to the last. Of the fingers, *f*, the first (the analogue of the thumb) exceeds the rest in length : it consists, however, of only two phalanges ; the other fingers, which decrease gradually in length, are composed of three.

The paws of these animals, though expressly made for swimming, are not, it is evident, so truly paddle-like as those of the Whale or Porpoise : the anterior pair are plainly divided into strong toes, armed with nails, and webbed : the posterior limbs are feeble ; but the toes are still distinguishable, and serve as supports to a large extent of web, constituting an apparatus admirably adapted for propelling the animal through the water, and calling to mind the feet of the Diver (*Colymbus*), or Great Auk (*Alca impennis*), both as to appearance and position.

This rapid survey of the hand of Man, and its analogue in the lower Mammalia, leads, next, to a consideration of the inferior extremities.

Of all the Mammalia, in Man alone the posterior limbs are the sole organs of progression; and in him they are exclusively appropriated to this purpose. Walking erect, his posterior limbs have to bear the whole of the body's weight, and to maintain its due equilibrium. Let him run, or leap, or walk, whether slowly or rapidly, these organs sustain him, preserve him steadily and firmly in his usual attitude, and obey him, as far as the power with which they are endowed will admit. It need hardly be observed that the feet are incapable of grasping, being destitute of an opposable thumb, and that they are plantigrade; that is, so constructed, as to allow the sole, from the heel to the toes, to be fairly applied to the surface of the ground; while, at the same time, the arched form of the instep contributes, with the action of the large muscles of the calf (the tendons of which are inserted into the heel), to secure an elastic step, and a free, yet firm progression. Allusion has been before made to the volume of muscles on the leg (forming, what is termed, the calf), as essential to the elastic step of Man. No other animal possesses a well-formed and decided calf, because no other animal walks as he does: at each step, while one foot is in the act of advancing, and just before it is brought to the ground, the heel of the other foot is raised by the action of these muscles, so as to throw the weight of the body momentarily on the toes. Hence the strain on the tendo Achillis, in walking;—a strain increased while running, leaping, or dancing; or on dropping from any height upon the toes (a mode dictated by instinct, in order to break the concussion); and there are not infrequent instances, where a sudden and violent effort has occasioned the rupture of this tendon, into which the muscles of the calf converge. The action of these muscles is that of flexors of the ankle-joint: they draw the foot backward, and, in this position, retain it with great power, and more or less permanently, as the occasion may be. If we stand on tip-toe for a length of time, we begin to feel the muscles of the calf aching with fatigue; and the same sensation, succeeded by stiffness, results after a toilsome walk; after skating, dancing, and similar exercises.

Not only do the lower limbs of Man differ from those of all other animals in the possession of the calf, but, also, in general configuration; in the proportions of the parts composing them; and in the superiority, as to bulk, which they exhibit, compared with that of the arms. With the exception of the Kangaroo, the Gerboa, and a few other rodents, no other animals exhibit anything like this disparity, because their four limbs are all equally organs of locomotion; all equally sustain the body's weight. In such as use the fore limbs for striking, seizing, digging, &c., as well as for the purpose of locomotion, the anterior limbs even greatly preponderate in volume, in many instances. Such is the case in the Ape tribe, the nearest to Man in external configuration;—for example, in the

Orang Outan ; let his small ill-fashioned legs, incapable of supporting his body upright, be compared with the long muscular arms, of superhuman strength, by which he swings himself from tree to tree with astonishing agility. The same law prevails in the burrowing Insectivora, the Mole, and the Chlamyphorus ; in the Echidna and the Armadillo ; and in the Carnivora generally.

The reason of the development of the inferior extremities in the human subject, is as apparent as that of their deterioration in the lower races enumerated above. In earliest infancy this predominance is not so apparent : the childhood of Man is a state of utter helplessness : months elapse before he can commence, with tottering steps, his first locomotive essay ; and years pass away before his foot is firm and free—before he rejoices “ in the strength of his youth.” During this interval, a relative development of the lower limbs, beyond that of any other portion of the frame, has gradually taken place, and has given to the figure its perfect and true proportions.

With the development of the lower limbs are immediately connected the magnitude and the breadth of the pelvis ; it consists of two distinct portions, each being united to that division of the vertebral column called the sacrum ; and thence taking a circular sweep, round and forward, so as to meet in the front ; thus enclosing an area, of which the sacrum constitutes the dorsal, or back wall (figs. 64, 65). Each of these pelvic bones was originally divided into three, meeting in the cup-like cavity which receives the head of the thigh-bone ; and though, at an early period, they become ossified, so as to lose all trace of their primary division, anatomists still appropriate three distinct names—the ilium, the ischium, and the pubis—to the three respective parts ; the general title of pelvis (from its basin-like figure) being applied as a designation to the whole. The ilium, or iliac portion, *c, c* (figs. 64, 65, 66, 67), constitutes the broadly-expanded upper part, on each side of the sacrum, *a* : the ischiatic portion, *e, e*, extends downward from the acetabulum, *f, f*, whence it rises upward, forming the lower margin of a large orifice (the thyroid, or ischiatic foramen), to join the pubic portion, *d, d*, which extends from the anterior portion of the acetabulum, sweeping forward to meet its fellow in the fore part of the pelvis, the two bones being united together by a ligamentous cartilage.

In no Mammalia is the pelvis so capacious, relatively, as in the human subject ; for, as its development is connected with the attitude and locomotive powers of the species, and, as in no other Mammalia are seen the same attitude, and the same locomotive powers, so in none, not even in the Ape, does it resemble that of the human race : it varies, remarkably, among different genera, in its figure, and in its relative proportions : in the Cetacea it is in a merely rudimentary condition. In the Seals the iliac

portion is short and contracted, compared with the ischiatic and pubic portions: it varies, however, in breadth, length, and figure, in different species. In many of the Insectivora the pelvis is narrow and elongated, the parts composing it being slender, and the ischiatic opening very large. In the genus *Chrysochloris*, however, this orifice is very minute, the ischiatic portion being greatly developed.

Among the Edentata—in the Armadilloes, Pangolins, and Ant-eaters,—the iliac bones are thick, elongated, and curved slightly downward; the ischiatic bones are large, having a broad tuberosity reflected posteriorly outward; the pubic portion is considerable, and the ischiatic opening of great size.* In the Sloths the iliac bones are ample, and the pelvic cavity large; in the *Megatherium* the iliac bones are also of great extent, but the pelvic cavity is contracted; their ample spread in the Elephant, likewise, is very remarkable. Without attempting to describe the changes of form and proportion, in every genus, which the bones of the pelvis exhibit, the peculiar characters of this part of the osseous framework, ever present, in one great group of the Mammalia, cannot be omitted. The Marsupialia have two additional bones entering into the composition of this part of the skeleton, which are not found in any other mammals. These two bones are long, slender, and compressed, and are united, at one of their extremities (spread out more than the opposite), to the pubic bones, one on each side of their mutual junction, or symphysis: their office is to support the abdominal muscles, and not the marsupium, or pouch, of these animals; for they are found in the males as well as females; and, in those instances, as in the *Ornithorhynchus* and *Echidna*, where no marsupium exists. The *pyramidalis* muscle is attached to their inner edge, whence it radiates to the mesial abdominal line; and a small transverse muscle, arising from the skin on each side, passes over these bones toward their upper extremity, acting as a support and compressor to them. The presence of these bones (usually denominated the marsupial bones), as an unvarying character in the skeleton of all the Marsupialia, is very remarkable; the more so, as they bring to mind the modification of the sternum and ribs in the Saurian reptiles; and are coincident, if not with an oviparous, at least with a mode of reproduction which may be termed ovo-viviparous.†

Leaving, then, the pelvis, the posterior extremities next demand attention. As the arm consists of a humerus, fore-arm, and hand, the inferior extremity is correspondingly divided into the thigh, the leg, and the foot. The thigh-bone, or os femoris, in the human subject, is a large and strong cylindrical bone, slightly arched backward, having a round head at its upper

* The irregular figure of the pelvis of the *Chlamyphorus* will be best understood by referring to the sketch of its skeleton (fig. 87).

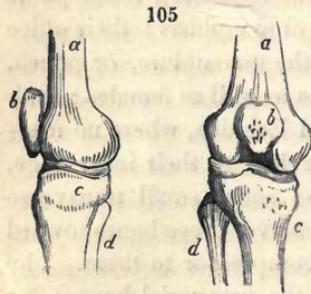
† Ovo-viviparous, producing young, in an egg, which is hatched internally, and previously to exclusion by the parent.

extremity, terminating a short neck, rising obliquely upward, from two large projections at its base: the larger and higher of these is known by the name of the trochanter major; the smaller and lower by that of trochanter minor: they serve for the attachment of the rotatory muscles of the thigh.

The inferior extremity of the thigh bone enlarges into a pulley-like articulating surface, which enters into the construction of the knee. The head of the thigh-bone (fig. 104) is firmly braced down, in the cup-like cavity of the pelvis, by various ligaments; and, in particular, by one, *a*, the ligamentum teres, which arises from the top of the head itself, and is affixed to the bottom of the cavity; so that when the hip-joint is dislocated, this ligament must necessarily be ruptured: in some few Mammalia it is wanting. It is not possessed by the Orang Outan (though it is found in the Chimpanzee and Gibbons), nor by the Elephant, the Sloth, the Seal, the Enhydra, the Walrus, or the Ornithorhynchus.*



In most Mammalia the thigh-bone is much shorter than in the human subject, and is so concealed as not to be perceptible in the limb as it appears in the living animal; whence has arisen the erroneous practice of calling that part the thigh, which really corresponds to the leg.



Lateral and anterior view of the knee.—
a, femur; *b*, patella; *c*, tibia; *d*, fibula.

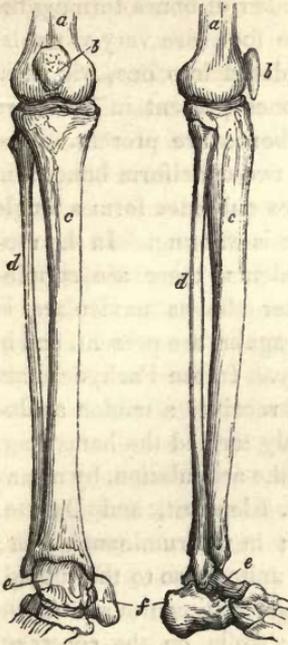
The knee-joint (fig. 105), that is, the articulation of the tibia, or large bone of the leg, with the extremity of the os femoris is firmly knit and well secured by ligaments, being also protected, in front, by a bone called the patella, or knee-cap. This bone may be regarded as a moveable olecranon, enveloped by the tendon of the powerful extensor muscles of the leg, which tendon is inserted into the exterior part of the top of the tibia. It is not found in the Bats; nor does it occur in the Kangaroo, and several other marsupial animals; at least, in these animals, it exists but in a state of cartilage. The tibia, so named from its resemblance to an ancient flute, and which forms the principal bone of the leg, is assisted by a slender bone, termed the fibula (or peroné), which runs along it somewhat laterally, and forms the outer point of the ankle; the inner portion being formed by the tibia. At its two ends the fibula is enlarged and compressed, the upper end being united to the tibia, the lower having an attachment to the base of the foot (fig. 106).

In ruminants, and the solid-hoofed Mammalia, the fibula is at its mini-

* It is said to be wanting in the Tucutuco (*Ctenomys Braziliensis*), a small rodent animal.—See *Zool. Voyage*, Beagle, Mamm. p. 80;—but of this there is some doubt.

num of development ; being, in the Horse, a small styloid bone, attached to the upper part of the tibia ; and, in the ruminants, a little square bone, at the lower end of the tibia, forming the outer ankle.

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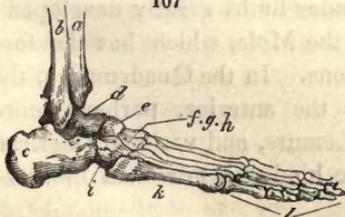


Leg of human skeleton.—*a*, femur ; *b*, patella ; *c*, tibia ; *d*, fibula ; *e*, astragalus ; *f*, os calcis.

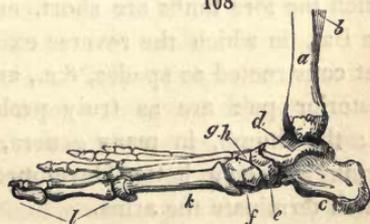
compact together in solid array. The os calcis, or heel bone, is situated below and behind the astragalus : it is the largest bone of the tarsus, and receives the tendo Achillis, to which reference has previously been made. The os naviculare interposes between the astragalus

The foot comes next under consideration ; for which the previous examination of the hand will have prepared the way. Like the hand it is divided into three parts—a basal part, termed tarsus ; an intermediate, termed metatarsus ; and the phalanges of the toes (digiti pedis). The tarsus, in the human foot (figs. 107, 108), consists of seven bones :—the astragalus, *d* ; the os calcis, *c* ; the os naviculare, *e* ; the os cuboides, *i* ; and three cuneiform bones, *f*, *g*, *h*. These bones constitute the instep, with the arched contour of which we are well acquainted. The cuboid bone on the outside, and the three cuneiform bones succeeding, make up the anterior row, or that on which the metatarsal bones are based : the tibia and fibula conjoin with the astragalus—a large irregular bone, having a polished, and somewhat depressed, articulating surface—to form the ankle-joint. Among themselves, like those of the carpus, the tarsal bones are all compacted together in solid array. The os calcis, or heel bone, is situated below and behind the astragalus : it is the largest bone of the tarsus, and receives the tendo Achillis, to which reference has previously been made. The os naviculare interposes between the astragalus

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Figs. 107, 108. Two views of the bones of the human foot:—*a*, tibia ; *b*, fibula ; *c*, os calcis ; *d*, astragalus ; *e*, os naviculare ; *f*, first cuneiform bone ; *g*, *h*, the two other cuneiform bones ; *i*, os cuboides ; *k*, metatarsal bones ; *l*, phalanges.

galus and the three cuneiform bones ; the cuboid bone rests against the anterior projecting part of the os calcis. The metatarsal bones are larger and stouter, in proportion to the toes, than the metacarpal are, as compared with those of the fingers ; otherwise they resemble them in

shape and general character. The first, or great toe, analogous to the thumb (though not antagonizing with its fellows), consists of two phalangeal portions; the others, of three.

With regard to the lower Mammalia, the number of bones forming the tarsus, and the general figure of this part of the foot, are very variable. In many instances two bones are found consolidated into one, which, in the human subject, are distinct; in some, bones present in Man are absent; in others, one or more supplemental bones are present. The Camel and the Horse, for example, have only two cuneiform bones; in the ruminants generally, the *os naviculare* and *os cuboides* form a single bone; in the Daman the internal cuneiform bone is wanting. In the monotrematous marsupials, and in most of the rodents, there are supplemental tarsal bones; and in many of the latter the *os naviculare* is divided: in all, however, the *os calcis* and the *astragalus* are present, and in most instances the *os calcis* projects considerably. In the *Pachydermata* and *Ruminantia* its elongation is remarkable: it receives a tendon analogous to the *tendo Achillis* in Man, and commonly termed the hamstring. The *astragalus* is remarkable for the deep pulley-like articulation, by means of which it is united to the tibia: in the Horse, Elephant, and Daman, it is united, anteriorly only, to the *os naviculare*; in the ruminants, also; in the Hog, Rhinoceros, and Hippopotamus, it is united also to the cuboid.

As there is great difference between the general contour and the destined uses of the hands and the feet of Man; while, on the contrary, from a sameness of use, the anterior and posterior paws, or feet, of the lower Mammalia, resemble each other, excepting in very minor particulars (as the number of digits, &c.); it follows, that the metatarsal bones, and phalanges of each pair, in the latter, will be mere copies of each other, or, at least, exhibit but trifling variations. To this remark, the pedimanous marsupials (as the *Phalangers*), in which the hind feet are furnished with an opposable thumb; the Kangaroos, Gerboas, *Viscacha*, and others, in which the fore limbs are short, and the hinder limbs greatly developed; the Bat, in which the reverse exists; and the Mole, which has the fore feet constructed as spades, &c., are exceptions. In the *Quadrumana*, the posterior pair are as truly prehensile as the anterior, perhaps more so; the thumb, in many genera, as the Lemurs, and various American Monkeys, being better developed in these hinder hands than in those which terminate the arms.

In the *Simiæ*, as in Man, the number of the tarsal bones is seven; in the solidungulous animals it is six; in the ruminants, five, with the exception of the Camel, in which it is six, and of the Giraffe, in which it is four. In the Hog, Tapir, Elephant, Hippopotamus, Rhinoceros, &c., it is seven; but, in the Daman, only six.

In the tarsus of the *Ornithorhynchus* nine bones are found: four in the

anterior row, supporting the phalanges, viz., a cuboid, and three cuneiform bones: behind the latter is a large os naviculare; between which and the tibia and fibula, is the astragalus (being articulated to both); on the outside of the astragalus is placed the os calcis, of considerable size, articulated both to the astragalus and the fibula. Resting partly on it, but chiefly on the os naviculare, and lower extremity of the tibia posteriorly, as a supplemental os calcis, is a large round bone, superior in size to the os calcis, and supporting another, but smaller, which forms the base of a powerful spur (in the male), bending upward and inward: this latter bone, in the spurless female, is merely rudimentary. Meckel states, that the two-toed Ant-eater has nine tarsal bones; the Marsupials and Carnivora have usually seven.

In the Aï the anterior bones of the tarsus are ankylosed together, and with the metatarsal; the astragalus and os calcis being alone distinct. In the Rodentia the number of tarsal bones is augmented by the division of the os naviculare, or scaphoid bone, into two portions; and often, also, by the presence of a long compressed supplemental bone, along the inner side of the tarsus, as in the Beaver: this bone is, however, wanting in the Hamster, the Squirrel, the Cavy, and the Porcupine: nevertheless, a division of the second cuneiform bone, in the latter, renders the number nine. In the Hare, the tarsus consists of six bones only. The arrangement of the phalanges and of the metatarsal bones is analogous to those of the metacarpal bones and phalanges of the anterior limbs.

With respect to the metatarsus, in the solipedous Pachydermata, and in the ruminants, it agrees with the metacarpus: in the former it is accompanied by two rudimentary stylets. In the Pachydermata, generally, and in all other orders, the number of metatarsal bones is the same as that of the toes; but they are by no means of equal size and volume. Where the toes are short and feeble, the metatarsal bones will be feeble also, as is seen in the outer toe of the Armadillo. In the Kangaroo, the two first, or internal metatarsal bones, are remarkable for their slenderness and close approximation to each other; each bears a small toe, and both are joined together as far as the claw. The third metacarpal bone is very robust and large, and sustains a strong elongated toe, armed with a hoof-like nail. The fourth metacarpal bone is short, and, though far inferior in bulk to the third, exceeds the first and second both together. In the Opossum, the first metatarsal bone stands apart from the others, and is flattened: in its situation, and in its opposableness to the foot, this bone, and the two phalanges which it bears, represent a thumb. In the Helamys, a rodent of South Africa, the first metatarsal is blended with the first cuneiform bone of the tarsus. It is, however, in the Gerboa, that the metatarsus is most remarkably modified. In this species (*Dipus Sagitta*) the toes are three; but the metatarsus consists

only of one long, slender, canon-like bone, with three pulley-like articulations at its inferior extremity, for the first phalangeal bone of each toe: the middle of these articulating surfaces is the longest and narrowest. This long metatarsal bone must, indeed, be regarded as consisting, elementarily, of three, consolidated together. In the *Alactaga*, however (*Dipus Jaculus*), the two outer toes have each its own metatarsal bone, but very slender, and only extending up each side of the middle metatarsal bone for about one-third of its length.

The metatarsal bones in the *Bat* are short and slender; while, on the contrary, the metacarpal bones (excepting that of the thumb), are, as before stated, extremely elongated.

Of the arrangement and number of the toes in different groups of *Mammalia*, and of the forms and modifications of the nails, or claws, which sheath the last, or ungueal phalanx, nothing need here be said; as, this topic, and, indeed, the peculiar characters of the feet, both anterior and posterior, will be enlarged on in the treatment of each group respectively. The delineation of a broad outline will be, in the first place, sufficient, and the filling up will be a progressive work, as the orders, families, and genera, into which the *Mammalia* resolve themselves, come, in turn, under especial consideration; and, if more attention has been hitherto bestowed on the human skeleton than on the osseous framework of the lower orders, it is because a clear knowledge of the parts of which that consists, and of their mutual arrangement, is essential to an appreciation of the differences and modifications traceable throughout the class.

ON THE TEETH OF MAMMALIA.

It is only within the last few years, that the importance of the dental system of *Mammalia*, as being intimately connected with their economy, and, consequently, with their systematic arrangement, has been clearly perceived and acknowledged. From Aristotle to Ray, although the form, differences, and relative position of the teeth were not altogether unnoticed, no definite attempts were made to deduce, from their characters, those general rules, now received and appreciated by the naturalist; or to systematize the facts presented by them, with a view to the establishment of great natural groups, or orders,—the first step in the true science of zoology. It is unquestionable, indeed, that Aristotle indicated three kinds of teeth: namely, front teeth, projecting teeth (canines), and back teeth; the latter being either flat, or, as in the *Cats* and other *Carnivora*, saw-like, when regarded all together; and he, moreover, remarked, that, in ruminating animals, the front teeth, or

incisors, of the upper jaw were wanting ; but, nevertheless, no zoological principles, by which to be guided in the study of Mammalia, resulted from these notices : the zoological value of the dental system remained in obscurity.

It is not designed here to trace the progressive increase of attention which has been directed to the dental system, from Ray to the present era : much less to expatiate on the effects of that attention, so manifest in the scientific works of this epoch—an epoch signalized by the rapid progress of philosophy in every department. In some instances, perhaps, too much weight has been attached to dental characters, to the exclusion of those afforded by other organs. Hence, guided by the anomalous condition of its teeth, Linnæus and others have referred the Aye-aye, of Madagascar, a lemurine animal, to the order Rodentia, under the erroneous denomination of *Sciurus Madagascariensis*. In like manner, Pallas, and various naturalists, regarded the Hyrax as a rodent ; instances, however, of this mistaken and exclusive regard to the teeth do not lessen the value of the characters they really present.

Being instruments for seizing or collecting food, and also for reducing it to a state in which it is fitted for transmission from the mouth to the stomach—the teeth, as must be evident, will vary materially, according to the nature of the food to be subjected to their action ; and, consequently, they furnish a clue to the instincts and manners of an animal ; for instinct and organization have a mutual dependance upon each other. In Mammalia, the teeth are placed in a series, along the edge of the upper and lower jaw bones, so as to oppose one another, and are fixed in cavities, or sockets, termed alveoli, from the bottom of which they originally arose.* Their number varies, and, in a few species, they are altogether wanting : in some, as the Sheep and Deer, they are exclusively appropriated to the procuring and preparation of food ; in others, however, as the Dog, Tiger, &c., they are also used as weapons of offence.

The teeth may be regarded as consisting of two parts ; viz., a crown, which is the part external to the socket ; and a root, which is the part remaining implanted in the socket.

Examination proves, that the crown does not usually consist of one homogeneous mass ; but of two, and sometimes three, different substances, which have received distinct appellations. In ordinary cases, the crown consists of a central substance, essentially resembling bone, termed ivory, enclosed in an envelope of enamel. With respect to the third substance, it is termed cortical, *crusta petrosa*, or *cœmentum* ; and by its intervention, like a cement, masses consisting of ivory, encased in

* In other classes of Vertebrata, the situation of the teeth varies. Among fishes, for example, they not only occur on the true maxillary bones, but on the palate, the vomer, the tongue, and on the gullet.

enamel, are soldered together : such teeth are compound ; the grinders of the Elephant are an example. Ivory, enamel, and crusta petrosa, combine, according to F. Cuvier, in four different modes of arrangement. Some teeth are composed of ivory, enamel, and crusta petrosa ; others of ivory and enamel ; others (as in the Cachalot), of ivory and crusta petrosa ; and others, again, of ivory only. Ivory consists of gelatine and phosphate of lime, and, when cut, has a silky, fibrous appearance ; the fibres, which are, in fact, minute tubes, being nearly parallel to the external surface of the tooth. The enamel is much harder than the ivory, which it merely envelopes, and from which it can be separated : it consists essentially of fluete of lime, and, a section being made, it presents the appearance of brilliant needles, perpendicular to the surface of the ivory. Crusta petrosa, or cortical substance, is of the same composition as ivory, consisting of gelatine and phosphate of lime : it is, in fact, an outer layer of ivory, deposited after the formation of the internal ivory and enamel (in compound teeth), from a peculiar membrane. In teeth, consisting only of ivory and cortical substance, the latter assumes the place of enamel, and is deposited over the ivory, varying in thickness according to circumstances. On the teeth of the Cachalot, it is of great thickness, and its structure is dense and compact. In the compound molars of the Elephant, it forms a thick solid bed, in which the folds of enamel, investing the ivory (fig. 109), appear to be impacted.* According to the experiments of F. Cuvier, the anterior part of the incisors of the Rodentia is covered with a delicate layer of cortical substance, which, as in the Beaver, the Porcupine, and many other species, is of a bright orange colour—this colour is said to be owing to the presence of iron in the form of a simple oxide. In the dentition of the Elephant, instances are presented, at the same time, of the simplest and of the most compound structure of teeth : the grinders are compound, as already stated—the tusks are solely ivory.

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Grinding surface of Elephant's tooth.

The following valuable observations are from a paper by Professor Owen, "On the structure of teeth, and the resemblance of bone to ivory, as illustrated by microscopical examination of the teeth of Man, and various existing and extinct animals." In this paper Professor Owen alludes to the recent investigations of Purkinje, Müller, and Retzius, with respect to the intimate structure of teeth, and follows up the results of their experiments by a detail of the conclusions to which his own re-

* In the Horse, the cortical substance, forming the external part of the molars, is of great thickness ; as it is, also, in the molars of the Hippopotamus. On the summits of the projecting surfaces, in the molars of the Ruminantia, it is thin, but becomes thicker in the depressions between them.

searches have led. He observes, "that, until a very recent period, the analogy of tooth to bone was supposed to extend no farther than related to the chemical composition of the hardening material; while the arrangement of this earthy constituent, as well as its mode of deposition, during the growth of the entire tooth, were considered to be wholly different from that of bone, and to agree with the mode of growth of hair, and other so-called extravascular parts, with which teeth in general closely correspond in their vital properties." To this he adds, "that the supposed proofs of the laminated structure of teeth (in favour of their distinction from bone), derived from the appearances presented by the teeth of growing animals fed alternately with madder, and ordinary food, and by those which often occur during the decomposition of certain teeth, which are then resolved into a series of concentric or superimposed laminæ, were equally applicable to true bone, and quite unavailable in illustrating the point under consideration; and that the appearances presented by the superficies of vertical sections of teeth, viewed with the naked eye, or a low magnifying power, were due, not to the intervals of separate and superimposed lamellæ, but to the different refractions of light caused by the parallel undulations or alternations of structure of minute tubes, proceeding in a contrary direction to the supposed lamellæ. This apparently lamellated structure, however, is not constant, nor equally plain in different teeth: on the contrary, the fractured surface, or the polished surface of the human, and many other teeth, presents a silky or iridescent lustre, which has attracted the attention of several anatomists." Hence Malpighi conceived, that the teeth were composed of minute fibres, reticulately interwoven; and Leuwenhoeck, in 1683, discovered, that these apparent fibres, were, in reality, minute tubes. In 1835, this tubular structure of ivory was re-discovered by Purkinje and Fraenkel, who, moreover, "added to dental anatomy several new and interesting facts relating to the structure of the enamel; pointing out, more especially, the form and characteristic transverse striæ of the component crystals; and, farther, they determined the true osseous nature of that distinct layer of substance, which had been previously known to surround the fang in the teeth of Man, and which they once observed to be continued upon the enamel of a human incisor." This, Professor Owen has discovered to be identical in its structure with the cement (*crusta petrosa*), which enters more abundantly into the composition of the compound teeth of the *Herbivora*. After adverting to the experiments of Professor Müller, on the nature and contents of these dental tubuli, Professor Owen refers to Professor Retzius of Sweden, and states, that, "besides confirming the fact that the ivory or bony constituent of a human tooth consists of minute tubes, lodged in a transparent medium, disposed in a radiated arrangement, with the lines proceeding

in a direction perpendicular to the superficies of the tooth, Professor Retzius has more particularly observed and described the dichotomous branching of the primary tubes; the minuter ramuli sent off, throughout the course of the main tubes, into the clear interspaces; the calcigerous cells, with which those fine branches communicate; the terminal ramifications of the tubuli, and their anastomoses with each other, and with calcigerous cells at the superficies of the ivory or bony part of the tooth." According to Professor Retzius, the function of these branched and anastomosing tubes is nutritive: they convey, "by capillary attraction, a slow current of nutritive, or preservative fluid, through the entire substance of the tooth; which fluid may be derived either from the superficies of the pulp, in the internal cavity of the tooth, or from the corpuscles and cells of the external layer of cortical substance or cœmentum; with the tubes radiating from which corpuscles, the fine terminal tubes of the ivory anastomose." In addition to the determination of the nature and arrangement of the dental tubuli, Professor Owen has proved the existence of other component substances in teeth, besides those usually described and admitted; the microscopic characters of which are alike distinct from those presented by ivory, enamel, cement, or true bone.

One of the substances, he states, is "characterized by being traversed throughout by numerous coarse canals, filled with a highly vascular medulla, or pulp, sometimes anastomosing reticularly; sometimes diverging, and frequently branching; sometimes disposed nearly parallel with one another, and presenting more or fewer dichotomous divisions. The canals, in many cases, are surrounded by concentric lamellæ, and thus resemble, very closely, the Haversian canals of true bone; but the calcigerous tubes, which everywhere radiate from them, are, relatively, much larger. The highly-organized tooth-substance, just described, differs from true osseous substance, and from the cœmentum, in the absence of the Purkingian corpuscles, or cells. This structure is exemplified in the teeth of many fishes, and in some of the edentate Mammalia.

"Another component substance of tooth more closely resembles true bone and cement, inasmuch as the Purkingian cells are abundantly scattered through it: it differs, however, in the greater number and close parallel arrangement of the medullary canals. This structure is exhibited in the teeth of the Megatherium, Mylodon, and other extinct Edentata."

An attempt will not be made to follow Professor Owen through his elaborate details of the modification of the above-named dental substances in various fishes, reptiles, and Mammalia; but those, who are interested in minute anatomy, are referred to the original paper. (See the *Eighth Report of the British Association for the Advancement of Science.*) His final

remark, however, cannot be omitted, namely,—“ that, through the endless diversity, which the microscopic texture of the teeth of different animals presents, the universal law of the tubular structure can be unequivocally traced ; and, that the general tendency of the modifications observable, in descending from Man to the lower classes of the vertebrate animals, is a nearer approximation of the substance of the tooth to the vascular and organized texture of bone.” With reference to the application of the tubular structure of the teeth, to the explanation of their pathology, a new field, as Professor Owen observes, is opened ; from the cultivation of which some valuable practical improvements in dental surgery may result. In the use of the microscope, for the examination of thin slices of fossil teeth, with a view to the determination of the natural group, to which the animal itself belonged, when other characters fail, or when a complete tooth is unattainable, we have a new and important test.

With respect to those groups of Mammalia, in which the teeth present the usual structure of compact ivory, enamel, and cement, they have been minutely described in several genera, by Professor Retzius.

The bearing, however, of the microscopic discoveries in dental structure, upon the natural history of the Mammalia, is rather remote than immediate : to the naturalist, the forms, the number, and the arrangement of the teeth, are of primary importance ; and it is upon these points, conjointly with others, that his groups of the Mammalia are founded : nevertheless, he is glad to receive aid in his pursuit, or confirmation as to the justness of his views, from the researches of the microscopic anatomist, who, in his investigations of the intimate structure of the organs in question, traces modifications exclusively peculiar to the natural families, or genera, established on other data.

An examination may now be made into the general characters, which the roots, or the fangs, of the teeth present, as to their relative degree of perfection.

The roots of teeth are either real or fictitious. In the first case, the root consists of either ivory, solely (the enamel ending at the commencement of the root, commonly called its neck), as in Man, the Carnivora, Ruminantia, &c. ; or of ivory and cœmentum, as in the Cachalot. When the root is fictitious, it is a mere continuation of the crown, whatever that may consist of, with the same arrangement of its parts. Teeth, with fictitious roots, continue to grow, at least to a late period of life. The tusks of the Elephant, the incisor teeth of all rodents, and the molars of many, as of the Hare, Cavy, and Arvicolæ, are examples ; but not the molars of the Squirrels and true Muridæ, or Rat tribe. The formation of the teeth takes place in what anatomists have

termed a capsule, which is, in fact, an apparatus for their production, seated in the alveolar cavity of the maxillary bones.* Like every other part of the system, the teeth are the result of a process of secretion. The apparatus, by which the material of the teeth is elaborated, and which, at the same time, also determines their form, is, itself, more or less complicated, according to the structure of its product. It consists, then, of a pulp and two membranes.

The pulp, or bulb, consists of a spongy, or tuft-like, mass of blood-vessels and nerves, and is destined for the secretion of the ivory of the tooth. Its form is that of the tooth which it produces: it is, indeed, the mould, upon which the ivory is modelled. The first capsular membrane is the enamel membrane: it envelops the bulb, following its form and contour; but terminates at its base, corresponding to the neck of the tooth, which part is the boundary of the enamel in teeth with true roots. This membrane is brittle and translucent; from its inner surface (although F. Cuvier was unable to detect any vessels), it deposits, particle by particle, on the ivory moulded by the bulb, the enamel with which it is invested; which, being fully accomplished, it becomes then opaque and elastic, and, at last, finally obliterated. To the transparency of this membrane, to its subsequent thinness, and to its total obliteration, when the crown of the tooth is duly formed, the cause of its having hitherto been overlooked is, doubtless, to be attributed. It is, however, easily to be distinguished from the contiguous parts on the molars of ruminants, and especially their posterior molars, immediately after birth. To look for this membrane when the teeth are developed, is, of course, useless.

The second membrane is that which deposits the cortical substance, or *crusta petrosa*; and which is even to be discovered where this substance does not enter into the composition of the teeth; but in such cases it is very thin, and seems to act merely as a protecting envelope to the capsule. As the substance secreted differs little from the ivory, so, in its structure, this membrane approaches the bulb, being highly vascular. In compound teeth its function is very important. Following the sinuosities of the enamel-covered ivory, it fills, like an external pulp, the interstices of the folds, and completes, by its secretion, the composition, which the internal pulp and the enamel membrane have previously elaborated.

* "Les mâchoires présentant d'abord une seule alvéole commune, vaste, mais peu profonde, dans l'intérieur de laquelle se développent les sacs dentaires. Peu à peu il s'élève des cloisons osseuses, imparfaites au commencement, et parfaites à une époque plus reculée, qui divisent l'alvéole primitive en plusieurs compartiments. Ces cloisons, qui formaient originairement une gaine ample à la dent toute entière, n'entourent plus tard que sa racine, à laquelle elles sont alors étroitement appliquées. A mesure que celle-ci se développe les arcades alvéolaires augmentent considérablement de hauteur, pour se rétrécir ensuite, après la chute des dents; cette diminution du diamètre vertical des arcades dentaires tient au rétrécissement et à l'acclusion des alvéoles."—*Traité Gen. d'Anat. Comp.*, par J. F. Meckel. Vol. viii., p. 338.

When the tooth, as in the Cachalot, is invested with cortical substance only, this membrane, it may be presumed, takes the place of the enamel membrane; and, from the mass of matter it has to supply, must be of great extent and thickness. By the evolution of the teeth it becomes obliterated in its centre; but its marginal parts amalgamate with the gum, originally spreading over the whole. Thus, then, it is not until the internal pulp and the enamel membrane have formed the crown (where the crown is composed of ivory and enamel), that the cortical membrane, or external pulp, assumes its functional office. One part, however, of the process only is as yet finished; the root has still to be formed, in order that the tooth may rise. The enamel membrane having disappeared, the bulb secretes the root; and, where the cement enters into the substance of the tooth, this membrane also contributes its share. It must not be forgotten, however, that the root is either real, or a mere continuation of the crown. In the first case, it would seem that, having duly completed its task, the pulp loses its productive energy, having become, during the process, enclosed within the ivory of the crown, and reduced to a small space; and hence the roots are pierced at their points, for the transmission of the vessels and nerves of this pulp, which sustain its vitality, and endow it with the highest sensibility. In the second case, the elaborating apparatus continues active during life, or, at least, till a very late period, ever carrying on a work of ceaseless renovation, so as to raise up the tooth in proportion as it is worn away. This process is beautifully exemplified in the incisor teeth of rodents.

The dental capsules exist at an early stage of existence; and the teeth, though as yet undeveloped, are, to a great extent, formed at the period of birth. This observation chiefly applies to the deciduous, or milk teeth, which, in a few years, fall out, and are succeeded by a permanent series.

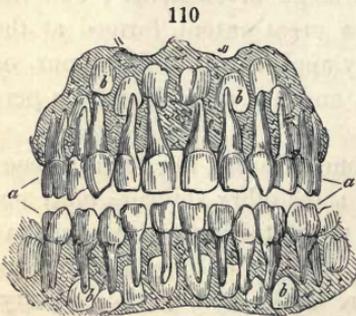
The terms, deciduous and permanent, founded upon the dental phenomena observed in the human species, and some other animals, must not be taken in a rigorous sense as applicable to the teeth of all Mammalia; for, among them, it has been proved that, on the one hand, there are instances, in which the milk teeth fall before birth; and, on the contrary, that there are others, in which they are retained to a period long after maturity. A statement of the progress of dentition, as presented in the human species, and in one or two of such Mammalia as differ the most in the routine of their dentition from that standard, will serve to give a clearer idea of the matter than any other mode of explanation.

To begin, then, with the human species. The first dentition here takes place from the sixteenth to the twenty-fourth, or thirtieth, month after birth, and usually commences in the lower jaw: the incisors are the

first to make their appearance ; then, on each side, the first grinder ; next, the canine tooth ; and, lastly, a second grinder. And here it is to be observed, that they are grinders with four tubercles, and not bicuspid grinders, which are placed next in order to the canine during this primary dentition ; a fact, which is the opposite of what obtains on the completion of the permanent teeth : this phenomenon appears to result from a general law.

When the sixth, or eighth year is attained, the phenomena of the second dentition commence by the development of a third molar, stronger than those already noticed, and the strongest of the set about to be formed. Next, all the teeth of the first dentition fall out (their roots being more or less absorbed), exactly in the order in which they appeared, and are replaced by others, stronger and larger, but of the same character ; excepting that the two molars, succeeding the canine, are replaced by false, or bicuspid molars. This operation is completed at about the twelfth year ; soon after which the penultimate molar appears : and, lastly, the back molar, or wisdom-tooth, which may be regarded as affording something like an indication of a third dentition. The time of the appearance of this tooth varies : it seldom cuts the gum till several years after the others, and is occasionally delayed till near the thirtieth year.

In Man, and most Mammalia, the permanent teeth are formed in capsules peculiar to themselves, below the first series ; and their formation is not only begun, but advanced, before the fall of the milk teeth, to such a state, that, as these are successively lost, the vacancy is speedily supplied. It is owing, no doubt, in a great measure, to the *vis a tergo*, produced by the outward pressure of the permanent teeth, that the roots of the milk teeth become absorbed, and the crowns finally excluded from the jaws. The annexed sketch (fig. 110) displays the relative situation of the two sets of teeth, previously to the fall of the first.



View of milk, or deciduous teeth, the permanent teeth being as yet undeveloped, and lying in their deep alveolar cavities.—*a*, the deciduous series; *b*, the permanent series about to become developed.

In the *Quadrumana*, the permanent teeth do not exactly follow in the track of the deciduous series ; for behind each deciduous tooth is a foramen leading to the cavity, in which the corresponding permanent tooth is in course of formation ; and through this its crown ultimately emerges, at the same time that it forces out the deciduous tooth, and obliterates all trace of its alveolus. During this process, the jaws, in the *Simiæ*, greatly expand, adapting themselves to the size of the permanent teeth, the canines of

which are of formidable magnitude. The development of the permanent series is attended with great irritation of the system. The Simiæ suffer much at this epoch; and, in the Dog, the second dentition is often a painful process. In the human species, the first dentition would seem to be the most critical; owing, perhaps, to the comparative feebleness of our race during infancy, but more to the development of the brain, and the unobstructed flow of blood to that organ, which seems, at this era, to be peculiarly liable to increased vascular action (the blood being determined toward it in a more than ordinary ratio), ending in convulsions, or effusion within the ventricles.

Another sort of process must now be noticed, by which a succession of teeth is secured, and which is found to obtain in the Phacochoerus, and Elephant, among the Pachydermata, and in the Capybara, among the Rodentia. This process refers solely to the molar teeth. Instead of the molars being succeeded once, and once only, by a set formed below them, it appears that an oft-repeated change takes place by the gradual development of a molar, posterior to the others, and which, as a sort of intruder, forces them forward as it usurps their situation; so that the first molar, which is the most worn (having been the longest used), is ultimately dislodged by the pressure from behind it, and falls.

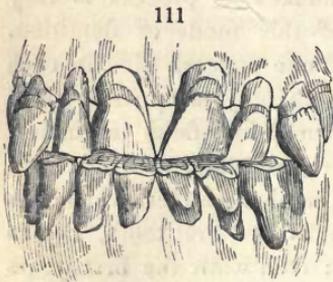
The Elephant, for example (in which animal this process is very marked), will afford a good illustration of this mode of dentition. The molars of this animal are four; namely, one on each side in each jaw. At first, the anterior ridge of each tooth only is apparent; but it advances, layer after layer of ivory and enamel imbedded in cortical substance being added, till the tooth is perfect, and fully evolved. No sooner, however, is this accomplished, than another grinder, which has been preparing in a deeper socket beyond that of the first tooth, begins to shew itself, and then gradually to advance; and, while the first wears by use, it is, at the same time, pushed forward by its successor, till, at length, the ossification of its alveolus concurring with the efforts of the posterior molar, its relics (for it is worn to an inconsiderable portion) are expelled. That which has taken its place undergoes a similar fate, and so on for seven or eight successive changes. Thus, the Elephant has, first, one tooth only on each side (in each jaw), then two; and, afterwards, alternately, one and two, in succession, to the end of the changes. On referring to the section of the skull of the Elephant (fig. 20), the relative position of these teeth will be easily understood.

As it respects the dentition of the Rodentia, it has been affirmed, by Cuvier, that all those, which have but three molars, experience only a single dentition; and that a second occurs only in such as have a number beyond this: that is to say, the second dentition only changes the anterior supernumeraries. He also states, that the teeth of the first dentition, in

the Guinea Pig, are shed before birth. In the Hare tribe, it is a few days after birth that the shedding of these teeth takes place; at which period, the little rudimentary incisors, which lie behind the large pair, make their appearance.

The teeth of Mammalia have been divided into three kinds:—First, incisors, or cutting teeth, arising from the anterior part of the superior maxillary (intermaxillary in the lower orders) bones, above and from the corresponding part of the lower jaw; secondly, canines, succeeding the incisors, one on each side; those of the lower jaw, when the mouth is closed, advancing before those of the upper: to these succeed, on each side, thirdly, the molars, or grinding teeth.

With respect to the names, by which the teeth are designated, it must be confessed, that they are not of strictly universal application; for the trenchant back teeth of the Felidæ cannot be called molars, or grinders (*mola*, a mill; *molo*, to grind); nor is the term incisor better adapted to the front teeth of the insectivorous animals: still, however, as these terms are universally adopted, and as none of a comprehensive signification can be well devised, their use becomes a matter as much of necessity as convenience. The incisor teeth vary, in form and character, almost ad infinitum. In Man, and the Simiæ, they are broad and compressed,



Teeth of Orang.

with a flat edge; and the upper and lower incisors are opposed to each other vertically, or nearly so; though less truly in the Simiæ than in Man: in both they are large and important: in the Orang their strength and thickness are very remarkable (fig. 111). In the Bats they vary in shape and importance; and (as in the genus *Edostoma*), those of the upper jaw often differ, both in form and number, from

those of the lower jaw. In the Carnivora their number is six in each jaw; but they are small, feeble, and comparatively unimportant. In the Insectivora they also vary, assuming, in many species, as the Shrews

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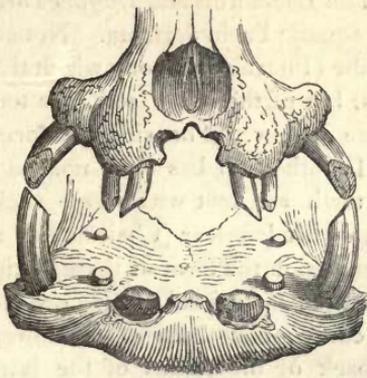


Incisors of Shrew.

(fig. 112), a prehensile character; and are adapted, by their length, and subulate, or awl-shaped form, for seizing small objects of prey. Where the incisors are long, the canines are little distinguishable from the lateral incisors, or from the false molars; but, where the canines are large, all the incisors are small. In the Ruminantia there are no incisors in the upper jaw; and those of the lower jaw are flat, broad, and oblique, so as to oppose their upper surface to the callous gum of the upper jaw. The Pachydermata present great variation in the character of the incisors. In the Horse we find them large and strong,

with flat broad edges, or surfaces, opposing each other, a central depression shewing itself as each tooth is worn. In the Hog they are strong; those

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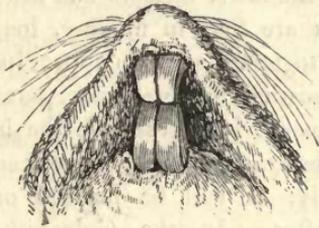


Teeth of Hippopotamus.

of the lower jaw projecting obliquely. In the Hippopotamus (fig. 113) those of the upper jaw are conical, and project downward; those of the lower jaw horizontally, the two middle being extremely developed, long, and cylindrical. In the Elephant there are no incisors in the lower jaw; and the two in the upper assume the form of huge, cylindrical, recurved tusks, without a true root. On the contrary, in that fossil animal, the Dinotherium (an aquatic pachydermatous animal), the incisors of the

lower jaw sweep abruptly downward, like the tusks of the Elephant, resembling them in shape (excepting that they are rather incurved), and almost equalling them in magnitude.

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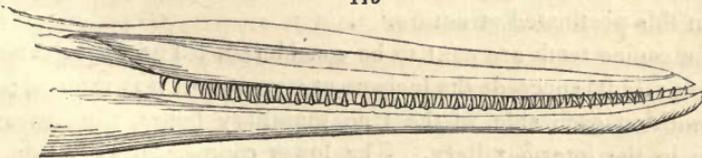
Incisors of Capybara.

The Rodentia have large curved incisors, see the annexed figure (114), of the mouth of the Capybara, without true roots, with scalpriform, or chisel-like edges, of great sharpness. The Edentata are destitute of incisors. Among the marsupial animals the true Opossums have ten incisors above, and eight below; the Dasyuri, of Australia, have eight above, and six below; the Phalangers (Phalangista, Geoff.)

have six incisors above, and two large pointed oblique incisors below, as have, also, the Petauri and the Kangaroos.

The Wombat closely resembles the Rodentia, and has two incisors in each jaw. The Cetacea have no incisors; nor, indeed, can the teeth, with which the jaws of certain groups (as the Dolphin, Porpoise, &c.) are furnished, be called either by the term canine or molar: they are

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conical, prehensile, or seizing teeth, interlocking when the jaws are closed, as in fig. 115, which represents the jaws of a Dolphin. There is, however, one exception; the Narwhal (Monodon), destitute of other teeth,

has two incisors, of which the right is usually found undeveloped within the intermaxillary bone, while the left projects in the same line with the body to the extent of several feet, being a straight, conical, spirally-twisted weapon, analogous to the tusk of the Elephant. The Lamantins and Duyongs are not properly ranked as Cetacea; they are aquatic Pachydermata. Notice has been purposely omitted of the Seal tribe (*Phocidæ*), among which the form and number, not only of the incisors, but of the other teeth, are too variable to be the subject of a discursive review. The singular form of the incisors in the Elephant and the Dinotherium has been noticed; but curiously abnormal forms of those teeth are met with where such might be least expected. The Aye-aye, of Madagascar (*Cheiromys*), a lemuridous animal, differs from all the Lemurs, in the form of these teeth, and in the absence of canines. The incisors of this animal closely resemble those of a rodent, having the same curve; and those of the lower jaw (as in the Beaver), sweep to the back of the ramus of the jaw, beneath the roots of the molars: the points of the incisors resemble a

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Teeth of Lemur.

ploughshare. The ordinary Lemurs have (as seen in the accompanying figure, 116) four incisors above, small, and placed in pairs, with a central space between them, into which are fitted the points of the lower incisors and lower canines. The lower incisors are four in number, long, compressed, and fitted close together, so as to appear like

one tooth, serrated, or consisting of comb-like parts; their direction is oblique. The lower canines, which resemble the incisors in every respect, excepting that they are stouter, have been long regarded as incisors; but erroneously, as will be pointed out

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Teeth of Galeopithecus.

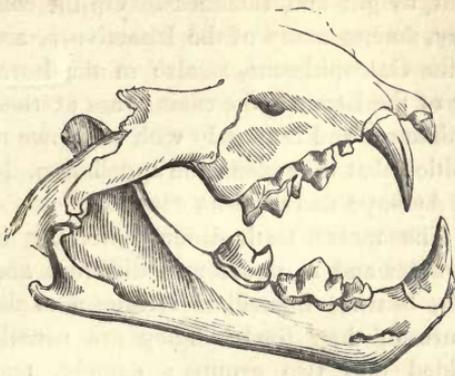
hereafter. In the Galeopithecus, also (fig. 117), the incisors are curiously formed: those of the upper jaw are placed in pairs; those of the lower jaw are also four: all are pectinated, or, with a comb-like surface;

those of the lower jaw deeply and delicately, even to the commencement of the root. The canines (if so they may be called) participate, also, in this pectinated structure.

The canine teeth are next to be considered. The upper canine tooth (where present) succeeds the incisors at a greater or less interval; it is the first tooth on each side, in the true maxillary bones, the incisors being always in the intermaxillary. The lower canine, on each side, always advances before the upper canine, and is either in contact with its anterior surface (as in the Tiger, fig. 118), fitting into a space between that and the upper incisors; or, as in the Horse (the male), it is not

in contact with the upper canine, though still anterior to it. In the human skull the lower canine passes within, but is still anterior to the upper canine; but there

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Jaw of Tiger.

is no space for its reception, a character in which Man stands alone. In the Simiæ the space is very marked. By this rule, then, the canines of the lower jaw, where their form is that either of the incisors or false molars, and otherwise not distinguishable from them, may be determined. In many orders, as the Rodentia and Pachydermata,—the Camels, Llamas, Musk Deer,

and Muntjacs excepted,—there are no canines. In the Camels and Llamas there are canines in both jaws; in the Musk Deer and Muntjacs only in the

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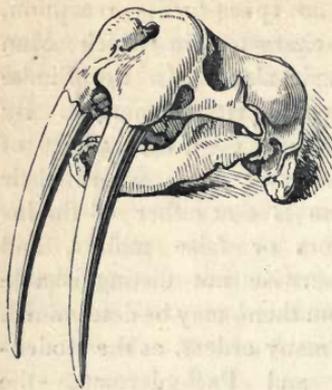


Canines of Musk Deer.

upper, and these are very long and sharp, as exhibited in the annexed figure of the upper jaw of the Musk Deer. The Camels, Llamas, and Musk Deer, it is curious to observe, have no antlers; and the antlers of the Muntjacs, elevated on a long osseous peduncle, are of very inconsiderable size. Rudimentary canines, however, exist in many of the males of the Deer tribe. With the exception of the Sloths, there are no canines in the Edentata. It is in the Carnivora that the canines assume their normal development; and the term canine, ordinarily

applied to them, indicates them to be especially developed in the Dog. They are, when normal, longer than the other teeth, conical, acute, and strong, often compressed, and with a cutting edge behind: their number never exceeds one on each side in each jaw. In many animals they are hugely developed into tusks, as in the Boar, the Phacochærus, and the Morse. In the two former animals, and their allies, those of the upper jaw curve upward out of the mouth, and those of the lower emerge with a similar curve, and are in contact with the anterior face of the upper canines. In the Morse (fig. 120) they exist only in the upper jaw; imbedded in enormous projecting alveoli, they sweep down, slightly incurved, forming large, sharp tusks, or weapons of defence, perfectly exposed (the lower jaw fitting in between them), and of twelve, or eighteen inches, in length. In the Hippopotamus (fig. 113), the canines

form huge tusks: those of the upper jaw, though of considerable thickness, are short and blunt, being worn by the canines of the lower jaw, which



Tusks of the Morse.

curve upward with a bold sweep, and are of great weight and thickness. On the contrary, among many of the Insectivora, and in the Galeopithecus, as also in the lower jaw of the Lemurs, the canines are at their minimum; and it is only with reference to position that they claim the appellation. In the Aye-aye there are no canines.

The molar teeth differ materially in character and in number in different animals, bearing immediate reference to the nature of their food. They are usually divided into two groups; namely, true molars, and false molars. The false molars,

where present, follow the canines, and are not only smaller than the true molars, but of a different shape: they are either bicuspid, as in Man and the Simiæ; or unicuspid, as in the Dog: their number in the Carnivora never exceeds three on each side, in each jaw, excepting on the lower jaw of *Canis Megalotis*, which has four.

The true molars are infinitely diversified. In Man and the Simiæ they exhibit a uniformity among each other, and have four tubercles on their grinding surface; excepting the last molar of the lower jaw in certain genera of the Simiæ, which has five tubercles. In the Insectivora they are crowned with acute tubercles, or conical points, more or less elevated; the Mole affords a good specimen of acutely tuberculated grinders. In some of the Seals the molars are simple and conical; in others, they are divided into three pointed tubercles; in others, again, they are slightly three-lobed. In the Rodentia there are no false molars, and the true molars are mostly laminated; in ruminants, and in the Horse and Elephant, there are no false molars; and the molars, when worn, also display a laminated structure.*

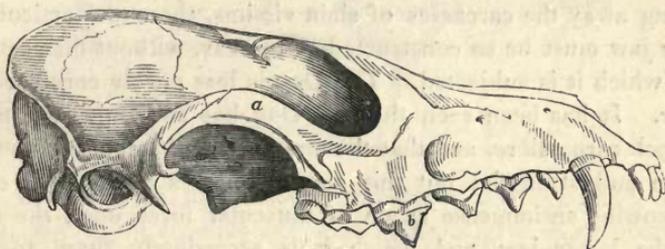
In the Edentata, the molars, where present, are simple and cylindrical. In the Carnivora the molars are divided into false, carnivorous (carnassières), and tuberculous molars; the number of the latter diminishing according to the sanguinary habits of the species. The carnassière,† or carnivorous molar, succeeds the last false molar, and forms, as it were, the base, upon which rests the anterior part of the zygomatic arch; or, in other words, a line following the curve of this arch will bisect the middle

* The laminae of compound teeth are disposed either transversely, longitudinally, or obliquely, and present various forms—as of a trefoil in the Hippotamus; of crescents in the ruminants; of triangles and irregular folds in the rodents.

† The carnassière really belongs to the false series.

of the tooth: it is large, strong, and powerful; of a compressed shape; and divided into two or more trenchant conical points, often having, also, a small inner tubercle. The action of the carnassière of the upper jaw, with respect to its correspondent tooth in the lower jaw, is scissor-like. Posterior to the carnassière succeed the tuberculous molars, never being more than three in number, except in the marsupials, in which they are four. These are less numerous and smaller in the Cats and Mustelæ than in the Dogs: the Cats, in fact, have a small tuberculous molar only, in the upper jaw, but none in the lower. In the Mustelæ, or Weasel tribe, there is a very small tuberculous molar below, and a larger one above. In the Dog there are two tuberculous molars above, and two below: the first tuberculous molar above, is large and strong; its greatest measurement is transverse. The sketch of the skull of the Dog (fig. 121) shews the position of the zygomatic arch, *a*, with respect to the carnassière, *b*.

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Skull of Dog.

In the Bears, the least carnivorous of the order, the carnassière is scarcely to be so called: and it is followed, in each jaw, by three large tuberculous grinders, adapted for bruising vegetable substances.

Various formulæ have been proposed, by which to give, as succinctly as possible, the dental system of animals: the following is a specimen of that most in use; and it refers to the Dog:—Incisors, $\frac{3-3}{3-3}$; canines, $\frac{1-1}{1-1}$; molars, $\frac{6-6}{7-7}$; = 42.

In this formula the character of the molars is not expressed—a material objection; otherwise it is simple and intelligible. It indicates that there are three incisors on each side above, and three below; one canine on each side, above and below; and six molars on each side above, and seven on each side below. But, as the character of the molars is not given, the formula may be modified, with advantage, as follows:—Incisors, $\frac{3-3}{3-3}$; canines, $\frac{1-1}{1-1}$; molars, false, $\frac{3-3}{4-4}$; carnivorous, $\frac{1-1}{1-1}$; tuberculous, $\frac{2-2}{2-2}$; = 42.

The dentition of the genus *Felis* will stand thus:—Incisors, $\frac{3-3}{3-3}$; canines, $\frac{1-1}{1-1}$; molars, false, $\frac{2-2}{2-2}$; carnivorous, $\frac{1-1}{1-1}$; tuberculous, $\frac{1-1}{0-0}$; = 30.

The dentition of Man consists of—Incisors, $\frac{2-2}{2-2}$; canines, $\frac{1-1}{1-1}$; molars, false, or bicuspid, $\frac{2-2}{2-2}$; true, $\frac{3-3}{3-3}$; = 32.

When there are no false molars, as in the Rodentia and Ruminantia, the form will be thus:—Ox: incisors, $\frac{0-0}{4-4}$; canines, 0; molars, $\frac{6-6}{8-8}$; = 32.

As the teeth of each species of Mammalia are modified according to the food upon which it is destined to subsist, so, according to the characters of the dental system, will be the structure of the articulation of the lower jaw, and its extent of motion. Where, for example, the food is exclusively vegetable, and the teeth are adapted for grinding to a pulp, the lower jaw must possess a considerable degree of motion, in order that the molars may perform their office with due effect: but where, as in the Tiger, the food is exclusively of an animal nature, requiring not to be ground, but cut up previously to being swallowed, and where the action of the molar teeth resembles that of the blades of a pair of shears, the movements of the jaw will be more limited, and the articulation altogether more secure. Where the teeth are weapons, and the lower jaw has to bear the strain of powerful muscles, in the acts of rending and tearing, and of carrying away the carcasses of slain victims, there the articulation of the lower jaw must be so constructed as to bear, without dislocation, the stress to which it is subjected. The Dog is less purely carnivorous than the Tiger. It has been seen that the Dog has two tuberculous molars behind each carnassière, and that the first tuberculous molar above is of great size and strength; but this animal crushes bones with ease—an action throwing an immense strain of muscular force upon the articulation of the lower jaw, and which it is accordingly fitted to sustain. The strictness, or laxity, then, of the articulation of the lower jaw, as a general rule, harmonizes with the dentition and the nature of the food, upon which the teeth have to act; regard, also, being had to the manner in which they have to act upon it. The modifications, however, of this articulation, are very varied: if, for instance, we compare the articulation in question, as it appears in one group of herbivorous quadrupeds, the rodents, with its construction, as observable in another herbivorous group, the ruminants, a wide distinction will be found between them—a distinction connected with the manner in which the lower jaw is used.

To point out the principal modifications of this articulation will now be attempted; and, in doing so, it may be premised, that the condyles of the lower jaw, or, in other words, its articulating processes, are received into a depression, more or less distinctly marked, at the base of the zygomatic process of each temporal bone, anterior to the auditory orifice, and termed the glenoid cavity. This cavity is lined with smooth cartilage; and so, also, is the condyle of the lower jaw: both, moreover, are lubricated with synovial fluid, as are other articulations of the skeleton, such as the knee, elbow, ankle, &c. In Man, and most other Mammalia, this glenoid cavity is exclusively on the temporal bone; but, in the marsupial animals, the extremity of the long zygomatic branch of the

malar bone enters into it, forming its external part, while a small portion of its internal margin trenches upon the base of the spinous process of the sphenoid bone. Indeed, in the human skull, the spinous process of the sphenoid bone, though not entering into the glenoid cavity, would seem to strengthen and elevate its internal boundary.

In Man the articulating condyle, *a* (fig. 122), is fitted into the glenoid cavity, *b*, and is so bounded behind by a ridge, *c* (the vaginal process), that the luxation, backward, of the lower jaw is impossible; but the

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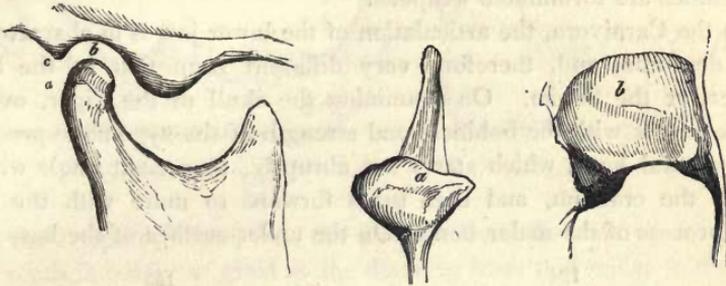


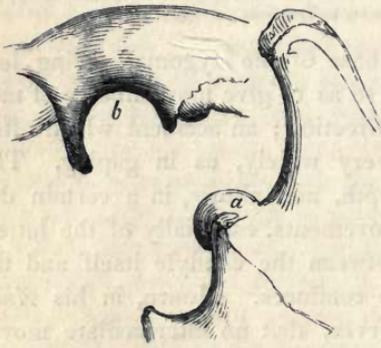
Fig. 122. A lateral view of the articulating condyle of the lower jaw in Man, *a*, and of the glenoid cavity, *b*.
Fig. 123. Another view, shewing their surfaces.

anterior boundary (a tubercle at the base of the zygoma,) being less elevated, and being rounded off, also, so as to give more liberty of motion, easily permits dislocation in that direction; an accident which often occurs, when the mouth is opened very widely, as in gaping. The cavity, however, is of considerable depth, and allows, in a certain degree, of lateral and antero-posterior movements, especially of the latter, to which the cartilage, intermediate between the condyle itself and the face of the glenoid cavity, not a little conduces. *Monro*, in his *Anatomy of the Human Bones, &c.*, observes, that an intermediate moveable cartilage, thin in the middle, thick at the edges, and, therefore, concave on both sides, is connected firmly by ligaments to the condyle, so as to follow its motions; but so loosely to the temporal bone, as readily to change its situation, from the cavity, to the zygomatic tubercle, and return again, while the common ligament of the articulation affords space enough for such a change backward and forward: but this ligament, like other ligaments of the joints, by a hinge-like union, is strong and short at the sides, to confine the lateral motions. The motions of the human jaw—its muscular strength, and the character of the teeth, accord with the multifarious diet of our race, of which the animal portion, at least, has to be more or less prepared before its reception. In the *Simiæ* the glenoid cavity is much more shallow than in the human subject, and is destitute of any anterior wall, or tubercle, of the zygoma, rising to form a barrier: in fact, it presents a flat surface, on which

the condyle plays ; but the freedom of the articulation does not appear to be increased : indeed, the overpassing of the canines (of which the lower are received into a space between the upper canines and the incisors), would of itself interfere with a very free lateral grinding movement. The muscles acting on the lower jaw are far more powerful than in Man :—in the Orang their volume is immense ;—and the teeth of the *Simiæ* are far larger and stronger in proportion : the incisors are well adapted for the rough work of stripping off the husks of fruits ; the molars, for masticating hard seeds, and other vegetable matters ; while the canines are formidable weapons.

In the *Carnivora*, the articulation of the lower jaw is in character with their dentition, and, therefore, very different from that of the human subject, or the *Simiæ*. On examining the skull of the Tiger, or Wolf, we are struck with the boldness and strength of the zygomatic process of the temporal bone, which starts out abruptly, at a right angle with the side of the cranium, and then turns forward to unite with the zygomatic process of the malar bone. On the under surface of the base of the

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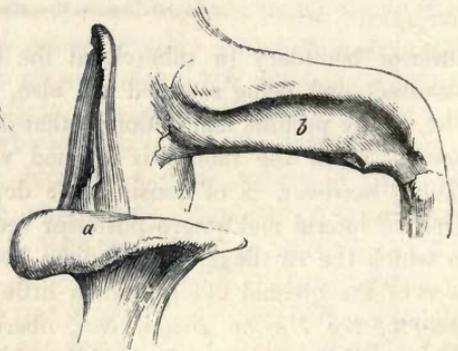


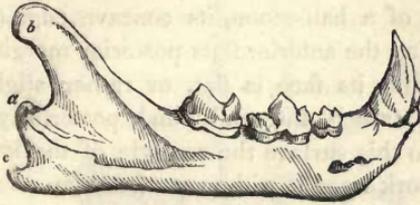
Fig. 124. A lateral view of the articulating condyle of the lower jaw in the Tiger, *a*, and of the glenoid cavity, *b*.
Fig. 125. Another view, shewing their surfaces.

zygomatic process of the temporal bone is the glenoid cavity, *b* (fig. 125), in the form of an elongated canal, with an elevated margin before and behind, extending along that process till it assumes its forward bend ; and, consequently, transverse to the cranium. To fit this cavity, the condyle of the lower jaw, *a*, is accurately formed : it is a long transverse process, rounded above, appearing as though a smooth cylinder of bone had been transversely joined to the posterior part of the ramus of the jaw. In Man, and the *Simiæ*, the articulating condyle is thrown to a considerable distance from the posterior angle of the jaw, and is as elevated as the coronoid process : indeed, it is more elevated in Man : but, in the *Carnivora* it is seated at the base of the coronoid process, just above the

acutely projecting posterior angle of the jaw, and on a line drawn through the teeth from the alveolar margin of the canine.

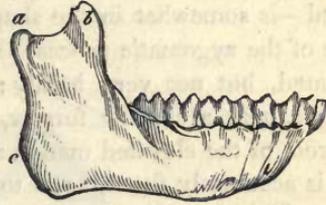
The annexed sketches serve to illustrate this difference: fig. 126 is the lower jaw of the Tiger; fig. 127, the lower jaw of the Monkey:—*a*, the condyle; *b*, the coronoid process (into which the temporal and masseter muscles are inserted); *c*, the posterior angle.

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Lower jaw of the Tiger.

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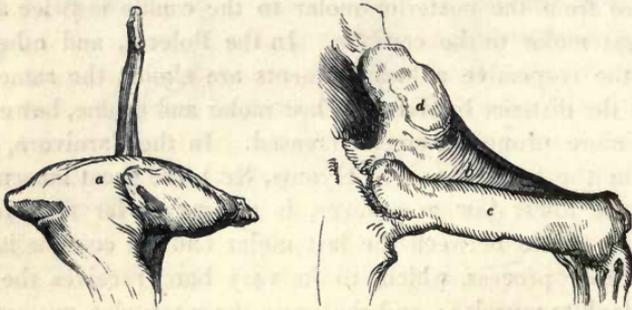
Lower jaw of the Monkey.

In the Leopard, Tiger, &c., the distance from the condyle to the last molar tooth is nearly as great as the distance from that molar to the anterior face of the canine. The skull of a Leopard gives the following measurement:—from the posterior molar (its back part) to the condyle, two inches and three-quarters; from the posterior molar to the base of the canine, anteriorly, three inches and a quarter. In the Wolf and Jackal, the distance from the posterior molar to the canine is twice as great as from the last molar to the condyle. In the Polecat, and other genuine *Mustelæ*, the respective measurements are almost the same as in the Cat tribe; the distance between the last molar and canine, however, being somewhat more proportionately increased. In the Carnivora, then (and especially in the feline race, the *Hyæna*, &c.), the great muscular force, acting on the lower jaw as a lever, is thrown as far forward as possible; for the space between the last molar and the condyle is occupied by the coronoid process, which, to its very base, receives the insertion of the *crotaphite* muscles; and the more these muscles are carried forward, the greater will be their effect upon the lever of the jaw. The strain of this lever is referred to its point of articulation: hence its peculiar construction, which, admitting of only one action, a simple hinge-like movement, promises firmness and security. No semi-rotatory, or lateral motion, can take place in such an articulation; for the transverse condyle is closely fitted into a corresponding cavity: in some animals, as the Badger, the edges of this cavity advance, and enclose the condyle, so as to lock it permanently up: therefore the lower jaw cannot be separated from the skull, within the glenoid cavities of which its articulating processes are solidly fastened.

The characters of the trenchant molars of the true Carnivora, the

mutual action of which, on each other, resembles that of the blades of shears, are inconsistent with the liberty of motion which the lower jaw of Man and of the Simiæ possesses, and, still more so with that of the lower jaw of the ruminants. In these latter is seen a modification of the glenoid cavity, the reverse of what obtains in the Carnivora; one which admits of a free, lateral, rotatory motion, in accordance with the structure of the molars, which have to grind to a pulp the mass of herbage subjected to their action. The glenoid surface—for cavity it can scarcely be called—is somewhat in the shape of a half-moon, its concave edge (the edge of the zygomatic process) being the anterior: its posterior margin is elevated, but not very boldly; and its face is flat, or rather, slightly convex, with a shallow furrow, or trench, internally, and, posteriorly, at the root of the elevated margin: to this surface the condyle of the lower jaw is accurately fitted, so as to work upon it with great freedom of motion. The peculiar lateral movements of the jaw, by which the Cow grinds the herbage to a pulp, are familiarly known; and it is this lateral motion, which the flat and open character of the glenoid surface allows. In the Kangaroo, the glenoid surface very closely resembles that of the Sheep and Goat, but not that of the rodents. The Llama and Camel approach the Horse, in the character of the glenoid cavity. In the Horse, this cavity is remarkable (fig. 128).

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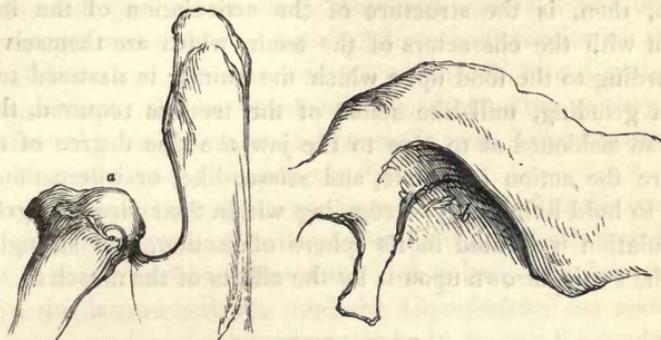
Full view of the articulating condyle of the lower jaw of the Horse, *a*, and glenoid cavity, *b*, shewing their surfaces.

Its anterior margin consists of a broad, smooth ridge, with a convex surface, and arched somewhat like a bridge; the central depression is oblong, and externally shelves upward and backward, as though its margin had been smoothly cut away; while a bold process, sweeping down from this oblique surface, just before the auditory foramen, bounds the central depression posteriorly, and is applied to a depressed surface on the inner part of the condyle of the lower jaw, *a*: from the outer part of the condyle the oblique surface of the glenoid cavity, *b*, retreats, so that the greater portion of the condyle is not in contact with any part of the

glenoid cavity while the jaw is at rest. The motion allowed by this articulation is a rolling movement from side to side; but the jaw can neither be advanced nor drawn back,—the bridge-like margin, *c*, preventing a forward movement, and the long process, *d*, a posterior retraction.

The following figure (129) gives a lateral view of the same parts: *a*, is the condyle of the lower jaw of a Horse; *b*, the glenoid cavity.

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Lateral view of the articulating condyle of the lower jaw in the Horse, *a*, and of the glenoid cavity, *b*.

In the Rodentia, another and still different modification prevails, by which a movement backward and forward is permitted, as well as laterally. The glenoid cavity, instead of being transverse, is longitudinal, without an anterior or posterior elevated margin: internally, it is bounded by the flat surface of the squamous portion of the temporal bone; externally, by a portion of the zygomatic process, at the root of which it is situated. In the Rat, Squirrel, &c., the condyle of the lower jaw is a small convex surface surmounting an elevated branch. In the Hare, however, this condyle is oval, anteriorly, and is continued backward, becoming almost linear, along the broad margin of this branch of the jaw: the anterior oval portion only is fitted into a small glenoid cavity, while the rest is closely applied to the side of the temporal bone, to which it is secured by ligament: hence, in the Hare, a lateral motion of the jaw only is afforded; the condition of the glenoid cavity, and the fixedness of the condyles of the lower jaw, preventing an anterior and posterior movement: whilst, in the Squirrel, Rat, &c., the movement is obliquely lateral, first to one side, then to the other, the jaw alternately advancing and retreating.

In the Cetacea, the articulation of the lower jaw is such as only to permit a simple hinge-like movement, and its condyles are rigidly confined, by fibrous ligaments, to the glenoid cavity. The teeth of the carnivorous Cetacea (the Dolphin, Porpoise, &c.) do not oppose each other, but alternate with each other, so that those of one jaw pass into the interspaces between those of the other. These animals do not masticate their

food, nor even divide it into morsels, as the feline animals do, but seize it with a snap, and swallow it in an instant: to the office of seizing and retaining the slippery agile prey, upon which they feed, the teeth and jaws of these aquatic tyrants are specially adapted. Eager as a hound in the chase, they pursue, with relentless pertinacity, the shoals of fishes, whose numbers they greatly thin; for their appetite is voracious, and their digestion rapid.

Thus, then, is the structure of the articulation of the lower jaw consistent with the characters of the teeth, which are themselves modified according to the food upon which the animal is destined to subsist. Where a grinding, mill-like action of the teeth is required, the articulation is so fashioned as to give to the jaw the due degree of mobility; but where the action is simple, and scissor-like, or where the jaws are destined to hold living prey, struggling within their vice-like gripe, there the articulation is limited in its sphere of motion, and strengthened to endure the strain thrown upon it by the efforts of the muscles.

ON THE DIGESTIVE ORGANS, AND THEIR APPENDAGES.

THE digestive apparatus in the Mammalia, the due and healthy action of which is essential to the well-being of the individual, is so complicated and curious, as to demand a notice of it at some length: more especially, as it presents certain modifications, in various groups of animals, important to be understood by the naturalist who would know something more of living bodies than their external form, and superficial characters. The digestive canal commences with the mouth; and the teeth are the first agents in the reduction of the food to a state proper for transmission to the stomach. From the mouth, a muscular tube, the œsophagus, leads to the stomach, in which the digestive process takes place:—to this succeeds the intestinal canal; during its course through which, the digested mass, or chyme, is subjected to the absorbing action of the lacteals, or chyloferous vessels, which take up the nutritious portion, or chyle, and ultimately convey it to the heart, to be mingled with the blood. Where the food is of a vegetable nature, or abounds with an inferior portion of nutriment, the stomach and intestinal canal are far more complex than in truly carnivorous animals, in which the stomach is simple, and the intestinal canal short; for the more highly animalized (if the word may be allowed) the food, the more replete is it with nutriment, and the more easily is that nutriment extracted.

The food of Mammalia consists of herbage, fruits, grain, and other vegetable matter; of molluscous animals, worms, insects, fishes, reptiles, birds, and also of other Mammalia.

In all herbivorous Mammalia the stomach is enormous, often highly complicated, and the intestinal canal long: the material necessary for the support of the system is not only very considerable in quantity, but it requires to be ground to a fine pulp before its proper digestion can be accomplished. In fish-eating animals, as the Porpoise and Dolphin, the stomach is complex, and the intestinal canal long, but simple. These animals are necessarily voracious: their digestion is rapid; but the cold-blooded prey, upon which they feed, yields a less proportion of nutriment, relatively to the quantity of material swallowed, than does the flesh of hot-blooded vertebrata, on which the true Carnivora, for the most part, feed; so that these animals, destructive as they are, are less voracious than are piscivorous Mammalia: the Tiger destroys life to a far less amount than the Porpoise or Seal.

The mouth, as already observed, is to be regarded as the commencement of the digestive apparatus: its posterior part, above, is bounded, partially, by a fleshy curtain, termed the soft palate, or *velum pendulum palati*. In the human subject, and the Chimpanzee, the apex of the velum forms a small projecting glandular body, termed the uvula. From each side of the uvula, the velum passes downward, in the form of a double arch, on each side: the anterior arch sweeping from the base of the uvula to the root of the tongue; the posterior, to the side of the pharynx. In the fleshy space between these arches lie the tonsils, certain glands, which secrete a lubricating fluid. The common opening, between the anterior and posterior arch, viz., the space bounded above by the soft palate, is termed the fauces, or *Isthmus faucium*; the posterior orifice of which (capable, as may be seen, of being dilated or contracted) opens into the pharynx, or wide commencement of the *œsophagus*. Into the fauces opens the glottis, or entrance of the larynx,* of which the trachea, or

* The larynx, or vocal organ, is the commencement of the trachea, or windpipe, and consists of several cartilages: viz., the thyroid cartilage, forming its anterior part, and its largest portion, and placed immediately below the *os hyoides*; the cricoid cartilage, situated immediately below the thyroid and the first cartilaginous ring of the trachea, and generally forming a semicircular band—two arytenoid cartilages, which are small, and supported on the posterior upper edge of the cricoid, and between the two wings of the thyroid. These two cartilages form, between themselves and the thyroid, a longitudinal fissure, extending from before, backward, which is called the glottis, or *rima glottidis*. From the arytenoid cartilages on each side, to the thyroid, anteriorly passes a ligamentous expansion, narrowing the fissure of the glottis, which, by the action of delicate muscles, may be widened or contracted: these ligaments are termed the *chordæ vocales*, or vocal chords; they regulate the intonation of the voice, and modulate the notes of which it is capable, like the stops upon a flute. The *rima glottidis* is furnished with a valvular cartilage, termed the *epiglottis* (present only in Mammalia), of a triangular shape, with a broad base, and situated behind the root of the tongue: under ordinary circumstances it is elevated; but, in the act of swallowing, it is drawn down by certain small muscles, so as to fold over the rima, the sides of which are, at the same time, closed together, in order that the food may pass over without entering the larynx, an accident which sometimes happens. The trachea, or windpipe, is continued from the larynx, and consists of a series of cartilaginous rings, imperfect behind (where the larynx and *œsophagus* are in contact), invested with an external and internal lining, which form the interspace between each ring. An inspection of the trachea of the Sheep, or Ox, will render this explanation easily understood.

windpipe, is a continuation: the Eustachian tube, which leads to the internal ear, enters it on each side; and the two posterior nares enter above.

The anterior portion of the mouth is roofed above by the true palate, and bounded by the teeth of both jaws. The skin of the palate is firm and tough, with a longitudinal ridge down the centre, and marked, more or less, by transverse ridges and furrows. In some animals, as the Rabbit, &c., these ridges and furrows are very numerous and distinct. The floor of the mouth is occupied by the tongue, an organ which exists in all Mammalia, varying, however, in shape and extent of mobility: in general, it is broad, long, and rounded at the apex: it is composed of muscles, and is based upon a peculiar bone, termed the os hyoides (from its shape, which is supposed to resemble that of the Greek *v*, *upsilon*). This bone consists of a body, or central portion, and of lateral appendages, termed its cornua, which are continued, by cartilage, to the basal part of the temporal bone.

The os hyoides varies greatly in figure, and in the proportions of its parts, throughout the whole of the Mammalia; and in a group of American Monkeys, termed Howlers (*Mycetes*), this bone presents a most remarkable dilatation of its body, in the form of an enormous oval drum,



Os hyoides of Howling
Moukey.

with thin osseous walls; through an opening into this drum passes a membranous sac, distended with air from the larynx; and the vibrations of the air, during the loud cries of these animals, are communicated to the osseous case of the membrane, which acts as a sounding board. (Fig. 130, represents the dilated os hyoides of one of these species.)

In the Cetacea a principal feature of the os hyoides is its want of connexion with the larynx, in consequence of the elevated position of this tube.

The tongue is essentially composed of muscles; which are either proper (that is, not inserted into the os hyoides) or common (that is, inserted into the os hyoides, or the lower jaw). Of the first series, the greater number are in pairs; that is, the same on each side: in the Carnivora, there exists a bundle of cartilaginous fibres, enclosed in a sheath, and running down the centre of the under surface of the tongue: its form is worm-like; and, indeed, it is known by the name of "the worm." In the Dog, Cat, and Bear, it is very conspicuous: Blumenbach has detected it in the Opossums, and Carus in the Mole. By its elasticity it serves to give vigour to the movements of the tongue; but, in the Dog, it has been ignorantly regarded as the cause of rabies, or, at least, as favouring the reception of this disease; and hence it is often cruelly torn away.

The tongue, then, is a muscular organ, provided with a vast multitude of vessels and nerves, and covered with a delicate humid epithelium, or membrane, closely investing its papillæ. Beneath this delicate membrane there is, in animals generally (and remarkably so in the ruminants), a reticular layer, of soft texture, termed the rete (or mesh) of Malpighi, pierced by the papillæ, which are, in many animals, considerably elevated.

In numerous Mammalia the tongue is not only of use in turning the food from side to side, or for assisting in deglutition, but it aids also in collecting food: it acts as a feeler; as a comb, or rasp; and even as an organ of prehension.

The Ox, with his free tongue, rolls the herbage of the meadow into a sort of tuft, before seizing it between the gum pad and the lower incisors: he also rasps his own coat, or that of his companion, with its rough surface. In the Dog and Cat it is the sole agent, by which fluids are conveyed into the mouth, by that action of the tongue termed "lapping." The Giraffe twists his long, black, extensible tongue round leafy branches of trees, in order to draw them toward his lips. In the Ant-eater, the tongue is a long, slender, cylindrical organ, capable of great extension, and covered with viscid saliva; and it is the principal instrument for conveying food into the mouth. This animal, having made forcible entrance into the houses of the Termite-ant, darts its tongue among these insects, picks them up, and withdraws it, the action being rapid in the extreme. In the Pangolins (*Manis*), the tongue is similarly constructed. In the Armadilloes (*Dasypus*), it is, also, long, slender, and extensible; moderately broad at the root, and gradually tapering to the extremity. The *Dasypus* *Peba* may be seen to apply this instrument to substances presented to it, with a rapid vibratile motion, reminding the spectator of the manner in which the Wryneck (*Yunx torquilla*) uses its long slender tongue, and, apparently, with the intent, either by its feeling, or sense of taste, of ascertaining its suitability for food.

With respect to the sounds, or cries, uttered by the lower Mammalia, the tongue has but little influence upon them; its anterior portion, at least, is but seldom, if ever, used, so as to produce a distinct consonant utterance for the beginning or termination of any note or intonation. It is otherwise in Man: here the tongue is an organ of speech; not that it produces, but modifies, sound; and the pronunciation of definite words, the symbols of ideas, depends greatly upon its motions. In the formation of consonant sounds, the lips, indeed, act a part, though a minor one, in comparison with the tongue. The consonant sounds of *b*, *p*, *m*, *v*, *w*, are labial. Those of *c*, *ch*, *s*, *sh*, *d*, *t*, *th*, *l*, *r*, *tl*, and others, which do not obtain in our language, are produced by the pressure of the tongue against the teeth, or the palate, with a discrimination acquired only by practice.

In Man, therefore, the tongue is not only subservient to his animal necessities—it is not only an agent in the acquisition of a knowledge of certain of the properties of bodies, by means of the sense of taste, but it is a most important organ for the communication of our thoughts, wills, and feelings, by the moulding of sounds into words, *επεα πτεροεντα*, symbols to our ears, and, once uttered, never to be recalled.

In many animals the cavity of the mouth is furnished with sacculi, or sac-like appendages, commonly termed cheek-pouches, which open into it, and serve as receptacles for food, which is carried in them, from the spot where it is collected, to the retreats, or abodes, of the animals, there either to be eaten immediately, or hoarded up for future use. These cheek-pouches, in those of the *Simiæ* which possess them, also in the Hamster, the *Arctomys*, the *Ornithorhynchus*, &c., are formed in the sides of the cheeks, exterior to the molar teeth, and run back (lined with the membrane, which covers the cavity of the mouth), sometimes, to a great distance beyond the angle of the lower jaw, so as to encroach upon the sides of the neck, as is seen especially in the Hamster, the cheek-pouches of which, distended, are represented by the following figure (131): the external skin, with the fur, is removed, so as to exhibit their true form and extent. When filled with grain, they are unloaded by the action of the muscles of the cheeks, and, among them, by the greatly-developed buccinator.

131



The Cheek-pouches of the Hamster.

In the *Pacas* (*Cœlogenus*), a group of rodents, a fissure in the skin of the cheeks, on each side, leads upward to a cavity beneath the expanded zygoma: but this cavity cannot be regarded as a cheek-pouch; it has no communication with the mouth, nor does it serve as a receptacle for food: its use, indeed, is not understood.

The lips having been mentioned, some notice may, in this place, be taken of them; and the rather, as, in several *Mammalia*, they are of essential service, in the act of procuring food, or of transferring it to the mouth.

All *Mammalia* have an upper and under lip, though, in many, the under lip is slightly developed: they may be described as flexible muscular curtains, covering the teeth, and forming, between them, the oral orifice. Of their form, in the human species, little need be said: their use, in the act of drinking, and the manner in which we close them during the mastication of food, are well known; but, besides their utility in the reception of food, they are powerful in the silent expression of the passions: by their varied movements, they denote mirth, or pleasure;

scorn, hatred, fear, and terror; grief and agony: they have, also, a settled or habitual expression resulting from their contour, which impresses us with ideas of sternness, or of moroseness; gentleness, or of good-nature. In the lower Mammalia, though the lips may quiver with pain, their movements, in general, are but an imperfect index of the feelings: the smile of pleasure, and the curled lip of scorn, belong to Man alone. In many animals, as the Cat, Dog, Hare, Rabbit, &c., the upper lip is more or less bifid, or indented by a deep vertical division. In the Cat tribe, both the lips are short, and of little use in the prehension of food; but the sides of the upper one are thickly beset with long bristles, the bulbs, or roots, of which are in contact with nervous fibrils (branches of the superior maxillary chord of the fifth pair), and are thus agents of touch. Nocturnal animals, in general, are provided with these feelers, as aids to the eye, and as guiders in their stealthy movements. In many animals the lips are capable of great protrusion, and possess a prehensile power of considerable extent. The proboscis of the Elephant is but its upper lip singularly elongated, and modified by the extension of the nostrils to its extremity: but, setting aside this extraordinary proboscis, great mobility will be found in the lips of other animals. In the Rhinoceros, for example, the under lip is broad and thick, and the upper is singularly moveable: the Rhinoceros can protrude the latter, in the form of a cone, or finger, twist it round food offered for reception, and turn the morsel into his mouth: he can collect hay, or vegetables, by its means, with great facility, or pick up the smallest fragments. The lips of the Horse, again, are prehensile: by their means he seizes hay, or corn, between his lips, and compresses the grass of the field into tufts, directing them between the teeth. The naked, slimy, upper lip, or muzzle, of the Ox, on the contrary, has no such prehensile power; but his tongue avails him for the same purpose. In the Camel (and the same observation applies to most hairy-muzzled ruminants) the lips are truly prehensile. The upper lip of this animal is cleft, and the two parts are not only capable of being protruded, but of being compressed together, so as to hold, between them, the branches, or twigs, of the dry shrubs of the desert, and thus gradually to pass them into the mouth. In the Hare and Rabbit, the bifid upper lip has a prehensile power, though it is not capable of being protruded: the latter holds in its lips a stalk of the dandelion, and gradually passes it back into the mouth, till the whole is masticated. The upper lip of the Great Ant-eater (*Myrmecophaga jubata*) is very flexible, and serves to take up food; being an assistant, in this respect, to the tongue of the animal.

Among the Carnivora, the Sloth-bear (*Prochilus labiatus*) is remarkable for the mobility and power of protrusion enjoyed by the lips, between which it seizes, with great address, food proffered for reception. In

general, however, the lips of the Carnivora are of no avail as organs for the prehension of food. The true Cetacea have marginal lips only.

Among the aquatic Pachydermata, the Dugong has the muzzle broad and flat; and the sides of the upper lip are garnished with short, thick, wiry bristles: it feeds upon the submarine algæ and fuci, which grow upon the rocks of the Indian seas; but the extent to which it uses its upper lip is not ascertained: most probably, its voluminous tongue, the surface of which is covered with long villous papillæ, is of important service. The wiry bristles of the upper lip are, doubtless, feelers.

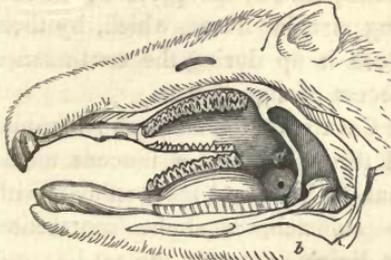
Leaving this discursive review of the tongue and lips, it may be observed, as a general rule, that the food of all Mammalia, whatever it may be, when taken into the mouth, is not swallowed without the addition of certain fluids, afforded by various glands, in which it is secreted: of these fluids, the principal is the saliva. The glands, in which this fluid is elaborated, are several; namely, the parotid, placed before the ear, and at the back of the articulating branch of the lower jaw; the submaxillary, placed at the inner side of the posterior angle of the lower jaw; and the sublingual, placed at the root of the tongue. Besides the saliva, a mucous fluid is furnished, from numerous crypts in different parts of the cavity of the mouth. The use of the saliva,* or, rather, one of its uses, is to moisten the food previously to its being swallowed. In herbivorous animals, as the Ox, which grind their food to a pulp, the salivary glands are very large, and secrete abundantly: the process of chewing excites their elaborative action, and they supply their fluid in the requisite quantity. Even the appearance of food, placed before an animal in a state of hunger, causes a flow of saliva. When the general system is diseased, or labouring under fever, the action of the salivary glands is suspended, the mouth is dry, and the tongue parched with thirst. Duly prepared, then, by the teeth, and moistened with saliva, the food, by means of the action of the tongue and muscular wall of the pharynx, is passed into the œsophagus, or tube leading into the stomach.

The œsophagus is muscular, its parietes, which consist of longitudinal and of circular fibres, forming a tunic of considerable thickness: internally, it is lined with a smooth membrane, lubricated by a mucous fluid, poured out from crypts dispersed over it. In the herbivorous Mammalia it is narrower than in the Carnivora. In some herbivorous animals the fauces, forming the back of the mouth, are funnel-shaped, opening into the œsophagus, through a small orifice, surrounded by a sphincter muscle of circular fibres, allowing only of the gradual transmission of food, which has been previously reduced to a thorough pulp. The

* The saliva, besides tempering the food, moistens the mouth, and renders the action of the tongue free and precise: in addition to which, according to M. Donné, it neutralizes, by the free alkali it contains, the excess of acid in the gastric juice, in the intervals between digestion.

Capybara, the Coipus, the Capromys, the Beaver, &c., present us with this construction of the fauces, which was first pointed out in the Capybara, by Mr. Morgan, in *Linn. Trans.*, from whose illustration, engraved in that work, the annexed figure (132), representing the

132



Fauces of the Capybara.

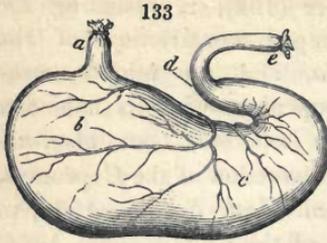
funnel-shaped constriction of the fauces, *a*, and the minute œsophageal opening, with its sphincter muscle, *b*, is taken. (See, also, account of dissection of the Capromys, in *Proceed. Zool. Soc. L.*, 1832, p. 73; and of the Coipus, *idem*, 1835, p. 175.)

By the muscular action of the œsophagus, the food is carried through that tube into the stomach,

the laboratory of digestion. Hitherto the food has only undergone a mechanical operation,—the separation of its parts, or their reduction to a soft consistence; it has now to be converted, by a chemical process, into such a state as to render it fit for being taken up by the lacteals, and for ultimately entering into the composition of the living frame. The principal agent, in effecting this digestive process, is a peculiar fluid, termed the gastric juice, secreted by the coats of the stomach, and which has the singular property of dissolving, or converting, into a pulp (termed chyme), all the substances adapted by nature as the food of any given species; for it would appear, from various experiments, that the especial food of one animal, introduced into the stomach of another, with whose nature it is not consonant, remains almost wholly unaffected.* But, besides the gastric juice, which appears to be the secretion of minute glands, though it is impossible, in most instances, to detect them, a mucous, or mucilaginous fluid is poured out into the stomach, the product of various mucous glands, or follicles, and of use in defending the inner coat of the stomach from irritating substances. In the stomach of the Beaver, at its cardiac portion, there is a curious glandular apparatus, of a structure resembling that of the tonsils, being composed of numerous small glands, or follicles, forming an aggregate of about one inch and a quarter in length, and half an inch in thickness, which, by numerous apertures, pour out a viscid secretion: in the Dormouse, a similar structure exists; and also in the Wombat and the Koala, two marsupial herbivorous animals: this cardiac gland exists, also, in the Duyong.

* A very remarkable property of the gastric juice is that of correcting putrefaction: it possesses, also, the property of coagulating every animal fluid,—as milk, the white of an egg, jelly, &c., a preliminary to its solution of them into chyme.

The stomach (fig. 133) is divided into a cardiac and a pyloric portion. The œsophagus, *a*, opens into the cardiac portion, *b*; the pyloric portion, *c* (which is thicker and more muscular than the cardiac), is that nearest to



Simple stomach.—*a*, the œsophagus; *b*, the cardiac portion of the stomach; *c*, the pyloric portion; *d*, the pylorus; *e*, the duodenum, or commencement of the intestinal canal.

the intestinal canal, and opens into it, by an orifice, termed the pylorus, or pyloric orifice, at the point, *d*; an aperture provided with strong circular fibres, which, by their action, close it up during the continuance of the process of digestion.

In the Carnivora, the stomach is simple, and lined throughout by a mucous membrane; but, in Man, and most animals with a simple stomach, a slight contraction marks the division between the cardiac and pyloric portions. In the cardiac portion of the stomach, to which the food is first conveyed, it undergoes its preparatory digestive operation, and is gradually transferred from that to the pyloric portion, which is the true digestive division of the stomach. In many animals the cardiac portion is a receptacle, in which the food may be softened, previously to its gradual transmission to the pyloric portion, rather than a laboratory. Hence, in many animals, as the Hare, the Water-rat, the Hamster, &c., the cardiac and pyloric portions are so divided as to communicate by a narrow channel, through which the food is transmitted by the muscular action of the cardiac portion, which is lined with a smooth cuticular membrane, or epithelium, while the pyloric portion is coated with the normal villous membrane.

In the Horse, the Hippopotamus, the Hyrax, &c., the left, or cardiac portion, is lined with a thick, white, epithelium, having an abrupt marginal termination at the commencement of the villous lining of the pyloric portion. Among the Edentata, the stomach of the Manis presents a similar structure.

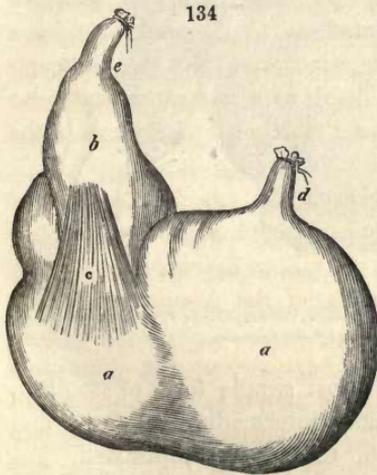
In many animals, piscivorous, and purely herbivorous, the stomach is much more complex than in the animals above noticed; and, instead of being simply divided by a constriction into two parts, is separated into various compartments, or has, appended to its cardiac portion, various sacculi, or supernumerary cavities, for the maceration of the food before entering that of the pyloric division.

In the true Cetacea the stomach consists of several compartments, succeeding from the left to the right, and communicating with each other by means of narrow orifices. Among these divisions, it is the first, or left, into which the œsophagus (which is short and spacious) directly opens; the last is the true pyloric portion. Cuvier estimates the number of these compartments to be four; Meckel, three;

Cuvier's fourth being, in his opinion, only the commencement of the duodenum, greatly dilated, as in birds. The first stomach, into which the œsophagus enters, is more or less rounded, very muscular, and lined with a horny tissue, or epithelium (a continuation of the epithelium of the œsophagus), and deeply furrowed. The thickness and hardness of this membrane is greatly augmented toward the entrance of the first compartment into the second; at which part the tunic presents elevations of a tooth-like figure. The second compartment is narrower than the first, and its lining membrane is much thicker: it is, moreover, deeply plicated, longitudinally, as well as transversely, at its upper part, where its thickness is decreased, and the epithelium abruptly interrupted.

The third cavity is narrower and much more elongated than the preceding, and rather resembles a portion of intestine than of the stomach: it is lined by a smooth, moist, flexible membrane, and is destitute of epithelium: the pyloric orifice is very narrow.* Cuvier observes, that "the first stomach of the ordinary Cetacea appears to have been modified, like their skin, by the aquatic habitat of these animals: it takes the place of organs of mastication. The second, more glandular, supplies, by its abundant juices, the want of salivary glands; the others answer tolerably well to the manyplus and rud of ruminants."

Among the Pachydermata several are remarkable for the complex character of the stomach. In the Peccary two pouches are added, to enlarge, as it were, the cardiac portion: in the Duyong the stomach is not only divided, but has pouches superadded, as well as a cardiac gland. The stomach of the Kangaroo, one of the Marsupialia, is curiously sacculated; as it is also in the Sloths. In the Ant-eaters, Pangolins, Armadilloes, and Manis, it is of a more or less globular figure, the œsophagus and pylorus approaching each other: the pylorus is of a conical figure, and very muscular, with a number of radiating fibres on its external surface, of a glossy lustre, passing up,



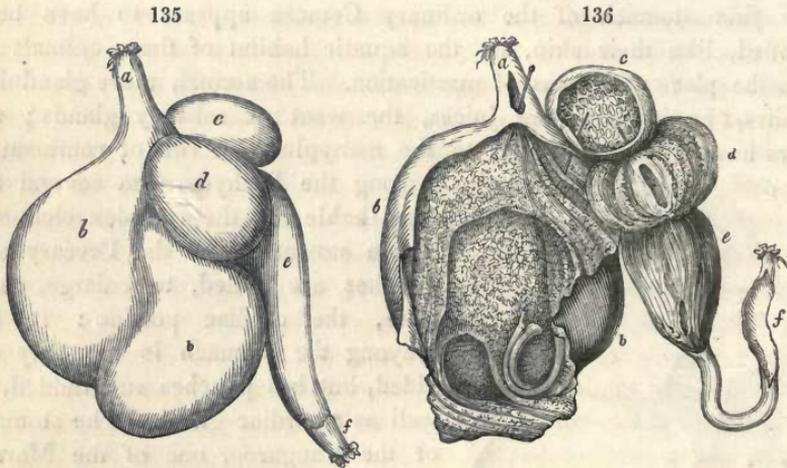
Stomach of nine-banded Armadillo. — *a, a*, the cardiac portion; *b*, the pyloric portion; *c*, the radiation of tendinous fibres, spreading from the pyloric portion; *d*, the œsophagus; *e*, the pylorus.

like a band, from it to the cardiac portion, which, in the stomach of the *Dasypus Peba*, is slightly contracted in the centre, and exhibits a tendency to the pouched, or sacculated condition, without, however, really assuming it. The above sketch (fig. 134) represents the stomach of the nine-banded Armadillo (*Dasypus Peba*).

* See Meckel's *Anat. Comp.*

Among the *Quadrumana*, one group of the Monkey tribes (the genus *Semnopithecus*) is remarkable for the sacculated condition of the stomach, no less than for its amplitude.

It is, however, in the *Ruminantia*, that the most complicated structure of the stomach prevails—a structure connected with the process of rumination, or the return to the mouth, and remastication, of the herbage, coarsely ground and swallowed, but which is to be remasticated to a fine pulp, and then transferred to a different compartment from that into which it was previously conducted. The stomach of the *Ruminantia* consists (as seen in figs. 135, 136) of four distinct cavities: the œsophagus, *a*, enters the first of these, viz., the rumen, or paunch, *b, b*, divided by a muscular band into two pouches: to this succeeds the reticulum, or honeycomb, *c*; then the maniplus, or manyfolds, *d*; and, lastly, the abomasum, or rud, *e*, the true pyloric cavity, in which digestion really takes place.



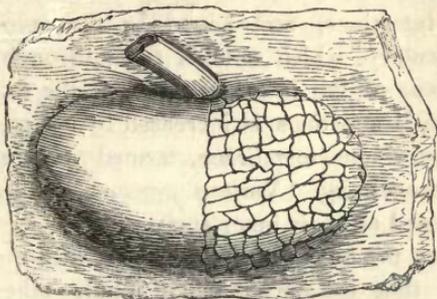
Stomach of Ox, two views.

Fig. 135, external; 136, laid open, so as to expose the internal structure.—*a*, the œsophagus; *b, b*, the rumen; *c*, the reticulum; *d*, the maniplus; *e*, the abomasum; *f*, the intestine.

It may be observed, that, between the most simple form of stomach, and the most complicated, there are many intermediate grades; and that, among the most simple, and, also, the most complicated, important modifications occur, both as to form, the character of the lining membrane, amplitude, and various other particulars. Hence it is, that Cuvier divided the complicated class of stomachs into such as are simply so, being composed of sacculi, or compartments, all having the same lining membrane, and into compound stomachs (*composés*), which, in addition to being complicated, are lined with membranes diversly organized. In the same way may simple stomachs be divided: some, instead of being universally lined with a mucous tissue, have the cardiac portion lined with

a cuticular epithelium, as those of the Horse, the Rhinoceros, &c. ; and some, again, as those of the Beaver, the Dormouse, &c., have a glandular apparatus, in the cardiac portion, for the secretion of a mucous fluid.

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Cardiac gland of the stomach of Beaver.

This singular gland is seen in the accompanying sketch (fig. 137) of a portion of the stomach of the Beaver:—the gland is partly dissected, in order to shew its conglomerate structure. Of the ever-varying details presented by the stomachs, both simple and complicated, of the Mammalia, a more detailed description will be given, as each order, or family, comes under review.

The commencement of the intestinal canal is termed the duodenum ; and into this portion of the intestine two important secretions are poured—one, the bile, secreted by the liver ; the other, the pancreatic juice, a fluid closely resembling saliva, and secreted by the pancreas, a large gland, which, spreading beneath the mesentery (to which it is attached), extends from the spleen, encircled by the fold of the duodenum. The use of the bile, and of the pancreatic juice, is not well understood ; the never-failing presence, however, of organs for their elaboration, proves their importance. In most animals there is, beneath the liver, and attached to it, a sac, termed the gall-bladder, acting as a reservoir for the bile ; but this is not universally the case. It is wanting in the Rhinoceros, Elephant, Hyrax, Hippopotamus, Pecary, and Tapir, but is present in the Hog : it is wanting in the Horse and its congeners : it is absent in many of the Rodentia, as *Georychus*, *Cricetus*, *Mus agrarius*, *minutus*, *decumanus*, *musculus*, *sylvaticus*, *rattus*, &c. ; also, in *Loncheres*, in *Histrix dorsata*, *Histrix prehensilis*, and in several of the Squirrels. Among the Ruminantia, it is wanting in the Camels and the Deer ; in the Giraffe it is generally absent, sometimes present ; it is found in the Oxen, Sheep, and Antelopes.

It may here be observed that, close to the cardiac portion of the stomach, and connected with it by a fold of mesenteric membrane, lies the spleen—a large, flat body, differing much in shape in different animals, and consisting of a tissue of tortuous blood-vessels : its use has, hitherto, baffled investigation.

The small intestines commence with the duodendum, and are somewhat artificially divided into duodenum, jejunum, and ilium : they are of a muscular texture, lined, internally, with a highly vascular, delicate, vil-

lous membrane, often disposed in deep folds, or valvulæ, and from which exudes a lubricating, or mucous fluid, for its protection; externally, like the stomach, they are covered with a smooth, serous membrane. In many of the Rodentia the duodenum is sacculated, or pyriform, at the commencement. The small intestines are often highly convoluted, generally longer than the large intestines, and bound to the spine by a membrane, termed the mesentery, which enfolds them throughout their length. In Man, and some of the lower Mammalia, the extent of the inner surface of the small intestines is increased by a regular series of transverse folds of the villous membrane, termed valvulæ conniventes: they are wanting in the Orang. Various mucous follicles (glandulæ aggregatæ) are also disposed on their inner surface.

It is in the small intestines, after the mixture of the chyme with the biliary and pancreatic secretions, that the formation of chyle takes place: the mode of this change is imperfectly understood. By the peristaltic action of the muscular fibres of the small intestines, the digested pulp is moved gradually onward; and a series of vessels, termed lacteals, the absorbing mouths of which open on the lining membrane, take up the chyle, in appearance like milk: these tubes traverse the mesentery, where a system of conglobate glands (the mesenteric) lie in their course, through which they pass, and at length merge into the dilated origin of the thoracic duct, termed receptaculum chyli, situated (in Man) on the first vertebra of the loins, to the right of the aorta. This duct runs between the inferior muscles of the diaphragm (or muscular partition between the chest and abdomen), to the right of the aorta; it then ascends between the aorta and a vein termed vena azygos; it next crosses obliquely over to the left side, behind the œsophagus and great curve of the aorta; passes behind the left carotid artery, and bends down, dividing into two branches, of which the superior receives a large lymphatic vessel from the cervical glands; the two branches now unite, and the duct continues its course toward the internal jugular vein, behind which it descends, and enters, at the left side of this vein, into the left subclavian vein, through a valvular orifice, mingling its contents with the blood, which is immediately transferred to the right cavities of the heart.

The coats of the lacteal duct, and those, also, of the lacteal vessels, are thin and transparent: the former is provided with valves, so constructed, as to allow the free passage of the chyle, but preventing its reflux. If an animal be suddenly killed, an hour or two after a meal, and immediately opened, the peristaltic action of the intestines will be seen in full operation, and the lacteals will appear filled with their milky fluids: these vessels, however, form only one part of the great absorbent system of animals. Absorption takes place on the surface of the body,

within the substance of the muscles, and in the cellular interstices between them. Mercury, opium, arsenic, &c. affect the condition of a living animal, if applied to the skin, or to the surface of a wound; and the bite of a venomous serpent is followed by death, from the absorption of the poison; but, beyond this, the very particles composing the body itself are all gradually and progressively absorbed. The emaciation of illness is owing, in a great measure, to the action of the absorbent system, which takes away more quickly than the secreting vessels deposit. All that is absorbed is thrown into the blood, and what is useless is expelled the system, partly by exhalant vessels, in the form of vapour, or perspiration, and partly by means of the kidneys, which separate from the blood its excrementitious portion, whence, by a tube (the ureter) from each kidney, it is conveyed into the urinary bladder (in Mammalia), and finally discharged.

Absorption takes place by means of a system of vessels, termed the lymphatics, or lymph-carrying vessels; their mouths, in the form of pores, are universally spread over the surface of the body; and they are also multitudinous throughout its general structure. They unite into large vessels, which ordinarily pass through glands, of which there are several conspicuous groups in different parts of the body, and through which the main lymphatic tubes take their course. In the neck, in the axilla, and in the groin, these glands are very perceptible: whether they are composed of cellular substance, or consist of a knot of lymphatic tubes, contorted and folded on each other, and surrounded by a peculiar envelope, is not ascertained. Ultimately, the lymphatics merge into the lacteal duct; though it is asserted, by some anatomists, that they communicate, in many places, immediately with the veins also; and this is very probable. Hence, by the nutritive vessels, or extreme ramifications of the arterial system, on the one hand, and by the action of the lymphatic system, on the other, the body is undergoing a perpetual change. The use of food is to furnish to the blood a supply of nutritive matter, in order that it may be ever prepared to meet the draught upon its resources.

It has been stated, that the chyle is conveyed with venous blood to the right cavities of the heart; from the right ventricle of the heart, it passes, mingled with the blood, through the ramifications of the pulmonary artery in the cellular tissue of the lungs: here the vital fluid becomes arterialized, by the action of the oxygen of the air we breathe, and is returned to the left side of the heart, by means of the pulmonary veins, to be thence distributed, a life-sustaining stream, to every part of the system. How erroneous are the common ideas of the solidity of animal bodies! the frames of the massive Elephant, the thick-set, heavy Rhinoceros, the huge Whale, are composed of millions of tubes—

arterial, venous, lymphatic, exhalant, and elaborative; and, were the heaviest exhausted of the fluids it contains, it would become a light and shrivelled mass.

The small intestines, in most Mammalia, are very distinct from the large intestines, into which they lead. The large intestines commence by a pouch, more or less voluminous, termed the cæcum, or caput cæcum coli: from this is continued the colon, often sacculated by bands of muscular fibres running along its surface, contracting it into a series of globular or ovoid pouches. From the lower part of the abdomen (the iliac region), on the right side, where the cæcum is placed, it mounts up and crosses the upper part of the abdomen, under the edge of the liver, sweeps down the left side, and, making a flexure (termed sigmoid, from its resemblance to the Greek letter Sigma), assumes the name of rectum. The internal lining is a mucous tissue, often disposed into valvulæ, as in the human subject.

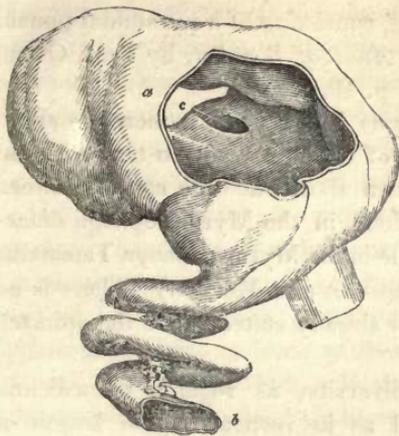
The cæcum, in its volume and structure, bears, like the stomach and intestinal canal (especially the small intestines), an immediate relationship to the nature of the animal's diet. Other circumstances being not contradictory, it may be taken as a rule, that animals existing exclusively on vegetable food, have the cæcum larger than those of carnivorous, or partly carnivorous, appetite: its state of complication, moreover, is often in a sort of opposition to that of the stomach. Thus, the diet being alike, animals with a very complicated stomach have the cæcum proportionately simple; others, on the contrary, which have the stomach simple, have the cæcum not only very voluminous, but even complex.

The presence of a cæcum, and a definite division between the large and small intestines, do not prevail in all Mammalia; and, in most cases where the intestinal canal is thus simplified, it is comparatively short. In the Insectivora, in the Bears, Racoons, Coatis, and their allies, also in the Polecats and in the Otters, there is no cæcum, nor any rigid division between the small and large intestines. In the Seals the cæcum is either wanting or it is very small;* but in these piscivorous animals the intestinal canal is long. In the canine and feline races the cæcum is of inconsiderable development.

In the Cetacea, the intestinal canal is simple, but elongated; being, to the length of the body, as eleven or twelve to one: there is either no cæcum, or it is very rudimentary. Hunter states that, in the *Balæna rostrata*, a small pointed cæcum exists, like that of the Lion. In the genus

* In a specimen of the common Seal which the author had an opportunity of examining, a small cæcum existed; the large intestines scarcely exceeded the small in circumference; the total length of the intestinal canal was fifty-two feet; the stomach was large; the pyloric portion elongated, and bent suddenly upon the cardiac.

138



Caecum of Orang.

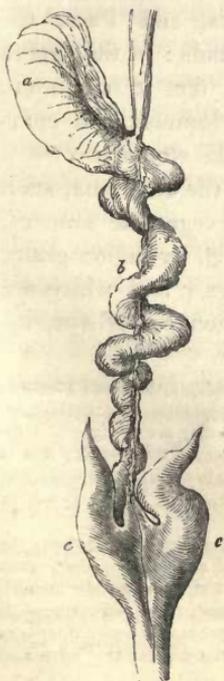
Balænopterus, and also in the genus *Delphinorhynchus*, there is a small caecum.

In Man the caecum is tolerably large and globular, with a long vermiform appendix, found only in the human species, in the Chimpanzee, the Orang, the Gibbons (in the last very short), and in that marsupial animal, the Wombat. In all the Simiæ there is a well-developed caecum, and also in the Lemurs. Fig. 138 represents the caecum of the Orang, with a portion removed, so as to shew the interior: *a*, the caecum; *b*, the vermiform appendage, seen hollow at its cut apex; *c*, the entrance of the small intestines.

In the Ruminantia the intestinal canal is of great length, and the

caecum is long, smooth, and ample, terminating in a blunt apex.

139



Triple caecum of Hyrax.

In the Pachydermata the caecum is generally large and sacculated: in the Horse it is constricted, by three bands of longitudinal fibres, into numerous sacculi. In the Hyrax there is a triple caecal appendage (fig. 139); namely, a first, or true, caecum, *a*, contracted into folds by three longitudinal bands, and so made trifid at its extremity; then, at about the distance of two feet from this, the colon, *b*, opens into two conical caeca, *c, c*, having a wide base, and narrowing to a vermiform termination. "In looking through the vertebrata," says Professor Owen, "for an analogous formation of the intestinal canal, we shall find the Hyrax standing almost alone in this respect. Among the Mammalia it is only in a few of the edentate species that the double caecum is to be met with, as in *Myrmecophaga didactyla*, Linn., and *Dasypus sexcinctus*, Linn., whilst in birds, although the double caecum more generally prevails, yet an additional single caecum, anterior to these, has only been found in a few species."

In the Wombat there is a short, wide caecum, with a cylindrical vermiform process; the colon is puckered into large sacculi, by two longi-

tudinal bands ; and, at somewhat more than five inches from the first cæcum, a second cæcum presents itself, consisting of a pyramidal pouch, of about three inches in length. (See *Anat. of Wombat*, by Prof. Owen, in *Proceedings of Zool. Soc. for 1836* ; p. 49, *et seq.*)

Among the Edentata, in the *Dasypus Peba*, there is merely a slight dilatation of the colon, at the entrance of the ilium, but no true cæcum ; in the *Dasypus sex-cinctus* there are two short but wide cæca, between which the small intestine enters the colon ; in the *Myrmecophaga didactyla* there are two small oval cæca ; while in the *Myrmecophaga Tamandua* there is no cæcum. (See Cuvier's *Leçons* ; also Meckel.) There is no cæcum in the Sloths, which animals, as already stated, have the stomach complicated.

In the Rodentia there is much diversity, as regards the cæcum, between the different genera, as well as in respect of the length of the intestinal canal. In some, the large intestines exceed the small in length ;* and, in most, the cæcum is of enormous volume, far exceeding the size of the stomach ; while the colon forms a kind of loop, or duplicature, folding upon itself for a considerable distance, as in *Capromys*, *Coipus*, *Octodon*, &c. In the genus *Myoxus* (Dormouse) there is no cæcum. In the Hares, *Lagomys*, *Ancæma*, *Agoutis*, and *Paca*, the cæcum is very large, and sacculated by tendinous bands : in the genera *Mus*, *Bathiergus*, *Cricetus*, *Arctomys Sciurus*, *Dipus*, &c. it is simple. In the Hares, the cæcum is at its maximum of development and complication, its volume exceeding, by ten times, that of the stomach.

It would appear to be a general rule, that those of the Rodentia, such as the Hares, which feed upon herbage, or succulent vegetable aliment, have the longest and largest cæcum ; that those which live upon grain, as the *Campagnols*, the *Hamsters*, and the *Lemmings*,† and which are very voracious, have also a cæcum of great size, though, perhaps, in-

* Meckel observes, "In general, it may be established, that, among the rodents, the small intestines are relatively shorter than the other portion. In the *Beaver*, the *Mus amphibius*, and *Bathiergus*, the two portions are nearly of equal length ; or, when there is a difference, they are as sixteen to fifteen, or as eight to seven. The proportion is still greater, as three to two, in the *Beaver* ; it is as two to one in the *Arctomys*, the *Hare*, the *Arvicola*, and the *Cricetus* ; as five to one in the *Hystrix*, the *Cœlogenus*, the *Cavia* ; as three to one in *Pteromys*, *Hydrochœrus*, and *Sciurus* ; as five to one in *Mus rattus*, *Mus musculus* ; and, lastly, as five to one in *Dasyprocta*."

In *Octodon*, the small intestines are two feet six inches in length ; the cæcum, three inches ; the colon and rectum, one foot five inches and a half ; the length of the head and body together, seven inches. In *Capromys Fournieri* (measuring, in the length of the head and body, one foot six inches), the small intestines are seventeen feet ten inches ; the cæcum thirteen inches ; colon and rectum—(?)

In the *Coipus*, measuring, from nose to root of tail, one foot eleven inches, the small intestines were ascertained to be sixteen feet four inches ; the cæcum one foot eleven inches ; the colon and rectum four feet four inches.

† In the *Lemming*, the cæcum is long (four inches), and sacculated at the base, whence it narrows to an acute apex. Length of the small intestines, two feet six inches ; of the large, one foot seven inches and a half. Length of the head and body of the animal, four inches and three quarters. The large intestine, or colon, commences in the form of a loop, spirally twisted in its course, so as to appear much shorter than it is in reality.—From *Notes of Diss. of Lemming*, by the Author.

ferior to that in the feeders upon succulent vegetables ; and that among the omnivorous rodents, as the Black Rat (*Mus rattus*, L.), the cæcum presents the smallest proportions. In many genera, especially of the murine group, the large intestine, after its origin, becomes narrower, and forms numerous spiral convolutions on itself, the number of turns being sometimes six : this peculiarity is observable in the Hamster, the Lemming, the Spalax, and others.

In the marsupials a cæcum generally exists ; in *Phalangista* the cæcum is long, and convoluted on the mesentery. In *Dasyurus* there is no cæcum. (See *Account of Anat. of Dasyurus macrourus*, in *Proceedings of Zool. Soc.* 1835, p. 8.) In *Didelphis* the cæcum is very short, and simple. (See *Account of Anat. of Didelphis Azaræ*, in *Proceedings of Zool. Soc.* 1834, p. 102.) In the Kangaroo the cæcum is rather larger, and sacculated. In the *Echidna* the cæcum is moderate ; but it is small in the *Ornithorhynchus*.

The entrance of the small intestine into the colon is generally valvular, even where the cæcum does not exist ; except, indeed, in the Bears, Weasels, Otters, &c., and also in the *Dasyurus*.

The digested food having, in its passage through the small intestines, parted with its chyle, the fæcal part only is passed into the large intestines, there to be accumulated, until nature requires its removal. Where, however, the cæcum, as in the Hare, is of extraordinary volume, and the large intestines long and tortuous, it would appear that chyle continues to be absorbed from the digested aliment in the colon, for a considerable distance ; and, in carnivorous animals, destitute of a cæcum, this absorption most probably is continued till within a comparatively short distance from the intestinal termination. The shortness of the alimentary canal, the comparative simplicity of its course, and the absence of a cæcum, or, where present, its small size, together with the unsacculated condition of the colon, in carnivorous mammals, all tend to a quick passage of the digested food, which, consisting of animal substances, is assimilated with ease, while the excrementitious part, which might, perhaps, run into a state of putrescence, has no impediments to delay its expulsion.* In herbivorous animals, on the contrary, whose food is of a lower kind of organization than that of the Carnivora, its delay is requisite ; and, that none of the nutritious part be lost, it is passed slowly over an extensive absorbing surface : hence the length and tortuosity of the small intestines, the complexity of the cæcum, puckered into sacculi, and the sacculated or winding condition of the colon.

* In an insectivorous animal, *Echinops Telfairi*, Mart., the intestinal canal, simple, and destitute of a cæcum, measures nine inches, being not even twice the length of the animal, which is rather more than five inches.—See *Trans. Zool. Soc.*, 1839.

With regard to the proportionate length of the intestinal canal, as compared with that of the body, it is, in Man, as about seven to one; in the Chimpanzee, as about six to one; in the Simiæ, generally, as six or eight to one; in the Carnivora, as three, five, or eight to one; in the Ruminantia, as eleven, or even twenty-eight to one; in the Pachydermata, as six, eight, or ten to one: in the Hyrax the intestinal canal measures nine feet four inches, being six times the length of the head and body.

In the Rodentia the length of the intestine varies with regard to the body, but greatly exceeds it in all: in the Coipus the total length of the intestine, including the cæcum, is twenty-two feet six inches, the head and body of the animal being one foot eleven inches, which is about eleven to one: in Octodon it is as about seven and a half to one: in the Seals it is as fourteen or fifteen to one.

Estimates of this kind, however, are not to be trusted, and are really of less value than is imagined: the anatomist has to regard the capacity, the valvulæ, and the sacculi of the intestines,—conditions of structure, which affect, materially, the extent of their inner surface, and for which it is difficult to make due allowance; but yet, without taking these conditions into the calculation, the result cannot but be unsatisfactory in the extreme: for it must be evident, that a very slender intestine, of great length, may have a much inferior extent of inner surface to that of a shorter intestine of greater volume, studded with elevated villi, furnished with valvulæ conniventes, or puckered into bold sacculi. The following sketches represent the mucous lining of the duodenum of the Porpoise,

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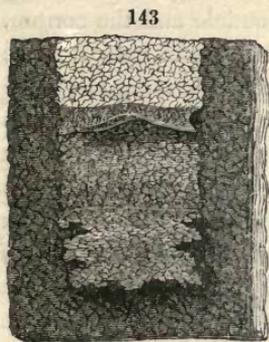
142



disposed in longitudinal folds (fig. 140); that of the small intestines of the Bear, with its beautiful villous surface (fig. 141); and that of the human colon, forming deep transverse valvulæ (fig. 142).

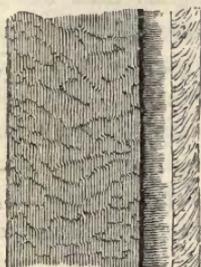
THE INTEGUMENTS AND CLOTHING OF MAMMALIA.

THE bodies of all Mammalia are invested with an external envelope, more or less dense, more or less delicate, commonly denominated the skin. The skin, however, is not a single substance, but consists essentially of the dermis, cutis, or corium, and a double epidermal tissue; the lowermost of which, or that in immediate contact with the corium, when coloured by a mucous pigment, has been termed *rete mucosum*. Fig. 143 represents the section of the skin of a Negro, with a portion of the external and of the internal cuticle, or epidermis, turned down; the latter is stained with the pigmentum nigrum, and is the *rete mucosum* of many anatomists. That the pigmentum nigrum does not always imbue, even when



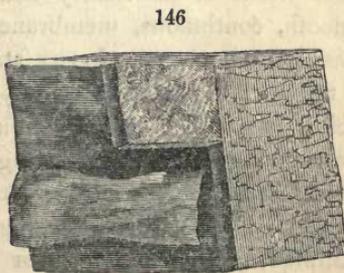
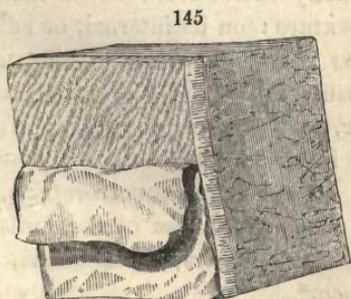
Skin of Negro.

secreted by the corium, the internal epidermis, is proved by several preparations in the Royal College of Surgeons; of one of which, the annexed sketch (fig. 144), exhibiting a section of part of the integuments of the Porpoise, is a representation. This preparation shews the cuticle divided into two layers, of which the external is, apparently, about to be cast off. The internal, or that next the cutis, would appear to be made up of fibres, passing perpendicularly to the surface; but that appearance is owing to the presence of innumerable canals for the reception of the long villi of the corium. The pigmentum forms a thin layer beneath this cuticle, but is not mixed with it, or extended to the surface, so as to influence its colour.*



Section of skin of Porpoise.

In the skin of the abdomen of the bottle-nosed Whale (*Delphinus*



Tursio, Fabr.), which is white, there is no apparent pigment, but the ex-

* In the red-coloured legs of the Turkey, and other birds, the pigment forms a varnish beneath the cuticle, as though a pencil, dipped in carmine, had spread a thin layer over the limb; and it is as easily washed away as if it had been thus laid on.

ternal cuticle (see fig. 145), though thin, is very apparent: the internal cuticle is a line in thickness, and presents a minutely wrinkled surface on its outer layer.

On the skin of the back of the same animal (fig. 146) the colouring matter is abundant, not only between the internal cuticle and the corium, but between the two layers of the cuticle also, giving a dark colour to the surface of the body. The rete mucosum, then, is only the internal cuticle imbued, during its secretion, with a coloured pigment, which may, as is proved, be deposited, in the form of a separate layer of mucus, and readily washed away. The demonstration of the presence of this pigment is much more easy in the Negro than in the white races of mankind: indeed, in the latter, many physiologists and anatomists have been disposed to doubt, if not deny, its existence; yet, if it be really to this mucous layer that the colour of the skin is owing, the varieties of complexion among the white races of mankind, from olive to the fairest blond, sufficiently prove its presence, however delicate its tint, or slight its quantity. In many animals the colour of the skin is very fugitive. The rich violet and scarlet on the muzzle of the Mandrill, and the fine orange on the face of the Douc Monkey, fade soon after death, scarcely a trace of the original tints being left behind. The skin of many of the Monkeys, when seen through the fur, as on the chest and abdomen, is blue; but, when the skin is taken off, after death, and dried, all the colour is gone.

The corium, cutis, or true skin, is that which immediately covers the muscles, fat, or cellular tissue beneath; it is the innermost of the three membranes, and varies much in thickness and density in different animals, but is always flexible and elastic. It is composed of dense gelatinous fibres, crossing each other in every direction, and, as it were, felted together, so as to produce a compact and strong tissue, with numerous perforations at given intervals. On the external surface of the skin the fibrous tissue is so closely and compactly interwoven, as to exhibit a smooth, continuous, membrane-like texture: on its internal, or adhering aspect, it presents a looser structure; and its fibrous threads merge into those of the cellular, or adipose tissue, in contact with it, and over which it is spread. Immersion in water, by separating the fibres of the cutis, or chorion, and rendering their intervals more distinct, demonstrates the arrangement of them, and of the tubular perforations, by which the fibrous tissue, through the whole thickness of the cutis, is penetrated, and which serve for the passage of hairs, of exhalants, and of absorbents, as they come to the surface.*

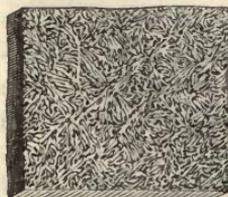
The cutis is permeated in every direction by numberless arterial

* It is the cutis, or true skin, only, of which, by the process of tanning, leather is formed, the cuticle, and all other parts, are separated previously to its immersion in the tan-pit. The structure of the skin becomes impregnated with the principle called tannin.

and venous ramifications, the fine capillary terminations of which form, on its surface, a network so minute, so interwoven, that the puncture of the most slender needle is followed by a drop of blood: their numbers baffle the utmost stretch of imagination. To these, predominating in size on the cheeks, is owing the roseate hue of health: they evidently possess a certain independency of action, and are influenced by the emotions of the mind: hence the sudden flush of anger, the pallor of rage, and the blush of shame. Many of these minute capillary tubes admit only the serous portion of the blood, excepting when exercise or mental emotion increases their action: multitudes open, by minute orifices, under the name of exhalants, transmitting a vapory exhalation, which, when condensed on the surface, is known as perspiration, or sweat. In addition to the exhalants, there are cutaneous follicles, secreting an unctuous fluid, the excretory tubuli of which, also, open on the surface of the skin, piercing through the epidermis. The absorbents, or opening tubes of the lymphatics, are almost as numerous as the blood-vessels; and the nerves are equally multitudinous.

The nerves, indeed, seem to form a sort of villous tissue of their own, on the surface of the cutis, which has been described, by Bichât, as the "corps reticulaire," and, by others, is termed the nervous, or papillary tissue. These papillæ, which are often of a conical shape, consist of fibres, like the hairs of a pencil; and they are most distinct and abundant where the sense of touch is most acute. On the palms of the hands, on the tips of the fingers, under the nails, on the tongue, and on the soles of the feet, in Man, they are in vast abundance, close together, and arranged in regular lines, straight or winding: on the snout of the Mole and Hog, and on the naked under-surface at the extremity of the tail of the Spider Monkey, the Opossum, &c., they are also very discernible. Their existence on the skin of the Cetacea has not been detected.

147



Corium of Elephant.

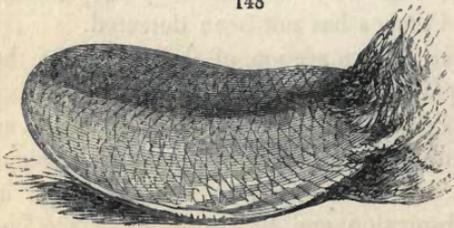
Fig. 147 exhibits a section of the corium of the Elephant, shewing it to be composed of an interlacement of dense white fibres, of a ligamentous nature, the interstices being occupied by the nervous papillæ, and by the vascular tissues concerned in exhalation, absorption, and the secretion of the colouring and horny materials of the pigment and the cuticle.

The epidermis, or cuticle, consisting of an outer and inner layer, is the external investment: it is thin and transparent, except in certain parts of the body, where it assumes a degree of thickness according to circumstances: on the palms of the hands, and the soles of the feet, for instance, it is much thicker than on the body generally; and on the palms of hard labourers, especially those who use the spade and the

plough, it acquires, by continued friction, an almost horny texture. It is capable of being raised by a blister, or by scalding water, from the subjacent parts, and is, itself, insensible, being destitute of nerves: indeed, neither these, nor vessels or tubes of any kind, enter into its composition: it is neither fibrous, cellular, nor laminated, but would appear to be formed by the hardening of the superficies of the mucous surface beneath. It is, in fact, extra-organic, a sort of natural garment, designed as a defence to the tender surface of the cutis, and as a preventive of the pain, which would otherwise be produced by the actual contact of even the air with the nervous papillæ. We know how sensitive the denuded skin is, when abraded by a blister; how painful the least touch; nay, how distressing a sensation a cold and drying air will occasion; and how the system sympathizes with the irritation of the nervous papillæ. Were it not for the epidermis, we should not be able to use our hands as organs of touch;* and, without it, our bodies, subjected to the "rude elements" around us, would thrill with agony.

The epidermis is most accurately adapted to the cutis: it invests the nervous papillæ; it admits the egress of the hairs; it is perforated by the minute exhalant tubes of the capillary vessels, the fine ducts of the cutaneous or sebaceous follicles, and the orifices of the absorbents; yet it prevents the evaporation of the mucus, or of the moisture of the cutis, the softness and flexibility of which it duly preserves. The beautiful lines which it presents on the palms, and on the tips of the fingers, and the soles of the feet, are well known.

Where the body is covered with fur, as in most of the lower Mammalia, the epidermis is often very thin, and, in some animals, it is so easily separable after death, that their skins are not to be preserved, with the fur attached, without difficulty; and it always becomes separated upon the commencement of the putrefactive process, slipping from the skin in shreds.



Tail of the Beaver.

On the dense, rough, naked hide of the Elephant and the Rhinoceros, the cuticle is thick, and, in some parts, almost horny, or studded with horny tubercles. On the tail of the Beaver (fig. 148), the Rat, the Opossum, &c., it is semitransparent, and re-

* Shakspeare observes, "The hand of little employment hath the daintier sense." (*Hamlet*.) Where the epidermis is preternaturally thickened by hard labour, it is too complete a barrier between external objects and the nervous papillæ, and prevents accuracy or delicacy of touch; it materially intercepts the impression of agents upon the organs of the sense of feeling.

sembles the slough of a snake, which is, in fact, the epidermis of that reptile. In the Cetacea it is smooth, and lubricated with an oleaginous secretion, so as to prevent the macerating action of the water.

Such, then, are the nature and composition of the common integuments, or skin, of the body: but the skin has appendages, destined for various purposes—warmth, defence, or ornament,—which now claim notice. These are hair, bristles, wool, and spines, scales and plates, nails and horns.

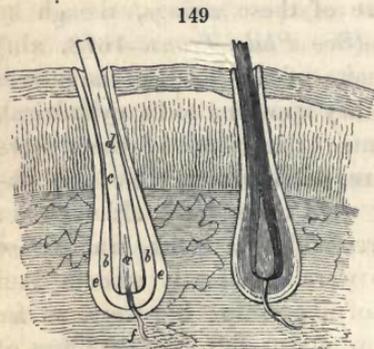
Hair and wool, though they differ from each other in certain structural peculiarities, are intrinsically the same; and, therefore, until the differences be defined, they may be considered as one. Hair (including bristles and wool) is of a horny texture, and grows from a secreting vascular bulb, or root, seated below the cutis: from this bulb the hair is gradually evolved: passing through a canal of reflected integument, which traverses the corium, it emerges from the surface of the skin, and continues to grow till it has acquired its full development. The intimate structure of hair has been the subject of very opposite opinions. Leuwenhoeck says, that hair consists of little strings, of which a thousand or more, according to the thickness of the hair, combine to make it up: but he was not able to determine the nature of these strings, though he is disposed to consider them hollow. (See *Phil. Trans.* 1678, xii.) Hooke (*Micographia*), speaking of the hairs of the head, in the human subject, states, that, for the most part, they appeared to be cylindrical, according to his microscopic experiments; that some of them were prismatic; but that, generally, they were nearly round: he also observes that, throughout their length, they were transparent, although not very clear; the end nearest the root resembling a black, transparent piece of horn. The roots of the horn were apparently smooth, and tapering inward, somewhat in the form of a parsnip; but were, as far as he ascertained, destitute of filaments, or any vessels like the fibres of a plant. The top, when split (as long hairs frequently are), resembled the end of a stick beaten until frittered, there being, sometimes, half a score splinters, or more. According to the same writer's experiments, these hairs appeared to be solid, cylindrical bodies; not pervious, like a cane or bulrush, nor having an internal pith, or external rind, as in Horse's hair, Deer's hair, and the bristles of a Cat.

It is singular, however, that the hair of the Horse and of the Deer, and the whiskers of the Cat, should be pervious, and that the hair of the head in Man should be solid: the inference, granting the correctness of the statement respecting the hair of the Horse and Deer, is, that, although Mr. Hooke failed in his endeavours to ascertain it, human hair has the same internal structure; and many circumstances tend to prove, that it consists of an external rind, or sheath, and an internal pulp, or

pith : it would seem, besides, that the hair is not extra-vascular, as has been supposed by many, although, undoubtedly, its growth is the result of additions to its root, by the secreting power of the bulb. The principle of vitality in the hair, may, indeed, be at a low ratio ; nevertheless, in that singular disease, the *plica polonica*, the hair not only enlarges in bulk, becoming swollen, and morbidly sensitive, but it often admits the passage of the red arterial blood, and will bleed when divided by the scissors ; a fact, in itself, sufficient to prove its vascularity.* With regard to the difference between hair and wool, it may be observed, that, in chemical composition, mode of growth, and organic texture, they are the same ; but that they differ from each other in certain points, till lately but little understood.

Hair is of two kinds, as respects its growth : one sort grows continually, or, having attained its full extent, is not periodically shed ; if cut, it continues to grow, like the incisor teeth of rodents, thereby demonstrating a persistent activity of pulp—the mane of the Horse is an example. The second sort, of which the fur of animals in general consists, grows to its full extent, and, whether cut or not, is shed and renewed periodically.

The following illustration (fig. 149) will serve to shew the mode in which hairs and bristles are developed and pass through a membrane-line canal, which traverses the corium.



Growth of hairs.

The bulb, or root, consists of an inner vascular pulp, *a*, invested with a capsule, *b*. From the latter of these is produced the outer part, or rind, of the shaft of the hair, *c* ; from the former, the inner, or central part, *d*. The whole bulb is enclosed in a membranous cell, *e*, to which it is not attached, but through which the vessels and nerves, *f*, pass

to its pulp, *a*. This membranous cell, which encloses the bulb, is prolonged, as the shaft of the hair grows, to the surface of the skin. That a tubular structure of hair results from its mode of growth (the base of the tube in the bulb being filled with pulp), seems to be very apparent ; but the tube in the shaft of the hair is, perhaps, often obliterated, or filled with a dry, spongy pith. When hair falls away, it is in consequence of the cessation of vital energy in the bulb, its blood-vessels becoming obliterated, and, consequently, the supply of nourishment being cut off. Hair, however, is renewed, as are feathers after the moulting of birds ; a new bulb

* Grief, sudden terror, or long illness, turn the hair white ; and, as will be noticed more particularly in a future part of this work, its colour is affected by temperature.

being formed. The greyness of hair, from age, results from a deficiency both of nutriment and colouring matter: the loss of hair, in old age (often, indeed, at an earlier period), not followed by a renewal, is in consequence of the secreting energies of the arterial system having begun to fail.

Bristles and spines are modifications of hair: they assume various forms, and are more or less rigid. In a genus among the Rodentia (Echimys), the spines, which are mixed with soft hairs, are bayonet-shaped (fig. 150, of which *a* is a section): in the Hedgehog (fig. 151), and the Porcupine (fig. 152, of which *b* is an enlarged section), these spines are sharp, rigid, and highly developed.



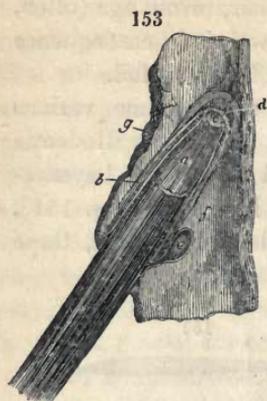
Bristles of Echimys, Hedgehog, and Porcupine.

If the skin of the Hedgehog be examined, the quills, with their roots and sockets, may be seen extending to different depths, according to the period of their growth. The newly-formed ones are deep, and terminate in a broad basis; but, as the growth of the quill proceeds, the reflected integument, forming the socket, contracts, and draws the quill nearer the surface. The pulp is, at the same time, progressively absorbed, so that, at last, the quill is attached to the surface of the skin by a narrow neck only, with a small terminal head, for firmer adhesion, below which the remains of the socket and sheath exist in the form of a small bulb.

A similar mode of growth is exemplified in the spiny quills of the Porcupine: these spines consist of a smooth, glossy envelope of horn, and an inner pith, or medullary substance, of a soft texture, and of a pure white. They grow from a bulbous root, formed within a cell below the cutis, and containing, also, a portion of fat, in which the vessels, supplying its pulp and capsule, are imbedded. The capsule consists of two membranes, of which the innermost secretes the horny envelope, while the pulp supplies the pith of the spine. The bulb is, itself, surrounded with a membranous sheath, into the cavity of which, as discovered by F. Cuvier, a duct opens, proceeding from a follicle, seated in the adjacent cellular tissue, and partially divided into an upper and lower cavity, filled with an unctuous matter, which, during the formation of the spine, is transmitted through the duct, either as a lubricating fluid, or as entering into its composition.

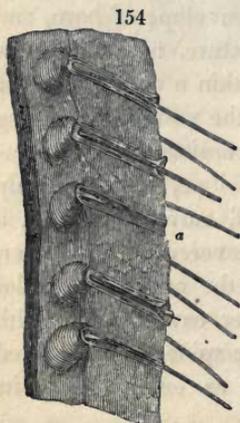
The diagram (fig. 153), representing the bulb of the quill, or spine, of the Porcupine, may serve to illustrate the foregoing remarks: *a*, is a cut section of the root, in a capsule, *b*, consisting of two mem-

branes; the pulp, *c*, which secretes the spine, has its surface fluted, so that the horny matter deposited on it is moulded into diverging laminæ, carried up the shaft, as the latter is pushed onward, whence the quill has the appearance of being grooved,—as, indeed, it would be, were not these laminæ covered with a horny secretion from the membrane of the capsule, as the quill recedes from the pulp: *d*, is the cell in which the bulb is contained, and in which the vessels to supply the pulp and the capsule are distributed; *e*, is the semi-divided crypt, containing unctuous matter poured into the capsule during the formation of the quill; *f*, the cellular tissue; *g*, the skin.



Capsule and bulb of a cuticular spine of a Porcupine.

If one of these spines be divided (as *b*, fig. 152), lines of the cortical, glossy matter (black or white, according to the black or white part of the spine which is cut) will be seen converging regularly from the external coat, through the pith, to a central point, to which they are directed, or, *vice versâ*, from which they radiate to the envelope. The colouring matter is only deposited on the glossy or horny envelope, and such is the case with all hairs. It has been supposed, that the colour of the hair depends upon that of the mucous tissue, through which it passes: the truth of this may be doubted. The same cause, whatever that be, which colours the mucous layer black, may also colour the hair, or bristles. In variegated individuals of the Hog, for example, we find the patches of black bristles growing from a black surface, the white bristles from a white surface; but there is no proof in this, that, because the mucous layer is black, therefore the hair is black. The beautiful blue colour of the skin of the chest and abdomen in several Monkeys has been already alluded to; the hair of these parts is white: again, in the human subject, jet black hair sometimes accompanies the fairest white complexion. Many animals have the hair ringed with alternate bands of different colours; the skin beneath being white or whitish; and, in several, the hairs have a metallic lustre (*Aulocodus* and *Chrysochloris*, for example), without any correspondence in the colour of the mucous tissue.

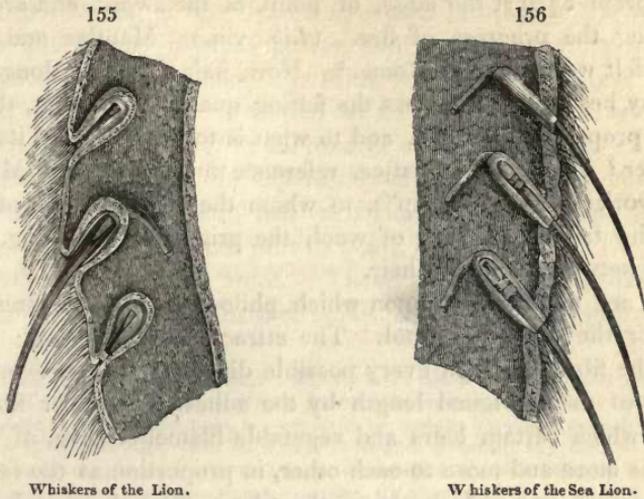


Bristles of Hog.

The annexed figure (154) represents a section of the skin on the back of the Hog. The cut surface exhibits the canals in the corium, containing the

roots of the bristles; one of which, *a*, has been extracted, leaving a conical pulp affixed to the bottom of the canal.

The following engravings exhibit, respectively, a section of the skin of the lips of the Lion (fig. 155), and of the Sea Lion (*Phoca leonina*, fig. 156),



Whiskers of the Lion.

Whiskers of the Sea Lion.

in which the sockets and bulbs of the whiskers are exposed, and the large nerves displayed, which pass to them, rendering the whiskers feelers.

The hair of animals is usually arranged, with a certain degree of regularity, in different forms or figures, the disposition of which is best seen when the hairs are removed, the orifices of the canals through which they passed being exposed. The figures assumed by these orifices vary materially: the annexed figure (157) shews their rosette-like arrangement on the skin of the Camel.



Surface of Camel's skin.

Most animals have both wool and hair as their clothing,* but the preponderance of the one over the other differs materially in various animals, and may be altered by climate, and other influences. The Sheep, in our portion of the globe, the Llama of Chili, the Yak of Tartary, the Camel, &c., are clad, almost exclusively, with wool. Abundance of wool is mixed with the hair of the Deer; even the Tiger and the Seal are not destitute of it; and it abounds in the fur of the Hare, the Beaver, the Chinchilla, and others;† but is always overlaid by the

* The Blood-horse of England is destitute of any particle of wool; but the shaggy Pony of the mountains of Wales, or of the bleak Shetland Isles, is half clad with it.

† "My opinion," says Mr. Plint, "is, that, with few exceptions, the covering of quadrupeds is a mixture of hair and wool, varying greatly in their proportions to each other. Let us consider them in their native state: they are exposed to the vicissitudes of the seasons, and, therefore, need a

hair. From the earliest times, wool has been known to possess the property of felting, and felted cloth is of great antiquity. Pliny observes, that wool of itself, driven into a felt, without spinning or weaving, serves to make garments; and that, if vinegar be used in the working, such felts are proof against the edge, or point, of the sword, and are capable of arresting the progress of fire. (*Lib. viii.*) Mantles and counterpanes of felt were used at Rome.* Now, hair, however long or delicate it may be, does not possess the felting quality. In what, then, consists this property in the one, and to what is to be attributed its absence in the other? And here, in justice, reference must be made to Mr. Youatt (see his work on the "Sheep"), to whom the credit is due of demonstrating the true characters of wool, the principles of felting, and the difference between wool and hair.

Many are the theories upon which philosophers have attempted to account for the felting of wool. The attraction of cohesion; the elasticity of the fibres, bent in every possible direction, and prevented from returning to their original length by the adhesion of other fibres; the property, which certain hairs and vegetable filaments have, of attaching themselves more and more to each other, in proportion as the fabric into which they are united is beaten,—the fibres entangling each other in circlets, and, by their elasticity, striving to return to their original condition: these, and modifications of similar theories, were accepted as a sufficient explanation. M. Monge was the first who ventured to assert that a feathered, or barbed edge, must be the structure of the surface of wool; that "the surface is formed of lamellæ, or little plates, which cover each other from the root to the point, pretty much in the same manner as the scales of a fish cover that animal from head to tail, or like rows placed one over another, as is observed in the structure of horns." On this theory, the truth of which M. Monge assumes, he explains the mechanism of felting, as accurately as though he had actually seen the serrated edge of the wool.†

covering, at one time, to throw off the influence of the sun's rays, and, at another time, to retain the animal warmth, when the surrounding temperature would otherwise rapidly withdraw it. Hair and wool are bad conductors of caloric, and admirably adapted for both purposes, and they exist in actual and relative quantity according to the altered situation and wants of the animal. Thus, in summer, the fleece of the Arctic Hare is thin, as, I believe, is that of the Argali; in winter, a fine wool fills up the interstices between the hair, and protects the animal from the inclemency of the weather. Here is an admirable provision for the wants of animals generally; but we should stop short of the exact adaptation of the fleeces to these wants, if we did not remark how necessary it is that the wool, so indispensable to the retention of the warmth of the animal, should be protected by a coat of long, smooth hair. Just imagine the Argali, or the Hare; or, to instance animals of the carnivorous genus, the Sable, or Polecat, clothed with wool only, and what a miserable plight the poor animal would soon be in! The fleece would prove a constant impediment to its movements among underwood, if, indeed, it were not entirely stripped off the back of the animal."—See Youatt on the "Sheep." p. 57; published by the Society for the Diffusion of Useful Knowledge.

* Strong and thick felted covering, dyed with a pattern of various colours, has been found on the body of a mummy from Thebes.

† "The workman," he says, "presses the mass with his hands, moving them backward and

M. Monge, however, did not see the peculiarity in question: and it was reserved for Mr. Youatt to demonstrate it.* The true cause of the felting property of wool, and, at the same time, its distinguishing character, when contrasted with hair, consists, as ascertained by microscopical experiments, in its serrated structure externally. When viewed through a microscope of great power, and as a transparent object, the fibre of wool assumes a ribbon-like form, with serrated edges; but these serrations, when the fibre is viewed as an opaque object, are found to result from the presence of a succession of inverted cones encircling a central stem, the apex of the superior cone being received into the cup-like base of the inferior one; and each cup-like cone has projecting and indented edges, directed from root to point, as seen in figs. 158 and 159, representations of Merino wool. These conical, or cup-like circlets, are farther resolvable into distinct scales, or leaves, set regularly around

forward, in various directions; this pressure brings the hairs against each other, and multiplies their points of contact. The agitation gives to each hair a progressive motion toward the root; but the roots are disposed in different directions, in every direction; and the lamellæ of one hair will fix themselves on those of another hair, which happens to be directed a contrary way, and the hairs become twisted together, and the mass assumes that compact form which it was the object of the workman to produce. In proportion as the mass becomes compact, the pressure of the hands must be increased, not only to make it closer, but, also, to keep up the progressive motion and twisting of the hairs, which then takes place with greater difficulty." Thus near did M. Monge arrive at the truth.

* Mr. Youatt thus announces his discovery: "On the evening of the 7th of February, 1835, Mr. Thomas Plint, woollen manufacturer, resident at Leeds; Mr. Symonds, clothing agent, of Cateaton-street, London; Mr. T. Millington, surgeon, of London; an esteemed friend, Mr. E. Brady, veterinary surgeon, at that time assisting the author in his practice; Mr. W. H. Coates, of Leeds, veterinary pupil; Mr. Powell, the maker of the microscope; and the author himself, were assembled in the parlour. A fibre was taken from a Merino fleece, without selection, and placed on the frame, to be examined as a transparent object. A power of 300 (linear) was used; and, after Mr. Powell, Mr. Plint had the first ocular demonstration of the irregularities in the surface of the wool, the palpable proof of the cause of the most valuable of its properties, its disposition to felt. The fibre, thus looked at, assumed a flattened, ribbon-like form. It was of a pearly-grey colour, with faint lines across it. The edges were evidently hooked, or, more properly, serrated;—they resembled the teeth of a fine saw. These were somewhat irregular in different parts of the field of view, both as to size and number. The area of the field was one-fortieth of an inch in diameter. By means of a micrometer, we divided this into four, and we then counted the number of serrations in each division. Three of us counted all four divisions; for there was a difference in some of them. The number was set down privately, and it was found that we had all estimated it at fifteen in each division. Having multiplied this by four, to obtain the whole field, and that by forty, the proportionate part of an inch of which the field consisted, we obtained, as a result, that there were 2400 serrations in the space of an inch, all of which projected in the same direction; viz., from the root to the point." The diameter of the fibre was ascertained to be 1-750th of an inch.

"We next endeavoured to explore the cause of this serrated appearance, and the nature of the irregularities on the surface, which might possibly account for the production of these tooth-like projections; we, therefore, took another fibre, and mounted it as an opaque object." After some difficulty, at length Mr. Powell succeeded; "and we were presented with a beautiful glittering column, with lines of division across it, in number and distance seemingly corresponding with the serrations that we had observed in the other fibre, that had been viewed as a transparent object. It was not at once that the eye could adapt itself to the brilliancy of the object; but, by degrees, these divisions developed themselves, and could be accurately traced. They are not so marked as the inverted cones which the Bat's wool presented, but they were distinct enough; and the apex of the superior one, yet comparatively little diminished in bulk, was received in the excavated base of the one immediately beneath; while the edge of this base, formed into a cup-like shape, projected, and had a serrated, or indented edge, bearing no indistinct resemblance to the ancient crown. All these projecting edges pointed in a direction from root to point."

the central stem, and varying, in number, size, and degree of projection, in the wool of different animals. In some instances these scales are

158



A fibre of long Merino wool, viewed as a transparent object.

159



The same, viewed as an opaque object.

pointed, in others round. In the wool of the Bat (fig. 160), these circlets are so decided as to produce the appearance of a series of cups, placed one in another, and having indented edges. Though hair is covered with scales, or rugosities, it has no serrations, or tooth-like projections; the hair of the Tiger is covered with scales, like those on the back of a Sole; while, in the wool of the same animal, the serrations are distinct and numerous, as they are, also, in the wool of the Bear, and of the Italian Wolf-dog. The human hair, as ascertained by Mr. Gill, is of a cylindrical form, and covered with scales, or rugosities, but without serrations.*

The engravings (figs. 158 to 169), from Mr. Youatt's work, serve to illustrate the microscopic characters, here detailed, by which hair and wool are respectively distinguished.

The wool of the Rabbit (fig. 161) is fine, with sharp, angular serra-

160



The wool of a Bat, as exhibited by the microscope.

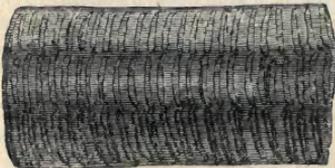
161



The wool of the Rabbit, opaque.

tions, to the number of 2880 in the inch, "being 160 more than in the highly-valuable and felting Saxon wool." The fibre, however, has fewer curls. The hair (figs. 162, 163) varies from $\frac{1}{290}$ to $\frac{1}{300}$ part of an inch

162



The hair of the Rabbit, transparent.

163



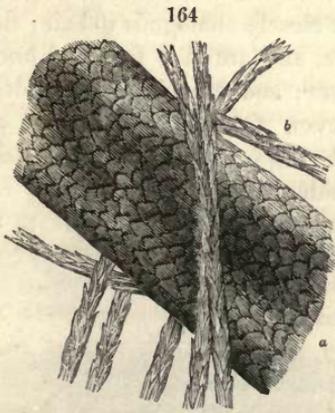
The hair of the Rabbit, opaque.

in diameter, and is covered with a scaly incrustation, but cannot be said to be serrated.

* Dr. Goring (see *Brandé's Quart. Jour.*, 1826, p. 433) describes the appearance of the hair of the human head, beneath the lens of a microscope, as being "indented with teeth, somewhat resembling those of a coarse, round rasp, but extremely irregular and rugged; these all incline in one direction, like those of a common file; viz., from the origin of the hair toward its extremity." "It is singular," says Mr. Youatt, "that although nine years have passed, and the microscope has been considerably improved, since Dr. Goring observed this structure of the hair, and almost every one, who possessed an instrument of much power, has been eager to gaze on this new discovery, no person has been so fortunate as to detect a single serration on its edge." A truly serrated surface is, according to Mr. Youatt, the character of wool only.

In the Seal, the wool is abundant beneath the compact hairs, and is exceedingly fine, but the serrations are few, and far apart; the hair, having about nine times the diameter of the wool, is beautifully covered with scales, but there is not the vestige of a serration (fig. 164).

In the wool of the Bear (fig. 165), which is very fine, the serrations were found to have a curious character; "they resembled so



Seal's hair, a, and wool, b.



The wool of the Bear.



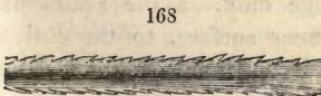
The wool of the Wolf-dog, transparent.



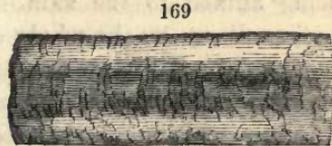
The wool of the Wolf-dog, opaque.

many spires, projecting at irregular distances, and at an exceedingly acute angle." In the Italian Wolf-dog (which has a considerable portion of short wool beneath the hair), the serrations of the wool were found by Mr. Youatt to be "superficial, and irregularly placed; some of them resembling small spines, and others looking like rounded prominences." When viewed as an opaque object, the cup appeared to be "composed of two, and sometimes three, leaves, with rounded extremities." (Figs. 166, 167.)

The wool and hair of the Tiger are here represented (figs 168, 169).



The wool of the Tiger, transparent.



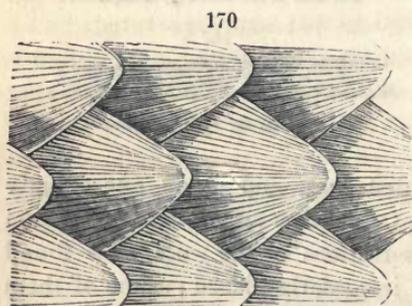
The hair of the Tiger, transparent.

"The wool is beautifully fine; it is only the thousandth part of an inch in diameter; its serrations are likewise numerous, amounting to 2560 in the space of an inch. The hair is covered with scales, resembling those on the back of a Sole, but with no serrations."

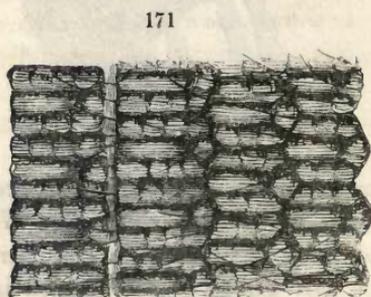
The differences, then, between wool and hair, according to Mr. Youatt, are as follow:—The fibre of wool is crisped, or curled, the curls increasing according to the fineness and felting property of the wool;

and, in addition to this, it is decidedly serrated; whilst hair, though sometimes curled, but in a very limited degree, in comparison with wool, has its edge only scaly, or rugose, and never truly serrated; and hence it is that hair, though it will entangle and harle, to a certain extent, will not felt into a compact mass.

Some animals, as the Pangolins (*Manis*), are clad in scales (fig. 170); some, as the Armadilloes, in plates (fig. 171). Scales, in their mode of growth, and in their general characters, are closely analogous to hair; they arise from the skin (cutis) by a broad base, and are of a firm and horny texture; they vary in thickness and hardness; and when lost, by accident, are replaced. It does not appear, however, that, like hair, they are periodically shed and renewed; in which respect they resemble nails. The scales of snakes are covered with epidermis, which is annually cast off in the form of a slough, a new epidermis being prepared beneath the old; but, in the Pangolins, the epidermis does not extend beyond the



Scales of the Pangolin.



Plates of the Armadillo.

base of the scales, which are imbricated, largely overlapping each other, and forming a dense and efficient coat of mail.

The Armadilloes are protected above with plates, which, instead of being affixed to the skin by one edge only, as the scales of the Pangolin, adhere, by the whole of their inner surface, to the cutis, and are covered by the cuticle, which is thick and smooth. These plates are, more or less, calcareous; and, in one species, the Mataco (*Dasybus Apar*, *Desm.*), they are completely osseous, and of great thickness.

The digital extremities of terrestrial Mammalia, are either protected, as in Man, by slender, horny laminae, termed nails, or by stronger and more curved sheaths, termed claws; or by a thick mass surrounding the phalanx, termed a hoof.

Nails, in their growth, are analogous to hairs; they arise from a portion fixed in the cutis, and adhering to it, termed the root. The nails of Man, and the claws of other animals, appear to be formed of extremely thin layers, placed one upon another; the addition taking place on the

inferior surface; and the external laminæ are the largest. In every essential, except in mere form, the hoofs resemble nails, or claws. The horn of Mammalia, that is, the horny sheath investing the osseous core, in the Ox and the Antelope, consists of hairs agglutinated into a mass; in

172



Horn of the Prong-buck.

many species, and especially in the Prong-buck (*Antelope palmata*), the peculiar composition of the horn is very apparent (fig. 172, the dotted line of which shews its osseous core); generally, indeed, the basal part (affixed to the cutis), and from which its growth proceeds, shews the fibrous nature of its structure. It is not necessary, however, that horn should sheath an osseous core: in the Rhinoceros, the horn of the nose is solid; but, in structure, it agrees with the sheath of the bony processes on the head of the Ox. Baleen (or whalebone, as it is commonly, though erroneously, called), which forms pendent plates, lining the palate of the Whale, is of the same nature, and consists of fibres, resembling hair, agglutinated together, and very easily separable

from each other. Few Mammalia have spurs; they exist, however, in the tarsus of the male *Ornithorhynchus*; they are essentially nails, or horn, of a conical shape, sheathing a bone, or osseous support; the spur of the Fowl, and the beak of birds, also, afford examples of the horny sheathing of bone.

The chemical composition of hair, scales, and horn is the same; the essential appears to be gelatine and coagulated albumen. Vauquelin detected two kinds of oil in hair; one, varying according to the colour of the hair from which it was extracted, black hair yielding black oil; the other, always white. Iron, oxyde of manganese, phosphate and carbonate of lime, silica, and sulphur, have also been detected in hair. Hair, submitted to the action of heat, in an open vessel, first swells, then fuses, or liquefies; subsequently, it emits a white flame, and resolves into a black carbon. On distillation, it yields a reddish liquor, containing prussiate of ammonia, a salt of ammonia, and an animal acid, which Berthollet has denominated zoonate of ammonia.

It is not within our limits to enter into the structure and growth of feathers, the peculiar clothing of birds: it may be observed, however, that they are nearly related to hairs, and are formed in a sheath, which, when the feather is complete, falls off, in the form of scales, or scurf; the quill, or barrel, is the last part finished, which done, the pulp of blood-vessels, &c., dries up, leaving only that tubular, chambered membrane behind, which is familiarly known, as it appears in the common goose-quill. Feathers, perhaps, might be characterized as hairs, or spines, at a

maximum of development. All feathers do not possess a web (which consists of branches from the shaft, termed barbs, each barb being furnished with minute branches, or barbules); on the contrary, the quill-feathers on the rudimentary wings of the Cassowary are simple spines, closely resembling those of the Porcupine, except that they have a thick, hollow barrel, or quill, at their base.

ON SPECIES, HYBRIDS, AND VARIETIES; ON THE DURATION OF LIFE, AND THE REPRODUCTION OF MAMMALIA.

It is important to establish, if possible, a clear definition of the term species. Species are fixed and permanent forms of being, exhibiting, indeed, certain modes of variation, of which they may be, more or less, susceptible; but maintaining, throughout those modifications, a sameness of structural essentials, transmitted from generation to generation, and never lost by the influence of causes, which, otherwise, produce obvious effects. It is by keeping this principle in view, that we unhesitatingly decide upon the specific distinction between fossil reliquia of extinct animals, and those now extant, of near affinity;—between the Mammoth, and the Asiatic Elephant; between the fossil species of Rhinoceros, and their living representatives. Species are permanent. Varieties are either accidental, or the result of the care and culture of Man. In the former case, they are of rare occurrence; in the latter, they perpetually exhibit a tendency to return to their original condition. The difficulty of keeping up any particular breed of Pigeons or Rabbits is well known; the Sheep continually manifests a tendency to resume the dark colour of the wild Mouflon; black Sheep annoy the farmer, by appearing in the midst of the most carefully-bred flock. The dog, that most modified of all modified animals, requires care and attention, in order to prevent its varieties from degenerating. Time alone produces no effect in altering species: the mummies of animals found in the catacombs of Egypt resemble their living descendants; the representations of animals on the relics of Egyptian temples, or delineated on the outer cases, in which, for from two to three thousand years, the remains of Man have been preserved, are the faithful figures of existing species. No animal, by a series of mystical transformations, can become an animal of a different species. Lamarck, indeed, considered species as the result of circumstances, and not as original products of the creative fiat: he considered the higher animals, and also Man, to have attained their present state by a gradual transition, through an indefinite period of time, from the lowest form of life; each race, as it advanced in elevation, transferring its assumed characters to its posterity, to be by them still farther modified, until the con-

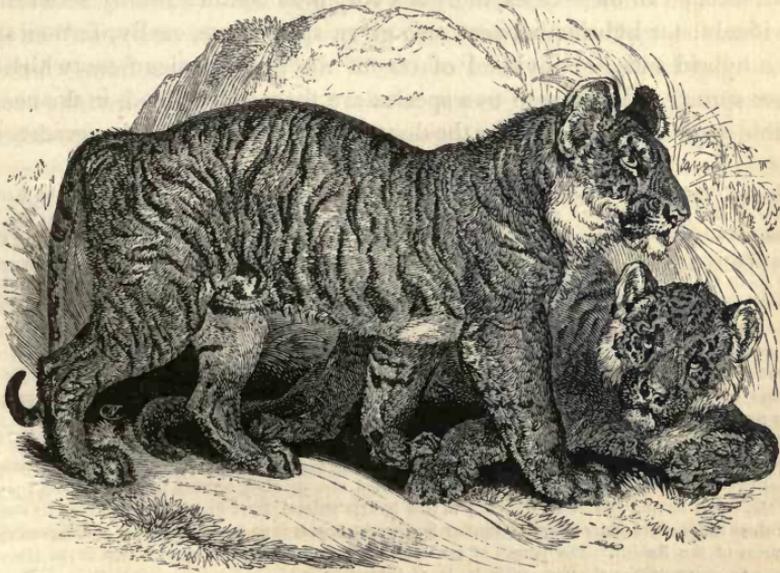
version of a monad into Man should be complete ;—a visionary theory, based upon a shadowy assumption. “ I have no doubt,” he observes, “ that all the Mammalia have originally sprung from the ocean, and that the latter is the true cradle of the whole animal kingdom. In fact, we see that the least perfect animals are not only the most numerous, but that they either live solely in the water, or in those very moist places where Nature has performed, and continues to perform, under favourable circumstances, her direct or spontaneous generations ; and there, in the first place, she gives rise to the most simple animalcules, from which have proceeded all the animal creation.” (See *Philos. Zool.*, tome ii.) Time, the wizard time, is to produce all this. To ask for proofs of this transition, is useless ; to demand the period of their occurrence, is to learn that these marvellous changes took place in remote ages, to which Man cannot look back. “ There is good reason why we do not see these changes successively performed, which have diversified the known animals, and brought them to their present state. We see them only when they are finished, and not when undergoing the change, and we very naturally infer that they have always remained as we see them. If the average duration of the life of each generation of mankind were only a second, and if a pendulum were mounted, and in motion, then would each generation consider this pendulum to be really at rest, having never seen it change in the course of their lives ; the observations of thirty generations would not demonstrate anything positive concerning the vibrations of this instrument. The revolutions of myriads of ages, are as the single vibration of an immense pendulum ; the time through which Man has occupied the globe, is scarcely as thirty seconds ; we have not seen the pendulum perform half of one vibration.” With Lamarck, then, there is no such thing as species. Some myriads of years since, a few gemmules, or embryos, of a sponge, instead of attaching themselves to a stone, or rock, in the ocean, and there becoming fixed, and assuming the characters of their poriferous parent, continued to swim about, by means of their vibratile cilia : by degrees they advanced to the shore, and, being left dry by the retiring tide, they ultimately became semi-aquatic beings, of some form or other. Various were the transitions through which they went. Finally, some returned to the ocean again ; and their descendants, passing through a series of progressive changes, at length attained the giant forms of Whales and Grampuses. Others, advancing from the shore, walked inland : they tried to breathe the air, and, by dint of repeated trials, effected their purpose : in some arose a desire to taste their fellows ; and claws, and strong teeth, and great muscular energy, were, ultimately, attained : others preferred a vegetable diet ; and plastic Nature seconded their wishes : one was not contented with the herbage of the ground, but took a fancy to the leaves of trees ; and, by trying to obtain them, the neck became elongated ; more so in the next generation ;

and, at last, see the monad-sprung Giraffe: some wished to fly; in process of time, wings were obtained: some, for ages, contented themselves with climbing trees, and leaping from branch to branch; and, by dint of striving to excel their first endeavours, the skin of their sides became extended into the form of a parachute: finally, thus, in process of time, came the world tenanted with all living things, Man being the ultimum. Philosophiâ "ineptâ, res ineptior nulla est." Buffon, and even Linnæus, denied the durability of species, and regarded the races of animals now extant as the diverging products of a given number of original stocks; the descendants of which, intermingling together, produced blended and degenerate races; and so on, till, at length, the mixed intercourse of those races ceased to produce a fertile progeny; the extent to which the production of fresh varieties, or species, can be carried on, being determinate. Buffon, indeed, who pushed this theory to its extreme, regarded all allied species as the descendants of a common stock, the model of the race; varied in their subordinate characters by the influences of climate, diet, and other causes; and, by their intermixture, producing other varieties. Hence, at some period, the primitive stock only existed; then sprang from those a race of degenerate descendants; and, ultimately, arose the products resulting from the mixture of these descendants. Time has, to a great degree, obliterated the primitive condition of the common type, to which the allied species are to be referred; yet, still, this type, or stem, is to be discerned, as the source from which these off-sets have branched out. In fact, all allied species are mere varieties of one common stock. Where a single species, as Man, forms the sole example of the genus, the stock has been continued in a direct line, without collateral branches, as in the case of the Elephant (which he regarded as a single species), the Rhinoceros, the Hippopotamus, the Giraffe, the Camel, &c. But, among the smaller and more prolific races, the offsets of the common stock were numerous in proportion to their fertility. According to these principles, Buffon reduced all the Mammalia, with which he was acquainted, to about thirty-eight families; each family originally consisting, not of distinct species, but of varied, or modified, descendants of a common parentage. This theory, however specious it may be, is utterly untenable; climate, food, and other contingencies may, indeed, and do, produce certain effects; they influence size, strength, beauty of proportion, length of ears, or tail, or the fulness of the fur; but they affect not the anatomical structure of species; they alter not the characters of the internal organs, or the structure of the teeth.

The skull of the Chimpanzee, the proportionate length of its arms, the presence of the ligamentum teres of the hip-joint, and the form of its hands and feet, distinguish it, and ever will distinguish it, from its ally, the Orang; nor is it possible that these two could have descended from the

same primeval origin. Many of the Simiæ, more different among each other than the Orang and Chimpanzee, Buffon regards as mere varieties: and so, also, with respect to other animals; but upon the same untenable premises. That distinct species will often breed together, and produce offspring, is certain: in some rare cases, perhaps, this hybrid progeny may be fertile *inter se*; and, even if it be so, the fertility of the offspring is no demonstrative proof of the common origin of both parents. It may be regarded as a safe proposition, that hybrids, or the progeny of two parents, each distinct as to species, never, or very rarely, occur among animals in a state of nature. A few solitary instances are on record, with respect to insects; and a doubtful case has been noticed among birds, in the *Tetrao hybridus*, of Norway; supposed, by some naturalists (without much reason), to be a hybrid, between the male Capercaillie (*Tetrao urogallus*), and the female of the Black Grouse (*Tetrao tetrix*).* But, these very rare instances apart, it is only among animals diverted, or, it may be said, distorted, from a state of nature, with their instincts impaired by domestication, and placed, by man, under circumstances preventing the natural direction of their impulses or affections, or constraining, or inducing, an artificial union, that the intercourse of different species takes place; thus, the Lion and female Tiger, caged together, have produced a hybrid progeny.

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* There is no longer any doubt respecting the character of the *Tetrao hybridus*; it is a distinct species, intermediate, in form, between the Capercaillie and Black Grouse, though much more nearly allied to the former. Its scarcity, where both the other species are abundant, and its intermediate appearance, seem alone to have excited the suspicion of naturalists, as to its being a hybrid. See Mr. Yarrell's observations, in *Proceedings Zool. Soc.* 1831, p. 73.

An instance of this kind occurred some years since in Mr. Atkins's menagerie; and the preceding representation (fig. 173) of the young animals was taken from the life. The common Mule is the produce of the union of the Horse and Ass; the Siskin, the Linnet, and the Goldfinch breed with the Canary-bird. Different species of Ducks, in confinement, will breed together; the same may be said of the Fowl and the Pheasant, and the Pheasant and Grey-hen (*Tetrao tetrix*)—(see *Proceedings Zool. Soc.* 1834, p. 52); and a hybrid has occurred between the Peacock and the common Fowl. In all well-authenticated instances, however (unless, perhaps, by man's express stratagem on the occasion), it is between animals of the same natural genus that the union has taken place; certainly, it is only in such instances that any offspring has resulted; indeed, it would seem, as might be anticipated, that the nearer the alliance of species, the more readily are they disposed to mutual intercourse; as in the case of the Fowl and Pheasant. But, with respect to the offspring, the question suggests itself, whether such hybrids are, or are not, fertile *inter se*. In some cases we think they are so; in many cases, certainly, the hybrid is capable of procreating with one of the two pure species, from the union of which it was produced.* Instances are known of the mule having bred with the mare; and also of the female mule conceiving; an occurrence said to be most frequent in warm countries; hybrid birds will also breed with an individual of the parent race.† In these cases, there is a very near bond of affinity between the individuals; for hybrids between two given species are, really, farther apart than a hybrid and an individual of one of the pure species from which the former sprung. But where two species are themselves allied, in the nearest possible degree (for we consider the distance between species to be graduated),

* In the *Proceedings Zool. Soc.* 1831, p. 66, occurs the following:—"A letter, addressed by Richard Thursfield, Esq., to Dr. Roots, was read, in illustration of the history of a hybrid between the Hare and the Rabbit, which was lately living at the society's farm. A gentleman, who was rearing a pair of tame Rabbits, placed with them, when they were about two months old, a young buck Hare, apparently about the same age, which became, in a short time, as domesticated as its companions. When the doe Rabbit was old enough, she had, by the buck Rabbit and the Hare, a progeny, consisting of three young ones, which resembled, in all respects, the mother and buck Rabbit, and of three mules. Two of these mules shortly died; the third, a female, was reared with Rabbits of her own age, and, when six months old, produced one young one: she was afterwards bred, from eight times, by tame Rabbits, and by a wild one; but no opportunity occurred of placing a buck Hare in confinement with her. Her progeny, by a tame white Rabbit, with which she bred twice, consisted of two young ones, which were perfectly grey, and of two which were spotted. The latter are still alive, and breed regularly, producing from five to eight at a time. The average weight of the progeny of the mule female was about five pounds; one, however, weighed six pounds and a half. She died shortly after coming into the Society's possession. Mr. Owen having examined the body of this hybrid animal, after death, reported that its size and colour were those of the Hare; but its hinder legs were shorter than in that species, and agreed rather with those of the Rabbit. The length of its small intestines corresponded with that of the Hare; its cæcum was seven inches shorter, while its large intestines measured one foot more than those of the Hare."

† See an interesting account of the breeding of hybrids (between the Pheasant and Fowl), with a Pheasant Cock, in *Proceedings Zool. Soc. L.*, 1836, p. 84. Hybrids between the Pintail and common Duck have bred with the male Pintail, from which they sprung, and produced young, of which a specimen was exhibited in December, 1831, before the Scientific Meeting of Zool. Soc. L. See *Proceedings Z. S. L.*, 1831, p. 158.

it is, perhaps, possible, that the physical constitution of the hybrids between them, may be so ordered as to enable them to reproduce offspring by their mutual union; and, moreover, that the fertility of hybrids *inter se*, may be much influenced by the natural fertility of their parents,—that is, that where two species, each, naturally, very fertile, produce hybrids, these hybrids may partake of the prolific nature of both parents, to such an extent as to be fertile *inter se*. However it may be accounted for, it cannot be doubted that, in some few cases, the hybrids between really distinct species are fertile, notwithstanding the weight of authority to the contrary.* According to Buffon, the offspring of the male Goat and Ewe are prolific; and if the ideas of Mr. Eyton be correct, respecting the specific distinction between the Chinese Hog and the common European Swine, the offspring of which are fertile *inter se*, there is an interesting case in point. (See *Proceedings Zool. Soc.* 1837, p. 23.)

It is commonly supposed, that the fertility of so-called hybrids, *inter se*, is sufficient to prove the specific identity, or common primitive origin, of the parents. The consequence is by no means clear. A permanent difference of form, however trivial, distinct habits and instincts, transmitted from age to age, however minute the distinction may be, are sufficient, it is contended, to establish the originality and genuineness of species. How close is the Grey-lag Goose (*Anser palustris*) to the Bean Goose (*Anser ferus*); how near the Wild Swan (*Cygnus ferus*), to Bewick's Swan (*Cygnus Bewickii*); and how much closer still is the latter to the *Cygnus buccinator* of North America; yet, on these instances (and we might fill pages with others even more pertinent), the species are regarded as genuine, because, however superficial or slight the differences may be between them, these differences are constant; nor would the fertility of hybrids between them invalidate the conclusion. Besides, it would appear that, although the first generation of hybrids may be fertile *inter se*, either their progeny, after the first or second remove, cease to be so (the prolific power becoming feebler), or that the progeny return back to the most influential of the parent stocks, and completely merge into it; so that the *ad libitum* continuance of a factitious race would seem to be denied by Nature. With this allowance, then, must the non-prolific nature of hybrids, as a test of the genuineness of species, be taken, rather than in an absolute, or unqualified, sense. Nay, the very circumstance of hybrids returning (where they do not

* Pallas entertained the opinion that our Sheep, Dogs, and, perhaps, Poultry, are factitious beings, not descended from any single wild original stock, but from a mixture of nearly allied primitive species, whose hybrid offsprings have possessed prolific powers. He observes, that those domesticated animals which either do not intermix with other species, or which produce with others an unprolific progeny, are very little changed, however completely and anciently they may have been under the dominion of Man: such, he regards to be the Horse, the Ass, the Ox, the Hog, the Camel, the Dromedary, and the Rein Deer. The varieties of the Dog have ever been a stumbling-block in the way of naturalists; but we cannot regard the Sheep, or the domestic Fowl, as hybrids. The ideas of Pallas, however, are well worth consideration.

absolutely cease to be prolific) to one of the original stocks, appears the greatest proof possible of the specific genuineness of that stock, the attractive power of whose typical organization (to use the expression) is so prevalent as to reclaim to itself the unsettled hybrid, destitute of the stamp of independent originality.

The hybrids between the Chinese Goose (*Anser cygnoides*), and the common Goose, are prolific; but, unless crossed again with the Chinese Goose, the race soon returns to the characters of the ordinary domestic species. (See *Pallas. Act. Acad. Scient. Petrop.* 178, p. 83, note; p. 96.)

Neither the occasional fertility, then, of hybrids, *inter se*, nor the production of offspring, by the union of a hybrid with one of the pure species from which it sprung, demonstrates that the two species, from which such hybrids originate, are falsely so called, and that they are mere varieties of one common, primitive parentage.

That species branch out into varieties, and often permanent varieties (at least, if strictly interbred together), cannot be disputed for a moment; it is on this principle of interbreeding between such, that the purity of the Race-horse, of the Bull-dog, Hound, Setter, or Terrier is maintained, and the respective qualities of each prevented from degenerating; an alloy, by the intermixture of another breed, shews itself, generation after generation, with more or less regularity and distinctness; and, if farther alloys be permitted, the result is, a mongrel generation, not a hybrid race.

One peculiar variety, which we see both in the human species and in the lower orders of Mammalia, is the Albino. Albinos, among animals, are distinguished from simply white individuals, by the pale, pinky, and unnatural tint of the skin; the softness, and absolute whiteness of the hair, including the eye-lashes; the rose-colour of the iris, and the redness of the pupil. Often, indeed, in the human subject, the skin is covered with a sort of scurf, and is dry, or harsh, as if the excretions of the surface were suspended; the eyes are intolerant of light. Albinism is a variety by defect; the colouring principle of the skin, the hair, and the iris, and the pigmentum nigrum of the eyes, are wanting; so that the vascular choroid membrane of the latter appears through the pupil; while the vascularity of the cutis, and of the iris, gives a pinkiness to the surface of the body, and a deeper, or red, tint to the latter. The constitution of Albinos is feeble; and the intellectual powers are often, if not always, of comparative inferiority. Albinos appear among all nations; they occur among the fairest races of Europe, and among the darkest of Africa; their peculiarities exist from birth, and are transmissible by generation.* Among

* Albinos of the human race, were noticed by Cook at Tahiti (Otaheite), and by Wafer, in the Isthmus of Darien; their occurrence is frequent in the mountain regions of Europe, and not uncommon among the Negro races of Africa. Jefferson, in his *Notes on Virginia*, records several cases; and, among them, one of an albino woman, from Guinea, who bore an albino child to a black man; and another, of an albino Negress, who had a black daughter by a black man. We know of no

the lower orders of Mammalia, albinism mostly occurs only among domesticated quadrupeds; albino Elephants have been known; and such, there is reason to believe, are the white Elephants at the court of the Birman empire; albino Ferrets, and Rabbits, and Mice are very common. Albinos, breeding together, produce Albinos; but, if interbred with the ordinary race, the peculiarity disappears in the descendants; breaking out, however, now and then, as if the tendency to it still lurked in the blood.

These, and similar instances of occasional variety, do not happen very extensively; variety on a great scale does, however, occur; and the exact nature and origin of races, as they are termed, demand attention. The subject is full of perplexity. The different races of mankind, for instance, to go no further than the Negro and the European, have their respective distinguishing characters; but whether races are, exactly, varieties, that is, the result of a combination of causes, which have operated on different offsets of one origin, or are aboriginal,—and, if the latter, whether this aboriginality, which involves the creation of them as they are, destroys specific identity, so that the same species may have distinct primordial beginnings,—are points of great difficulty.

It may be observed, that no natural causes, with which we are acquainted, appear to be capable of producing distinct races. With respect to the Negro, for example (a term which has ignorantly been applied, indiscriminately, to the whole of the black natives of Africa, as if they were all one people), it has been asserted, and taken for granted, that their form and colour have resulted from the heat to which they have been exposed, generation after generation, which, with other minor agents, has blackened their skin, thickened their lips, crisped their hair, and elongated the jaws and the heel; but these, if the true causes, would operate in like manner in like circumstances. What the Negroes are now, they were 3000 years ago. The period, in which the change took place, eludes investigation; nor can it be traced to the influence of climate or soil. An European, exposed to the fervid rays of the inter-tropics, will, indeed, become swarthy, tanned, and sunburnt, but not changed into a Negro. The parts of his body not exposed, will not be affected; his swarthiness is accidental and temporary; and his children will be of the ordinary

instance on record of Albinos intermarrying; but it cannot be doubted, by such a mode, a permanent variety might be produced. Wafer describes the Albinos of the Isthmus of Darien as having very weak eyes, incapable of bearing the light of day, during which season they are sluggish and dull; "yet, when moon-shiny nights come, they are all life and activity; running abroad, and into the woods, skipping about, like wild bucks; and running as fast by moonlight, even in the gloom and shade of the woods, as the other Indians by day, being as nimble as they, though not so strong and lusty." He previously observes, that "they are not so big as the other Indians;" that "they are comparatively weak, and not very fit for hunting, or other laborious exercises, and do not delight in such." Albinos are well known in Java and Ceylon, and, also, on the continent of India. The Hindoos regard them with horror, and cast their bodies, after death, like those of persons afflicted with cutaneous diseases, to be devoured by the wild beasts.

degree of fairness. But the children of Negroes, born in North America, or Northern Europe,—their children, and their children's children,—are still genuine Negroes. If the colour and form of the Negro were conditions thus acquired, such conditions would not be fixed and perpetuated; for, though like produces like—though the Race-horse, breeding with the Race-horse, produces a Race-horse, or the Bull-dog, with its like, produces a Bull-dog—still, the mere influence of climate, effecting, as it would seem, only superficial and transitory impressions, does not establish them upon the organization. No people, within the records of history, have been changed into a race of Negroes.*

While, however, the Negro retains his fixed and distinguishing characters, he is not only surrounded by the descendants of European colonists, retaining theirs, but by African tribes, not Negroes, differing in tint of skin, physiognomy, hair, and general contour. The Abyssinians, within ten degrees of the equator, and surrounded by Negroes, have a dark olive colour; have large, expressive eyes, and long hair. The Gallas, of the same latitudes, a nation of considerable extent, have, also, a brown skin, and long hair. The natives of Timbuctoo are not Negroes. In Madagascar, two or three distinct races exist: a true Negro race; and an olive-coloured, or yellowish-brown race, with crisp hair, termed, by Lesson, Madecasses, apparently of the Papuan stock; and, besides these, what appears to be an aboriginal race, inhabiting the interior, with dark skins and lank hair, called Virzimbers, a branch of the great Alfourou nation, which is spread over the Moluccas, New Guinea, and, also, inhabits the interior of the Islands of the Indian Archipelago. That the Negroes, then, do not owe their peculiarities to the mere effects of the heat of the torrid

* Dr. Prichard observes: "Nothing seems to hold true, more generally, than that all acquired conditions of body, whether produced by art or accident, end with the life of the individual in whom they are produced. Many nations mould their bodies into unnatural forms: the Indians flatten their foreheads; the Chinese women reduce their feet to one-third of their natural dimensions; savages elongate the ears; many races observe the rite of circumcision. We frequently mutilate our domestic animals, by removing the tail or ears; and our own species are often obliged, by disease, to submit to the loss of limbs. That no deformity, or mutilation of this kind, is hereditary, is so plainly proved by everything around us, that we must feel some surprise at the contrary opinion having gained any advocates. After the operation of circumcision has prevailed 3000 or 4000 years, the Jews are still obliged to submit to a painful rite. Docked Horses, and cropped Dogs, bring forth young with entire ears and tails. But for this salutary law, what a frightful spectacle would every race of animals exhibit! The mischances of all preceding times, would overwhelm us with their united weight, and the catalogue would be continually increasing, until the universe, instead of displaying a spectacle of beauty and pleasure, would be filled with maimed, imperfect, and monstrous shapes."—*Disput. Inau.* Though accidental, or induced, deformities, are not always transmitted to succeeding races, still this law only holds good to a certain extent; for there is a remarkable tendency, both in plants and animals, to transmit to their offspring the individual peculiarities which they may possess; not, indeed, those produced by the accidental loss of parts, but such "new characters of organization as spring up with the breeds, and which, owing to our ignorance of the circumstances of their rise, are termed accidental varieties." Thus, the short and bow-limbed Sheep of New England, which have appeared within a few years, and of which the origin, in a male Lamb, the product of an ordinary Ewe, is well authenticated, has become an established breed. Supernumerary toes, or fingers, are continued, as abundant examples on record prove, through many generations. Peculiarities in the physiognomy run through families, from generation to generation; no less than hereditary predispositions to various diseases.

zone, need not be insisted on. The question, then, arises, whether their origin is to be attributed to that tendency to variation of form, which obtains, more or less, throughout the animal kingdom, resulting from circumstances which elude our scrutiny, or, whether they are aboriginal, and, in this sense, a distinct race? Could we pierce the darkness of antiquity, the obscure of by-gone time;—could we work out a history of our species, commencing with Man's first existence on the globe, we might solve a question on which many are divided, and to which each party brings plausible arguments. As it is, we must, on many points, remain in conjecture, or with only analogy to guide us. One thing is clear, that no external, or physical causes, with which physiologists are acquainted, can change a nation of the Celtic, or the Teutonic race, into the Negro, the Papuan, or Alfourou. Formed *for* the regions they inhabit, and not *by* them, the true circumstances of their primordial rise are lost in the night of unrecorded ages.

But, supposing that the Negroes, or, that any well-defined races of mankind, be aboriginal, it does not follow that their specific identity with other races is, therefore, nullified. That they *are* of the same species with the other families of mankind, according to the received ideas of species, every circumstance tends to establish; nor does this admission interfere, in one way or another, with the question, either as to their aboriginal creation, or as to their assumption, at some unknown period, of their distinguishing characteristics. If, by the command of the Creator, the earth became covered with grass and herbage; if forests sprung up on the hills; then must millions of the same species of the vegetable kingdom have, simultaneously, acquired existence; there is, therefore, little to startle us, in the admission that such may have been the case, also, with respect to the animal kingdom.

Animals are born,—they attain maturity,—they propagate their species,—they die. The dawn of an animal's existence is the first step toward its death; the law of death necessitates the law of reproduction. Every species has a definite and natural duration of life; a duration determined by the laws of nature, but which cannot be known, except by experience. Hence it is, that a table of the natural duration of life, throughout the whole of the animal kingdom, or even throughout the vertebrate classes, involves a thousand insurmountable difficulties, in the way of its execution. We cannot watch the days of the existence of animals in a state of nature; multitudes are absolutely beyond the sphere of our observation. We cannot wander in the depths of the ocean, and study, in their native haunts, the countless thousands of living things which tenant the briny waters; and, therefore, we cannot estimate the natural duration of their lives. But, setting all this aside, so many are the chances of life, so few are the animals, within the range of our observation: that die from

age alone, that the exact period of the duration of life, even in those which man has domesticated, is not, in all cases, to be precisely ascertained. Our data cannot be safely taken from single instances; a collection of examples is requisite: to carry out the necessary researches, through the Mammalia alone, involves the labour of years, and will lead, at last, only to general deductions. Something may be learned from the extensive vivaria, which the rising taste for natural history has established in so many parts of Europe; but, unfortunately, animals in confinement seldom reach maturity; for, from the privation of liberty, the restriction of their bodily exercise, the unnatural food upon which they often subsist, and from an impure atmosphere, and an uncongenial climate, even should acute disease not sweep them off, their enfeebled constitution sinks, by slow decay, and prematurely yields to death.

Hitherto, then, the little knowledge which we possess, respecting the natural duration of the life of animals, appears to be more the result of casual opportunities than of systematic observation. Events, apparently accidental, have sometimes furnished us with facts, which diligence could not, perhaps, have ascertained. It is not, however, to be supposed, that every fact which has been, from time to time, observed by various individuals, has been duly placed on record; many have been lost, because their importance has not been known; and many others have not yet found their way into the archives of science. It is, generally, considered as a rule, that the sooner an animal arrives at maturity, the sooner is its existence terminated; and, without doubt, a certain degree of truth attaches to this opinion; more especially on a broad comparison of the vertebrate classes among each other. A question, however, here opens:—what are we to understand by maturity? The maturity of Mammalia supposes the completion of growth, and the power of reproduction; so, also, among birds; not so among reptiles and fishes, for these reproduce their species long before the period at which their growth is stationary. The term, maturity, therefore, in the sense in which we apply it to Mammalia and birds, is not appropriate to these. Indeed, among the cold-blooded Vertebrata, whose circulation is languid, whose natural heat is not much above that of the medium in which they live, and whose tenacity of life is proverbial, the natural duration of their existence might be supposed to be considerable. Tortoises and Turtles drag on a life through ages. In the Bishop's garden, at Peterborough, a Tortoise died in 1821, which must have exceeded 220 years of age. The Lambeth Tortoise, which was introduced into the garden in the time of Archbishop Laud, about the year 1625, died, from some neglect on the part of the gardener, in 1753; having been in the garden 128 years. Gilbert White records several details respecting a Tortoise which had lived thirty years in captivity; and states, that another, in an adjacent village, "was

kept till, by tradition, it was supposed to be 100 years old." Some of the huge Indian Tortoises, which have been kept, from time to time, in the Gardens of the Zoological Society, London, could not have been less than 200 years old, and, probably, much more, since their growth is slow, and their size, when first hatched from the egg, small; yet, some have weighed upwards of 400 pounds. The same observations apply to Crocodiles and huge Snakes, as Boas and Pythons; but no well-authenticated data have been obtained, upon which to form an estimate of their longevity. An instance is known in which the common Snake (*Tropidonotus natrix*) was kept eleven years in captivity; but of the cause of its death no account has been received.* The Toad is a long-lived animal; an instance is on record, of one having been kept, in a sort of half-domestic state, for thirty-six years, when an accident caused its death.

With respect to fishes, whose growth is slow, and whose skeleton never attains the consistency which it does even in reptiles, still less that which characterizes the bones of birds and Mammalia, their existence seems to be remarkably enduring. They inhabit a medium much less liable to sudden alterations of temperature than is the atmosphere, and their muscular powers are very great. The Pike has been known to live 267 years; the Carp, 200; without ending, even then, their existence according to the course of nature. It is probable that the oceanic fishes enjoy a still longer date of life than the fresh-water species; but no data exist upon which to draw out even a limited scale.

Confining our observations to the Mammalia, it may be observed, that it is difficult to reduce general rules to anything like universal application. It may be stated, however, that the most prolific are, ordinarily, the shortest lived. The smaller Mammalia, the Rodentia in particular, are very fertile; and their existence, on the average, is of short duration.† The fertility of the Rodentia, however, is not so much intended as a counterbalance to the natural death of the species, as to compensate for their destruction by extrinsic causes; for, so great is their loss by the agency of their predatory foes, that, unless the numbers destroyed were rapidly recruited, the annihilation of species would be in danger; and, with their annihilation, a deficiency in that supply of food which they furnish to the Carnivora subsisting upon them. On the other hand, it is reasonable to suppose that the larger Mammalia, and more especially those which produce only a single offspring in the course of every two years, will enjoy an extended duration of existence: to a certain extent, such is the case. The age of the Elephant, Rhinoceros, and Hippopotamus, is said to extend through centuries. The Horse, however, is old at thirty, and so is the Ox: the age of the Sheep is about fifteen years; but none of these larger Herbivora produce,

* The skin of this Snake, prepared and mounted, is in the Mus. Zool. Soc. L.

† The age of the Rabbit is from five to seven years.

throughout the whole of their lives, as many offspring as the Rabbit does in one year. Less obnoxious to destruction than the Rodentia, were they as fertile, no pasturage would suffice for the multitudes which, in a few years, would cover the land, destroying the vegetation around them, and, thereby, working out their own destruction—death by famine. The Hog, however, is long-lived, and very prolific. White, in his *Natural History of Selborne*, mentions a Sow that produced young till beyond the age of fifteen, when she was killed for bacon. Among the Carnivora there is great variety, with regard to the longevity of species. The Bear of Northern Europe lives till upwards of fifty; the huge grizzly Bear, which died in 1839, in the Gardens of the Zoological Society, London, had existed in the Tower for more than twenty years, and for six or seven in the Gardens, previously to his death; his age was very considerable, but cannot be exactly ascertained. The Lion, probably, lives long; he is mature in about seven years. Pompey, which died in the year 1760, was known to have been seventy years in the Tower; and one brought from the River Gambia, died at the age of sixty-three: the Dog lives from fifteen to twenty years; the Cat about fifteen.

Of the duration of the existence of the cetaceous Mammalia, no estimate can be taken. Who has numbered the years of the Whale? From the solidity of the skeleton of this animal, the huge bulk to which it attains, and the comparatively small size of the cub, which remains long under the mother's care, it may be inferred, that it is among the longest lived of Mammalia:—hundreds of years, most probably, roll away, ere its powers decline, and it slowly yields to death.

The age which Man naturally attains is from seventy to eighty years: the period at which he reaches maturity, differs much in different climates. In the hotter latitudes, the age of puberty, the dawn of maturity, commences very early; later in the temperate, and still later in the more northern: in temperate Europe, Man is mature at eighteen or twenty; at twenty-five, he has attained the fulness of manhood; the succeeding twenty-five years bring him to the borders of age; the next twenty-five years conduct him, at first by scarcely perceptible degrees, then by quicker, but still gentle steps, to decay and final dissolution; but many are cut off by diseases, by accidents, and by intemperance, before the allotted time of nature. Maturity is attained, by the female sex, a year or two earlier than by the male.*

* Dans toute l'espece humaine, les femmes arrivent à la puberté plutôt que les mâles; mais, chez les différens peuples l'âge de puberté est différent, et semble dépendre en partie de la température du climat, et de la quantité des alimens; dans les villes, et chez les gens aisés, les enfans accoutumés à des nourritures succulentes et abondantes, arrivent plutôt à cette état; à la campagne, et dans le pauvre peuple, les enfans sont plus tardifs, parcequ'ils sont mal et trop peu nourris, il leur faut deux ou trois années de plus; dans toutes les parties meridionales de l' Europe, et dans les villes, la plupart des filles sont pubères à douze ans, et les garçons à quatorze; mais dans les provinces du Nord, et dans les campagnes, à peine les filles le sont: elles à quatorze, et les garçons à seize."—Buff. *Hist. Nat.* tom. ii. p. 489.

In the warmer latitudes of Europe, females are marriageable at twelve or fourteen years of age.* It is remarkable, however, that, in the hotter climates of the east, age comes on much earlier in the female sex than in the male. Women are old at thirty or forty, in Arabia, Syria, Persia, &c. ; whereas, the men retain their physical powers to an advanced period.†

Instances of extreme longevity among the human race, are far from being unfrequent. Mr. Easton, of Salisbury, in a curious work on longevity, has collected notices of 1712 persons, who exceeded their hundredth year ; and, of these, many advanced considerably beyond that period.

The following are a few of the more recent instances :—

Thomas Parr . . .	died in A.D.	1635 . . .	aged	152
Henry Jenkins . . .		1670 . . .		169
Countess of Desmond . . .		1612 . . .		145
Thomas Damme . . .		1648 . . .		154
Peter Torton . . .		1724 . . .		185
Margaret Patten . . .		1739 . . .		137
John Rovir and his wife . . .		1741 . . .		172,164
St. Mongaha Kentigen . . .		1781 . . .		185

Baron Larrey states, “that there were, at Cairo, thirty-five individuals, upwards of 100 years of age.” The Cenobites of Mount Sinai are reported to attain, very frequently, to the age of 110 or 120. The Arabians of the Desert are said often to exceed 100 years.

Maturity succeeds the age of puberty, and is the completion of the preparatory steps, by which the system acquires the due conditions necessary for the reproduction of the species. In the human species, the indicia of approaching maturity are well known ; in the male sex, puberty is accompanied by a remarkable change of the voice ; it loses the feminine characters which it previously possessed, and becomes deep and sonorous ; the larynx acquires an increase of development, and the thyroid cartilage, hitherto small, becomes large and prominent.‡

* In Italy, the phenomena of the female economy are established at twelve years of age ; and in the south of Spain, marriages take place at that period. At Smyrna, women are sometimes mothers at eleven or twelve years of age. In Persia, Chardin reports, that females are mature at nine or ten years of age. The age of ten is the ordinary period, according to Niebuhr, in Arabia. In Jamaica, says Mr. Long, the women attain earlier to maturity, and sooner decline, than in the northern climates : they often marry very young, and are mothers at twelve years of age. Diversities of an opposite kind are observed in northern climates. In the north of Germany, the system is not perfected until the fifteenth year, according to Blumenbach. In some parts of Europe, the period is still more tardy.—Prichard's *Res. Phy. Hist. of Mankind*.

† “Speaking of the Arab nations, Bory St. Vincent, says :—“Les femmes sont nubiles de très bonne heure ; quelquefois des l'âge de neuf ans, jamais plus tard que douze ou treize aussi perdent-elles promptment la faculté d'engendrer, tandis que les hommes la conservent jusque dans l'âge avancé.”

‡ Il y a des rapports singuliers, dont nous ignorons les causes, entre les parties de la generation et celles de la gorge ; les ennuques n'ont point de barbe ; leur voix, quoque forte et perçante, n'est jamais d'un ton grave ; souvent les maladies secrètes se montrent à la gorge. La correspondance, qu'ont certaines parties du corps humain avec d'autres fort éloignées et fort différentes, et qui est ici si marquée, pourroit s'observer bien plus généralement ; mais on ne fait pas d'attention aux effets, lorsqu' on ne

The mind sympathizes with the physical changes of the system, it is animated by views, hopes, and desires, unknown before; childish thoughts pass away, the mental powers expand, and Man stands confessed in all the dignity of his intellectual and physical excellence.

In the female sex, the indicia of womanhood present corresponding phenomena;* the general form acquires fulness, and a more graceful contour; the voice, while it preserves its delicacy, gains power; and new emotions, developing with these physical changes, announce the dawn of maturity.

If we turn to the lower Mammalia, we observe their bodily powers and animal instincts to have now arrived at their completion. Obeying the laws of Nature, the sexes form companionships, sometimes permanent; but, more frequently, only enduring till the conception, by the female, of the offspring which she is destined to bear, bring forth, and suckle. Often, as among the Seals, the Deer, &c., one male is the lord of many females, whom he guards, with jealousy, from the approaches of a rival. In other cases, a single male and female consort for the season, and mutually guard and rear their offspring: generally, however, the whole care devolves upon the female alone. Where animals form societies, as among the larger Apes, the old males of each troop guard the females and their young, in time of danger, and endeavour to secure their safe retreat.†

The affection of the females for their young, is devoted and powerful; but it is transient, enduring only till the latter are able to maintain their own independence, nor is it participated in by the male, at least, in ordinary instances; nay, sometimes the female anxiously conceals her offspring from the male, lest he should destroy it.

The period of gestation, and the number of young produced at a birth, vary materially, in different Mammalia. Among the larger Herbivora, the females seldom produce more than one at a time; the Elephant,

soupponne pas quelles en peuvent être les causes; c'est, sans doute, par cette raison, qu'on a jamais songé à examiner avec soin ces correspondances, dans le corps humaine, sur lesquelles cependant roule une grande partie du jeu de la machin animale: il y a dans les femmes une grande correspondance entre la matrice, les mamelles, et la tête; combien n'en trouveroit-on pas des autres, si les grands medecins tournoient leurs vues de ce côté-la? Il me paroît que cela seroit plus utile que la nomenclature de l'anatomie. Ne doit-on pas être bien persuadé que nous ne connoissons jamais les premiers principes de nos mouvemens? Les vrais ressorts de nôtre organization ne sont pas ces muscles, ces veines, ces artères, ces nerfs que l'on décrit avec tant d'exactitude, et de soin: il réside, comme nous avons dit, des forces intérieures dans les corps organisés qui ne suivent point du tout les loix, de la mécanique grossière que nous avons imaginée, et à laquelle nous voudrions tout réduire."—Buff. *Hist. Nat.* tom. ii. p. 485.

* Simias non esse menstruales, ut Buffon et nonnulli opinantur, nobis satls apparet; libidine genitalia tumefacta, veneris tempore instante, profluvium sanguinis interdum dimittere, haud negari potest; nihilominus hoc profluvium non esse menstruum, ni fallimur, et ad veritatem explorandam curavimus, procul dubio videtur; ideoque ad Plinii sententiam accedimus, mulierem solum esse animal menstruale. Certè de Troglodyte, et Pitheco omninò nescitur.

† Monkeys are said to remain permanently attached to one or two females, rarely more; their union seems to be a sort of marriage; the males are exceedingly jealous, and watch their females very closely.

the Horse, the Ox, and the Camel, are examples; and it is among these animals of large size, ordinarily producing only one at a birth, and, in a more advanced state of development than obtains among most Mammalia, that the period of gestation is the longest. In the Elephant, it endures for about twenty-three months; in the Horse, upwards of eleven months; in the Tapir, between ten and eleven; in the Dromedary, twelve; in the Giraffe, upwards of fifteen months; in the Cow, nine; in the females of the Red-deer, Fallow-deer, and Rein-deer, somewhat more than eight months. In the smaller ruminants, as the Sheep and Goat, five months; in the Sow, which produces a numerous litter, only fourth months. In the Rodentia,—which not only bring forth a numerous progeny, but those, also, with the eyes closed, and in a very helpless condition, or, in other words (though their development, after birth, is very rapid), less matured, than are the young of the Horse, Ox, or Sheep,—the period of gestation is, comparatively, short; in the Beaver (one of the largest of the order), it endures for four months; in the Rabbit and Hare, from thirty to forty days; in the Dormouse, thirty-one days; in the Guinea-pig, three weeks; in the Squirrel and Rat, four weeks. Among the larger Carnivora, the period of gestation is longer than among the smaller species; it endures for six months in the Bear; 108 days in the Lion; seventy-nine days in the Puma; nine weeks in the Arctic Fox; sixty-two or sixty-three days in the Dog; fifty-five or fifty-six days in the Cat; in the Wolf, sixty-three days. The young of all the Carnivora are born blind and helpless, and, like the young of the Rodentia, require a bed, or nest, for their reception; their subsequent development is slow; and it is many months before they are able to rely upon their independent exertions; in the Dog, the eyelids begin to open about the twelfth day; and the permanent teeth are not fully acquired till after the completion of a twelvemonth. Of all the Mammalia, the marsupials have the shortest period of gestation, and produce their young in the most rudimentary condition; hence, the females, in most species, have a fold of the skin of the abdomen, or a pouch, for the reception of their young, and in which, attaching themselves to the teats, these semi-fœtal beings are fostered by her genial warmth, receive nutriment, and grow; nor, even when able to partake of other diet, in addition to the mother's milk, do they, altogether, forsake this natural dormitory, but resort to it, not only to obtain an occasional supply of milk, but, in times of danger, as an asylum. The Kangaroo, the largest of marsupial animals, produces only a single offspring at a birth, after a period of gestation for thirty-nine days. The young, as observed by Professor Owen, on the day of its birth, does not exceed one inch two lines from the nose to the end of the tail; its eyes are closed, and it resembles “an earth-worm in the colour and semi-transparency of its integuments.” At the

moment of its birth it is placed, by the mother, in her pouch; conducted to the nipple, to which it firmly adheres by the mouth, and continues attached until developed to a considerable size.

The Cetacea, in general, produce only one young at a birth; but their period of gestation is not known. The Quadrumana produce one, sometimes two, at a birth;* the period of gestation, in such species as have afforded an opportunity of determining the time, is seven months. Nine months is the usual term of gestation in the human race; one, sometimes two (very rarely more), are produced at a birth; and, in a state of utter helplessness, requiring, for many months, the mother's unremitting care. The long infancy, the slow growth, and the late maturity of Man, constitute a marked and important line of separation between him and all the lower animals; and materially influence his moral and social state of being.

All the lower animals produce their young at that particular season of the year most advantageous to the welfare of the offspring, and of the parents: hence is the season of sexual association confined within restricted periods: of the human species, the instinctive desires are solely under the control and direction of his reason.

It need scarcely be said, that the young of all Mammalia are, at first, nourished entirely by the milk secreted in the mother's breasts. The breasts, teats, or mammæ, are conglomerate glands (that is, a mass composed of smaller glands, compacted together), invested with cellular tissue; they are traversed by lactiferous tubes, communicating with each other, and, ultimately, merging in canals, which lead to the nipple (composed of a vascular tissue, and sensitive), there to open by several orifices. The situation of the mammæ varies in different animals; they are pectoral, ventral, or inguinal; and their number has reference to that of the young produced at a birth. In the human species, in the Simiæ, in the Lemurs, and Bats, and, also, in the Elephant, the mammæ are two and pectoral. In the Ruminantia they are either two or four, and inguinal, or, in the groin; in the Horse, and its allies, the mammæ are two, and inguinal. The Sow has from ten to twelve mammæ, in pairs, along the abdomen. Carnivorous animals have from six to ten ventral mammæ, in pairs. They are ventral and numerous in the Rodentia.

The period of lactation, or suckling, is regulated by the growth of the young, and the earlier or later development of their powers; at first they are fed exclusively with the mother's milk, but, in due time, they begin to partake also of the food which is to constitute their aliment when adult. Among the Carnivora, it is long before the young can procure their own prey; and it is not until after some weeks have elapsed, that they are capable of taking other nutriment than that afforded by their parents;

* The *Jacchus penicellatus* (or *Oustiti*) produces two at a birth; and so, most probably, do the allied species.

their appetite for blood, however, gradually awakens; and, now, the mother brings home the reeking prey, yet warm, to her den; they lick the blood, they endeavour to tear the flesh, and growl as they exert their efforts; their powers now rapidly expand, they partake less of the mother's milk, and more of the prey, with which she assiduously supplies them; they gambol around their parent, and chase each other, exhibiting, in playful frolic, the arts of surprise and attack, which they are soon to exercise in earnest; in due time they leave their den, and follow their parent, who still protects them, and supplies them with food. At length, they acquire strength and energy, enabling them to depend upon their own exertions; and, now, the conduct of the parent towards them undergoes a change; she no longer participates in their gambols, or permits their familiarity, but drives them from her presence; they separate, as accident may be, in different directions; they become strangers to each other, and to their parent, and spread their race in other districts. With the cessation of the strong attachment of the mother to her young, usually arise feelings of a different order. The impulse of nature again urges her to seek a mate; in due time, she brings forth another progeny; rears them with solicitude, and, again, compels their dispersion.

The term of lactation is longest in the larger animals, bearing reference to the period of gestation, and the slow growth of the young. In the Rodentia it is very short; harmonizing with their fertility. Many rodents produce young three or four times in the course of the year. The period of gestation with the Guinea-pig, one of the most fertile of the Rodentia, endures only for about a fortnight; and the female reproduces every two months during the spring and summer. The Rat, Mouse, Hamster, &c., produce three or four litters in the course of the spring; hence, their period of lactation is short, and the young grow rapidly, soon becoming independent of their parents. In some instances, the young do not leave the society of their parent till long after they are able to feed, and obtain their own living; the female of the Wild Hog, for instance, is often surrounded by young of various ages, the produce of different litters: until fully mature, they are liable to become the prey of the Wolf and Bear, and their safety consists in their herding together, under the protection of their savage mother; indeed, though the Boar lives a solitary life, in the recesses of the forest, fearing no foe, several females, with their respective young, usually accompany each other, and unite in the defence of the common herd.

Beavers, also, associate in families, consisting of two or three pairs of adults, and the irrelative offspring. They produce twice a year, to the extent of three or four at a birth. The young, generally, continue with their parents till the third year, when they begin to form separate habitations for themselves and their own progeny.

At a certain period of life, the reproductive powers of animals begin to fail: this failure first takes place in the female; as if, indeed, the bearing, bringing forth, and rearing her progeny, according to the due course of nature, had exhausted her animal energies, before the time when those of the male decline. In general, however, the lower animals continue to be reproductive, up to a period nearer to the natural termination of their existence than obtains in the human race; but, nevertheless, as age advances, the number of young at a birth (in such as produce several) is diminished, nor are the young so strong and healthy. A Cat, in the author's possession, had young in the fifteenth year of her age, though labouring under a cancerous disease in one of the mammæ, and which, in a few months afterwards, terminated her existence.

The suspension of the reproductive powers of the system betokens the failure of the vital energies; years, in the human species, may yet elapse before the close of life; but the free step, the firm limb, the clear eye, the keen relish of the pleasures of existence, the hopes and joys of youth and manhood, are fled. Weary with the toil and trials of the way, the aged asks only for repose and tranquillity, ere he "go hence, and be seen no more."

That the death of the lower animals should speedily supervene on the failure of their physical energies, is a wise dispensation. Man, in the decline of his days, is consoled by the sympathy of those around him; the hands of friends and relatives minister to his wants, and he experiences sources of comfort which are denied to the brute. But among the lower animals there is no mutual sympathy; the weak and the failing are deserted by the strong and active; unable to procure food, none supply their wants, none regard them in their death. So sinks the Lion of the desert: age has overtaken him; his eye is dim, his force abated, he fails in his once fatal spring: gaunt, and lean, and feeble, he drags his weary limbs to the old haunt,—the haunt from which he once went forth in the pride of his strength, when his voice scattered terror through the desert,—there, at length, to die. Better had he fallen by the hunter's javelin, "when his limbs were strong, and his courage high," than thus drain to the dregs a miserable existence. Merciful, then, is the law that subjects the brute creation to accumulated chances of premature death; and well is it for them, that the term of natural existence is so seldom attained. The scene of carnage, which the economy of nature presents, the warfare of species with species, the never-ceasing destruction of life, are the antidotes to misery and protracted suffering; death comes unlooked-for, it is not anticipated; up to the last moment the enjoyments of being are experienced, the allotted functions fulfilled, and every instinct obeyed; death comes unanticipated,—its bitterness passes in a moment.

ON THE ARRANGEMENT OF THE MAMMALIA.

SOME explanation of the plan adopted in the arrangement of the Mammalia is here obviously necessary; and this without entering into abstruse disquisitions, or perplexing details: the results, therefore, of an investigation of the subject, rather than the steps by which such results are attained, will alone be presented. It would, however, be unpardonable to omit, altogether, reference to the views of other naturalists; hence, a brief outline of the systems of Ray, Linnæus, Illiger, Cuvier, and others, will be adduced. It must, then, be premised, that every animal has its own characters, by which it is distinguished, and which constitute it a species. Each species consists of individuals. Individuality is the ultimate division; and when we designate a species, we include, in that title, every similar individual. Thus, when we call the Tiger a species, we include, in that word, every Tiger, one being the representative, or prototype, of all. In the next place it may be stated, that, by a spontaneous act of synthesis, the mind cannot but associate, in idea, such species as appear most nearly to resemble each other. We associate, for example, the Tiger and the Leopard, because we perceive, at once, their mutual affinity; and animals, thus collocated, are regarded as forming a group, more or less natural, according to the value of the affinities by which it is bonded together. If truly natural, it will consist of species, agreeing in every character, except such as merely serve to draw a line of specific distinction between them, and which are, consequently, of a trivial or superficial nature (as size, colour, length of fur, or shape and number of scales, or plates, length of snout, ears, tail, &c.); while a sameness of general form, habits, and manners prevails.—A group thus consisting of closely allied animals is termed a genus.

Again, there are genera which agree, in various structural characters, with other genera; and these are associated into what are termed families. But families have, again, certain structural grounds of union with other families, and these constitute orders. The assemblage of orders, all agreeing in essential modes of organization, constitutes a class. The characters of the class Mammalia, the subject of the present work, have been already detailed.

Now, as is very evident, the ideas we form of an order must be more comprehensive than those attaching to the subordinate sections, according to their respective grades; for the ratio of alliance, both as depending upon external and internal structure, diminishes as we proceed from genera upward. The progressive enlargement of groups, by the union of genera, so as to form families, and of families so as to form orders, is necessarily attended by a parallel diminution of the aggregate of characters

in common accordance: and in the assemblage of orders into a class, the diagnostics are solely to be drawn from organs, and their functions.

Now it is with the formation of genera, so that they shall be natural, and with the disposal of these genera, according to their true affinities, or, so as to display their affinities, that the systematic naturalist is especially concerned; for it need not be argued, that the value of a system depends upon its being a transcript of Nature. It must not, however, be concealed, that many difficulties lie in the way of all attempts to exhibit the scheme of Nature's combinations. Chasms interrupt the investigator; anomalous forms perplex him; he is apt, on the one hand, to overrate the importance of characters, or, on the other hand, to slight them. He often mistakes analogy for affinity, and he is, also, influenced by pre-conceived opinions. Hence it is, that naturalists, alike aiming at truth, differ so widely in their views. They take one set of organs, by which to be exclusively guided, and on which to construct a system, not, indeed, valueless, but artificial, instead of natural. Such were the arrangements of the earlier writers; the results of an extended series of anatomical investigations were wanting, to guide them in the establishment of groups; and hence do the trivial characters upon which they are founded, lead to unnatural combinations and strange disjunctions. It is not meant, by these observations, to depreciate the merit of the earlier naturalists; it is no little to their praise, that they should have done what they have, considering the limited extent of the materials within their reach; and, let it be remembered, that to improve is easier than to originate.

The following table presents the arrangement of "viviparous, hairy animals, or quadrupeds," according to the system of Ray:—

UNGULATA.

(ANIMALS HAVING HOOFS.)

SOLIPEDA. Single-hoofed. As the Horse, Ass, and Zebra.

BISULCA. Double, or cloven-hoofed. Primarily divisible into ruminants and non-ruminants.

Ruminating Bisulca—again separable into two sub-divisions; namely, those with permanent, and those with deciduous, horns.

1. Those with permanent horns; as the Ox, the Sheep, and the Goat.

2. Those with deciduous horns; as the Deer kind.

Non-ruminating Bisulca: as the Hog.

QUADRISULCA. Four-hoofed. As the Rhinoceros, Hippopotamus, &c.

UNGUICULATA.

(HAVING NAILS OR CLAWS.)

BIFID (Ruminants). The foot cleft in two only. As the Camel.

MULTIFID. The foot cleft in several parts.

With undivided fingers, cohering by a common skin, their extremities protruding only at the margin of the foot, and provided with obtuse nails, as the Elephant.

With the fingers somewhat separated; and these are either,

Wide-nailed, and anthropomorphous. As the Monkeys. Or,

Narrow-nailed. With fore or incisive teeth in each jaw.

Analoga:—With many such teeth. These animals are all carnivorous, or insectivorous, or live promiscuously on vegetables and insects. As the Lion, Dog, &c. **Carnivora.** Divisible into *Majora* and *Minora*.

Majora. Separable into two portions:—

1. Those with the muzzle short, and the head round. As the Cats.
2. Those with the muzzle more produced, and the head longer. As the Dog, Wolf, Fox, &c.

Minora. (In these the body is long and slender, and the legs short.) As the Weasel, &c.

With two prominent. All these are phytivorous. As the Hare, &c.

Anomala:—In these the teeth are either absent or peculiar, agreeing neither in form nor disposition with the others. As the Tamandua, Hedgehog, Mole, Bat, &c.

The system of Linnæus is confessedly an improvement on that of our illustrious countryman, and displays the clear and comprehensive mind of the immortal Swede: still its errors are not to be overlooked. We find the Elephant and the Walrus associated with the Manis, Ant-eaters, and Armadilloes; and the Hyrax with the Hares and Cavies. The sub-joined is a tabular view of the

LINNÆAN ARRANGEMENT OF THE CLASS.

MAMMALIA.

The primary sub-divisions founded on the structure of the feet; the ordinal characters taken from the teeth.

Sub-division 1. UNGUICULATA.

(WITH NAILS OR CLAWS.)

- Order I. PRIMATES.** *Characters:* — With four front incisive teeth in each of the jaws; upper four parallel, and a canine, apart from the others, on each side of both; *mammæ* pectoral; the feet like hands, the nails flat and oval. *Genera:*—Homo, Simia, Lemur, Vespertilio. (Man, Monkey, Lemur, and Bat.)
- II. BRUTA.** *Characters:*—With no fore-teeth in either jaw; the feet protected by stout nails. *Genera:*—Rhinoceros, Elephas, Trichicus, Bradypus, Myrmecophaga, Manis, Dasypus. (Rhinoceros, Elephant, Ant-eater, Manis, &c.)
- III. FERÆ.** *Characters:*—With two, six, or ten, but generally six, conical front teeth in each of the jaws; one canine, separated from, and longer than, the others, on each side, in both; and the cheek-teeth having conical projections; the feet armed with sharp, hooked claws. *Genera:*—Phoca, Canis, Felis, Viverra, Mustela, Ursus, Didelphis, Talpa, Sorex, Erinaceus. (Seal, Dog, Lion, Bear, Mole, Hedgehog, &c.)
- IV. GLIRES.** *Characters:*—Two incisive front teeth in each of the jaws, approximated, and remote from the grinders; no canines; feet adapted for running. *Genera:*—Hystrix, Lepus, Castor, Mus, Sciurus, Myoxus, Cavia, Arctomys, Dipus, Hyrax. (Hare, Beaver, Mouse, Squirrel, &c.)

Sub-division 2. UNGULATA.

(WITH HOOFS.)

- V. PECORA.** *Characters:*—No incisive teeth above; six or eight below, apart from the molars. *Genera:*—Camelus, Moschus, Cervus, Capra, Ovis, Bos. (Camel, Musk-deer, Deer, Goat, Sheep, Ox.)
- VI. BELLUÆ.** *Characters:*—Incisive teeth, obtuse and truncate. *Genera:*—Equus, Hippopotamus, Sus, Rhinoceros. (Horse, Hippopotamus, Hog, Rhinoceros.)

Sub-division 3. PINNIPEDA.

(WITH FEET LIKE FINS, FOR SWIMMING.)

- VII. CETE. *Characters*:—Spiracles, on the top of the head, pectoral fins, and a caudal fin, which is horizontal, and destitute of nails. *Genera*:—*Monodon*, *Balæna*, *Physeter*, *Delphinus*. (*Monodon*, Whale, *Cachalot*, Dolphin.)

In 1811, Illiger published his *Prodromus Systematis Mammalium et Avium*; but, previously, G. Cuvier had given his views to the world of science, and had called in the aid of anatomy to co-operate with zoology, in the development and elucidation of a *Règne Animal distribué d'après son Organization*. Cuvier's work, however, thus entitled, did not appear, in its present form, till 1816-7; but his *Tableau Elémentaire des Animaux* was printed in 1798.*

The *Prodromus* of Illiger, though confessedly a work of great research, nevertheless, has many imperfections. It is admitted, for instance, as the talented writer of the *Natural History of Monkeys, Lemurs, and Opossums*, has observed, that "the five families, into which Illiger divides his second order, Pollicata, † are neither co-ordinate with one another, nor definitely characterized." The order, indeed, is not natural; it includes the Monkeys, the Lemurs, the Tarsiers, the Cheiromys, and the Marsupials, excluding the Kangaroos. Now, the dissociation of the Kangaroos from the marsupial group, on the one hand, and the collocation of the rest of the marsupials, on the other, with the Simiæ and Lemurs,—if, indeed, anatomy be a guide in arrangements,—are sufficiently startling. However, even on the principles assumed, viz., the pedimanous structure of the hind feet, it is not very clear why the Wombat (*Phascolomys*) has a station among the Pollicata. Surely, if it be a violation of systematic arrangement to constitute the marsupials a group *per se*, the Wombat should be rather referred to the rodents (*Prensiculantia*, Ill.), than to an order of which the Monkey forms a part. ‡

Again, no good reason appears, why the order Salientia (Kangaroos,

* "Je dus faire marcher de front l'anatomie et la zoologie, les dissections et le classement; chercher dans mes premières remarques sur l'organization, des distributions meilleures; m'en servir pour arriver à des remarques nouvelles; employer encore ces remarques à perfectionner les distributions; faire sortir, enfin, de cette fécondation mutuelle des deux sciences, l'une par l'autre, un système propre à servir d'introducteur et de guide dans le champ de l'anatomie, et un corps de doctrine anatomique propre à servir de développement et d'explication au système zoologique. Les premiers résultats de ce double travail parurent en 1795, dans un mémoire spécial sur une nouvelle division des animaux à sang blanc. Une ébauche de leur application aux genres et à leur division en sous-genres fit l'objet de mon *Tableau Elémentaire des Animaux*, imprimé en 1798, et j'améliorai ce travail, avec le concours de M. Duméril, dans les tables annexées au premier volume de mes *Leçons d'Anatomie Comparée*, en 1800."—Cuvier, *Pref. de la prem. edit. du Règne Anim.*

† The first order, Erecta, answering to the Bimana of Cuvier, contains Man; but this order is merged, by some naturalists, into a mere section of an order, embracing the Apes, or Monkeys, of both worlds, and the pedimanous marsupials.

‡ Illiger terms the Koala, Wombat (gen. *Amblotis*). Of course, we allude to the *Phascolomys* (Wombat) Péron, or, *Phascolomys fusca* (Geoffr.), which is the animal we understand by Wombat. The Tarsiers and the Cheromys (Aye-aye) are not families of the same value as the *Quadrumania* (Ill.), or the *Marsupialia* (Ill.); nor can they be removed, in this sense, from the lemurine group.

and Kangaroo Rats) should succeed the Pollicata, excepting that Illiger could not shut his eyes against the natural connexion between the Kangaroos and the other marsupials, which conclude the preceding order, and which Storr, who first placed the marsupials with Man, the Simiæ, and the Lemurs, did not dissociate from the Linnæan genus *Didelphis*.* In fact, he perceived, that the Phalangers incline to the Kangaroos; and it is not unreasonable to expect that the immediate links between them will yet be forthcoming. This anticipation may be, indeed, entertained with the more confidence, as some of the Kangaroos are not absolutely terrestrial, but even arboreal. Those who scatter asunder the marsupials, make light of the descriptive phrase "*mastotheca ventralis*" (abdominal pouch), as if the character denoted by the expression were absolutely isolated; while, in fact, it is but one of many with which it is invariably associated.†

The orders of Illiger stand as follow:—

ORDER I. ERECTA. <i>Examples:</i> Man.	
II. POLLICATA.	Monkeys of the Old and New World (not distinguished from each other), Lemurs, and the pedimanous marsupials.
III. SALIENTIA.	The Kangaroos and Hypsiprymni.
IV. PRENSICULANTIA.	The Rodents.
V. MULTUNGULA.	Elephant, Rhinoceros, Hippopotamus, Tapir, Hog.
VI. SOLIDUNGULA.	Horse.
VII. BISULCA.	Ruminants.
VIII. TARDIGRADA.	Sloths and Prochilus.
IX. EFFODIENTIA.	Orycteropus, Ant-eaters, and Manis.
X. REPTANTIA.	Echidna, Ornithorhynchus (and Pamphractus?).
XI. VOLITANTIA.	Galeopithecus and the Bats.
XII. FALCULATA.	The Insectivora and the Carnivora, excluding Seals.
XIII. PINNIPEDIA.	Seals.
XIV. NATANTIA.	Lamantins, Duyongs, Whales, Porpoises, &c. †

* In the establishment of the genus *Didelphis*, it is very obvious that Linnæus was guided by true principles. Few marsupial animals were known in his time. He looked at their great characters; he saw that they must be associated; and his genus *Didelphis* ought to be regarded in the light of an order, or an equivalent to the *Marsupialia* of Cuvier.

† Supposing, for argument's sake, that we did not possess the information with which anatomists have furnished us, as regards the internal structure of the *Marsupialia*, but were merely aware of the fact, that a certain number of mammals, inhabiting a certain country, all agreed in the circumstance of bringing forth their young prematurely; and that they all possessed a pouch, for the reception of their young,—we might, even then, with the knowledge of the geographical distribution of animals, be led to suppose that these mammals were nearly related to each other by affinity. Accordingly, we arrange them together, and compare one species with another, and what is the result?—We find, variable or adaptive as are the characters among them, that the most dissimilar species are linked together by intermediate forms; and that we cannot separate one species without doing violence to the series, nor place one of the species in any other group, without doing violence to the affinities observable in that group. But supposing that we now bring anatomy to our aid, as a test, what then is the result?—It proclaims these mammals as beings of a peculiar and very low type of structure, and forbids us to associate any of them with the mammals of a higher type, as peremptorily as it does the association of the *Amphibia* with the true *Lizards*, or *Tortoises*.

‡ With respect to these orders, Illiger thus writes:—"Mammalium ordines ferè iidem sunt, quos Cuvier et Dumeril instituerunt, aliter tamen conjuncti. Nam Pedimana cum Quadrumanis, Digitigrada cum Plantigradis eodem ordine comprehendendi, Manatum, Halicorem et Rytinam ex amphibiorum (Pinnipedium) ordine ad cetacea translocavi; Salientium ordinem novum condidi. In serie ordinum in Mammalibus naturalium, multum desudavi, eosque varium in modum verti et collocavi, donèc ea quæ

The system adopted by Cuvier, in his *Règne Animal*, differs, materially, on one point, from the arrangement of Illiger; namely, in the union of the marsupials into an order *per se*. Cuvier, also, regards the seals as forming part of the carnivorous order, notwithstanding the modification of the limbs for aquatic habits (an adaptive modification, merely): he, moreover, places the Horse in the same order with the Elephant and Hippopotamus, and the Sloths with the Ant-eaters; regarding the adaptive arrangement of the limbs of the Sloths, for an arboreal existence, as only entitling them to the rank of a subordinate section.

The merits of Cuvier's arrangement are appreciated by all naturalists. He divides the Mammalia into nine orders, thus:—

ORDER I.	BIMANA.	<i>Examples</i> : Man.
II.	QUADRUANA.	Monkeys and Lemurs.
III.	CARNIVORA.	(Carnassiers) Bats, Insectivora, and true Carnivora, as Bears, Weasels, Otters, Dogs, Cats, Seals, &c.
IV.	MARSUPIALIA.	All the Opossums, Phalangers, and Kangaroos.
V.	RODENTIA.	The Rodents.
VI.	EDENTATA.	Sloths, Armadilloes, Ant-eaters, Manis, Echidna, and Or-nithorhynchus.
VII.	PACHYDERMATA.	Elephants, Hippopotamus, Hog, Rhinoceros, Hyrax, Tapir, and Horse.
VIII.	RUMINANTIA.	The Ruminants.
IX.	CETACEA.	Lamantins, Duyongs, and true Cetacea, as Whales, Dolphins, &c.

The arrangement of Cuvier is distinguished for clearness and simplicity; and, if his combinations be not in every respect natural, they evince the important advantage which has accrued from the aid of anatomy, in the investigation of the relationships of living bodies; without which, indeed, every system, however ingenious, will fail in its great aim; and, instead of being the road by which to arrive at knowledge, will be, at best, only an aid to the memory.

Within the last few years zoology has made rapid strides, and attained an acknowledged scientific dignity, resulting from the mode of its investigation, and the application of comparative anatomy, as a guide, in arranging the mighty mass of material, which has poured in, and continues to do so, from quarters of the globe till lately almost unknown, but now traversed by the inquiring and the scientific, and rewarding their toils by discoveries of the highest interest.

To the labours of Cuvier, and of such men, zoology stands indebted

nunc est series ut maximè obvia se mihi commendabat. Homo enim illam inchoare, Cetorum gens claudere necesse erat.* Ab Erectis ad Bisulca nexus ordinum facilis et naturalis est; Tardigrada verò cum Effodientibus et Reptantibus illum interceptiunt, quæ reverà nusquam aptè collocari possunt, et velut discretum a reliquis Mammalibus locum sibi poscunt. A Volitantibus, rursùs, series benè procedit usque ad Natantia". . . "Quod ad ordinum appellationes attinet Linnæi mos in eâdem animalium classi illas ex eodem fonte derivandi servatus, et motus organum, ut majorem quàm aliæ partes varietatem præbens, ad eas formandas adhibitum est."

* We do not see the necessity of this, as to the Cetacea.

for her elevation ; and it is in their footsteps that the naturalist is treading. New views, new arrangements, as facts and materials are accumulated, must arise ; but, in our views, and in our arrangements, we must invoke the guidance of anatomy ; for, if anatomy demonstrate a widely different type of organization between two living beings, though there may be points of analogy between them, there will be no true affinity. The science of zoology, slow in our own country till within the last few years, has, of late, made rapid progress : our collections already rival the finest of those on the Continent ; nor are men wanting, who, with comprehensiveness of mind, and zealous industry, have applied their energies to an investigation of the relationships of organic beings. Hence has arisen a system of arrangement, professing to take the harmonies and affinities of nature as its exclusive basis. It aims at unravelling her perplexities, at interpreting her hieroglyphics : it leaves the contemplation of individuals, to use the words of a talented writer, for the study of " the wonders displayed in the extensive affinities and combinations of the whole." It has acquired the appellation of the Circular System, because it is based upon the principle that every natural group forms, in truth, a circle ; in other words, that, proceeding from any given point, we follow a series of gradations, returning to that point again : moreover, that each circle, thus formed, impinges upon, or inosculates at, certain parts, with the like parts of other circles in approximation to it ; so that every class is made up of a harmonious constellation of circles, forming one vast zone ; this zone assisting, with that of other classes, to complete one mightier still—the zone of organic beings.

The new views developed on this theory, were first introduced and explained by Mr. Mac Leay, in a work, entitled, *Horæ Entomologicæ* : subsequently, they became adopted by other naturalists of great attainments, and, among them, by Mr. Vigors, who applied them to ornithology, with considerable ingenuity. Agreeing with Mr. Mac Leay, he regards each larger group as composed of five minor or subordinate groups, viz., two normal, or typical, and three aberrant. The normal, or typical, are those which exhibit the aggregate of the distinguishing characters of the general group or circle, in their maximum, or highest perfection—which exemplify the marked, the outstanding features of the group, and stamp their name upon it. The aberrant groups are such as partake, less decidedly, of these prominent characters, and indicate, in their degeneracy of form, and modification of habits, an affinity to other groups. They are, indeed, the passage by which any given circle conducts into those contiguous to it, forming the osculant portions of that circle. There is, therefore, a gradual blending of one form into another ; and so imperceptible is the transition, that, as day melts into night, we know not where the precise line of distinction should be drawn. For, in like manner as the aberrant

groups form the passage of orders to orders, of families to families, do the typical groups themselves pass into these aberrant groups, and so insensibly, that, at certain stages, the dividing line between them is rather conventional than distinctly indicated by Nature. This, however, is not all; each natural group is not only thus circular, returning into itself, and linked by points of inosulation to other groups, but each group has its analogues in the groups of other orders, and of other classes. Mr. Vigors, alluding to his researches in ornithology, observes: "I discovered, as I advanced, that the larger, or primary groups, into which it (the system of ornithology) arranged itself, were connected together by an uninterrupted chain of affinities; that this series, or chain, returned into itself, and that the groups of which it was composed, preserved, in their regular succession, an analogy to the corresponding groups, or orders, of the contiguous classes of zoology. I equally detected the existence of the same principle in most of the subordinate sub-divisions, even down to the minutest, to a degree, at least, sufficiently extensive to afford grounds for asserting its general prevalence." In these views, as well as in those which regard a quinary arrangement of the greater and the subordinate circles, Mr. Vigors strictly coincides with Mr. MacLeay; and he elsewhere observes, commenting on a passage in the writings of that eminent naturalist, "If the natural groups, into which the animal kingdom is divided, bear a uniform analogy to each other, a principle which is among the most important of those in the system which I wish to illustrate, it is a necessary consequence that their number should be definite. The primary groups of those departments of the animal kingdom which have hitherto been investigated, have been ascertained to be limited to five; and the first great divisions of birds will be found to branch out in a similar number."

The following is a series of the orders of the Mammalia, according to the views of Mr. MacLeay; adapted analogically to that of Birds, as given by Mr. Vigors. (Part i. vol. xvi. p. 32, of *Linn. Trans.*)

MAMMALIA.		AVES.	
1. FERÆ, carnivorous	corresponding to	1. RAPTORES.	
2. PRIMATES, omnivorous		2. INSESSORES.	
3. GLIRES, frugivorous		3. RASORES.	
4. UNGULATA, frequenting the vicinity of water		4. GRALLATORES.	
5. CETACEA, aquatic		5. NATATORES.	

The reasoning, upon which these orders are paralleled as analogues, or representatives of each other, is, in many instances, we think, totally inadmissible. The Ungulata (or hoofed mammals), and the Grallatores (or wading birds), are regarded, for instance, as the analogues of each other, because we find both to "contain examples of the longest legs, in proportion to the body,—witness *Cameleopardalis* and *Himantopus* (Stilt-plover). Both orders present us, in groups, not exactly aquatic, with instances of the

toes being soldered together, as the Horse, or connected together by a web, as the Flamingo. Both orders present us with the greatest elongation of muzzle, or facies;—witness, the Myrmecophaga, or Antelope, and Scolopax; and, also, the most depressed form of muzzle,—witness, the Hippopotamus and Platalea. In both orders we have the most elongated claws,—witness, Megalonyx and Parra. Both orders afford us the swiftest animals in running, as the Horse and Tachydromus; and the most pugnacious on account of love, as the Bull and Machetes.”

Somewhat subsequently to Mr. Vigors, Mr. Swainson directed his attention to the circular system; but with results, in many respects, widely different from those arrived at by the preceding naturalist. The principles of his circular system are detailed, at some length, in the *Fauna Boreali-Americana* (vol. ii. Birds). Mr. Swainson states his theory as follows:—

“First.—Every natural series of beings, in its progress from a given point, either actually returns, or evinces a tendency to return, again to that point, thereby forming a circle.

“Secondly.—The contents of such a circle, or group, are symbolically represented by the contents of all the other circles in the same class of animals; this resemblance being strong, or remote, in proportion to the distance or proximity of the groups compared.

“Thirdly.—The primary divisions of every natural group, of whatever extent or value, are three; each of which forms its own circle.”—The three groups consist of one typical, one sub-typical, and one aberrant.

The former writers, Mr. MacLeay and Mr. Vigors, consider the circumstance of a group returning from any given point, into itself, as the test of its being truly natural; not so Mr. Swainson: he considers that a group, if natural, must represent, and be again represented by, other groups. “Without some other test,” he observes, “for a natural group, than the mere circumstance of its returning into itself, or even its simple parallelism with a contiguous group, I consider demonstration not to have been attained. The theory of representation thus steps in, and at once dispels the illusion, or demonstrates the correctness of the series.” He also advocates the direct union of typical groups, which the quinary modification of the circular system does not recognise; and he states the “direct union of typical groups, without the intervention of those which are aberrant,” to be “an unquestionable property of natural arrangement.”

Again, the mode of synthetical investigation, which is followed by the author of the *Horæ Entomologicæ*, and by the great advocates of the quinary arrangement, is regarded by Mr. Swainson as inadequate to accomplish the end in view. “I soon found,” he says, “that, although this theory (the quinary) would explain much that I desired, it would not ex-

plain all ; and a publication of a quinarian arrangement of this same family (alluding to the Laniadæ, or Shrikes), nearly at the same time, but essentially different from my own, shewed me the necessity of looking much deeper into the subject. Convinced that truth, if it was to be discovered, would result only from minute and patient analysis, I entirely abandoned the synthetic method, as the rock upon which others were splitting ; while the mutual dependance of one natural group upon another, led, almost insensibly, from the analysis of the Laniadæ, to that of the vast order of Insectores."

With respect to the Mammalia, Mr. Swainson observes (see his *History and Classification of Quadrupeds ; Cabinet Cyclop.*) : " The primary types, under which all quadrupeds appear to arrange themselves, may thus be concisely defined. In the first (Man being excluded) the extremities of all the four limbs perform the office of hands, one of the toes being opposable to the others, and acting as a thumb, capable of free motion : hence they have been judiciously named, by M. Cuvier, *Quadrumana*. In the second, this prehensile structure of the foot is not seen, the thumb being upon the same plane with the other toes ; the claws, also, are mostly retractile. Like the *Quadrumana*, they possess three sorts of teeth, well developed, but the canines are particularly large ; and from this character, which indicates their carnivorous habits, Linnæus has termed the order *Feræ*, and M. Cuvier, *Carnivora*. The third, or aberrant, group, is chiefly distinguished by its imperfect and variable dentition ; the under jaw is without, generally, canine teeth, properly so called ; or, they exist merely in an abortive or rudimentary state. Like all other aberrant groups, in the animal kingdom, this, likewise, contains three subordinate sections, thus named :—
1. The *Ungulata*, or hoofed order. 2. The *Glires*, or gnawing order. 3. The *Cetacea*, or aquatic order. These divisions evince a strong tendency to unite into a separate circle of their own, by the *Hippopotamus*, or River Cow, in the first ; and by the *Manatus*, or Sea Cow, in the last.

" The general course of the mammiferous circle may be thus stated ; although there is strong presumptive evidence to believe, as will be seen hereafter, that the aquatic type of the *Quadrumana* is either extinct or undiscovered. Commencing, then, with the *Feræ*, Nature appears to quit them, for the *Lemurs*, by such animals as the *Arctitis*, Temm., and the *Potto* (*Cercoleptes*). The *Lemurs* naturally lead us to the *Monkeys* without cheek-pouches (*Cebidæ*) ; and these, to the genuine *Simiadæ*. The hiatus, just alluded to, occurs, therefore, between the *Quadrumana* and the *Ungulata*, which we enter by means of the *Rhinoceros*, and quit by the *Anoplotherium*. Arriving thus among the *Glires*, by means, most probably, of the *Kangaroos*, the *Beaver* evinces an affinity to the more aquatic animals belonging to the *Cetacea*, which order is again left, through the medium of the *Manatus*. The intimate connexion between this latter animal

and the Seals, is well known to all naturalists ; and we thus return again to the Feræ, from whence we first commenced tracing the circle.

“The analogies of these orders with the class of birds have been variously stated. That the rapacious quadrupeds represent the rapacious birds, is too obvious a fact to be questioned. The Quadrumana, on the same principle, have been rightly compared to the insessorial order of birds ; for both, in their respective classes, are the most highly organized. The Ungulata, the type of which is the ruminating tribe, containing the Oxen, Sheep, and Deer, were compared, by Linnæus, to the Gallinæa, or poultry ; and the analogy, until very lately, has never been questioned. The Glires, like the grallatorial birds, have the muzzle remarkably lengthened, and, for their size, are the swiftest runners of the whole class ;—witness, the Hare, the Rabbit, the Cavy, &c. (See, on the other hand, the opinion of Mr. Vigors, page 134.) Finally, the analogy of the aquatic Cetacea to the feathered swimmers, has been admitted by every one.”

Mr. Swainson’s parallel arrangement of the Mammalia and Birds is as follows :—

Orders of Quadrupeds.		Typical Characters.	Orders of Birds.
I. Typical group.	Quadrumana.	Pre-eminently organized for grasping.	Insessores.
II. Sub-typical group.	Feræ.	Claws retractile ; carnivorous.	Raptors.
III. Aberrant group.	Cetacea.	Pre-eminently aquatic feet, very short.	Natatores.
	Glires.	Muzzle lengthened and pointed.	Grallatores.
	Ungulata.	{ Crests, or other processes on the head.	Rasores.*

It has been explained, that, according to Mr. Swainson, the contents of each circle are symbolically represented by the contents of all the other circles in the same class of animals. In illustration of this law, are sub-joined the following examples, taken from the work of Mr. Swainson, already quoted :—

Circle, Simiadæ ; or, Old-World Monkeys.

I. Typical group.	Simia.	{ Grave, intelligent, inoffensive ; typical of the	Quadrumana.
II. Sub-typical group.	Cercopithecus.	Mischievous, malicious ;	Feræ.
III. Aberrant group.	Papio.	Head very large, little or no tail ;	Cetacea.
	Macacus.	{ Tail comparatively long ; hare-lipped ;	Glires.
	Inuus.	Head conspicuously crested ;	Ungulata.

* The analogies between the hoofed quadrupeds and the Rasores are thus represented (p. 183) :—

	Ungulata.		Families of Rasores.
I. Typical group.	Solipedes.	Tail excessively long.	Pavonidæ (Peacock).
II. Sub-typical group.	Ruminantes.	Tail very short.	Tetraonidæ (Grouse).
III. Aberrant group.	Anoplotheres.	Semi-aquatic.	Cracidæ (Curassows).
	Edentates.	Jaws prolonged, slender ; feet short.	Columbidæ (Pigeons).
	Pachydermes.	{ Size, large ; hair or feathers, very thin ; skin, thick.	Struthionidæ (Ostrich, Cassowary).

	Genus Bos.	The natural type ^s .
I. Bos Scoticus.	Fierce, untameable.	Feræ, Raptores.
II. — Taurus.	Pre-eminently typical.	Primates, Insesores.
III. — Dermaceros.	Appendages on the head greatly developed.	Ungulata, Rasores.
IV. — Pusio.	Stature remarkably small.	Glires, Grallatores.
V. — Thersites.	Fore part of the shoulders elevated.	Cetacea, Natatores.

“Without attempting to verify the trinary arrangement of the domesticated races (of the Dog), it will be readily perceived, that modifications of all the primary types of Nature are to be found among them. The long snout, which characterizes all the gliriform and grallatorial types, is seen in the Greyhound; the Water Dogs remind us of the natatorial structure; the thick tails of the Spaniels, and the large size of the Newfoundland Dogs, exhibit the rasorial type; while the others either arrange themselves under a ferocious or a highly intelligent group.”

The following is the symbolical parallelism of two families—Mustelidæ and Felidæ:—

	Mustelidæ.	Felidæ.	
I. Typical.	Mustela.	Felis.	Typical.
II. Sub-typical.	Viverra.	Hyæna.	Sub-typical.
III. Aberrant.	Ryzæna.	Canis.	Rasorial, or Ungulated.
	Nasua.	?	Grallatorial, or Gliriform.
	Ursus.	Thylacinus.	Aquatic, or Natatorial.

In this attempt to exhibit a short sketch of the views of Mr. Swainson, the author has preferred using the words of that naturalist, and the exemplifications he has himself given of the theory in question, to trusting to his own expressions, lest a false notion should be conveyed of the principles involved. To those who wish to pursue this system, the volume of the *Fauna Boreali-Americana*, devoted to birds, and the *History and Classification of Quadrupeds*, are recommended.

In 1838, appeared a *Catalogue of the Mammalia preserved in the Museum of the Zoological Society, London*, by the author's friend, Mr. Waterhouse (the present curator of that museum), embodying an arrangement of the Mammalia, modified upon that of Cuvier, and, in many important points, happily framed according to the indications of Nature. Naturalists expect too much, if, in a simple collocation of the orders, they look for a display of the multiform affinities and analogies, by which the forms of one order are related to those of another: nor will any series of orders run smoothly, link succeeding link; for not only do breaks occur in the chain, but it often happens that forms belonging to a lower type of structure, rise in organization, if we may so express ourselves, to a mark above that of the lower forms of a superior type; and, indeed, in surveying Nature, on an extensive scale, this is very evident. Look, for example, at the organization of the Cuttlefish (the highest among the Mollusca), and it will be found to rise above that of the lowest of the vertebrata, though the structural type of the latter is far superior to that of the Mollusca;

while, again, the Crustacea rise higher than the lower Mollusca. Hence it would appear, that Nature rather presents us with a system of groups, the lower rising above the termination of the upper, than with a series of consecutive links, in which the last form of one group blends into the first form of the next; and hence, moreover, arises one of the difficulties attending a linear arrangement of the whole, or of parts, of the animal creation. With respect to the arrangement of the Mammalia, in the *Catalogue of the Mam. Zool. Soc.*, it is to be observed, that the Insectivora are there placed as a tribe, or great section, of the Carnivora. M. Blainville appears correct in considering them as strictly entitled to rank as an order *per se*; and this is now the opinion of the author of the catalogue in question. A second alteration of the arrangement in that catalogue, consists in the collocation of the "Cétacés Herbivores" of Cuvier (the Duyong, the Lamantin, &c.), with the Pachydermata, of which they are the aquatic form; having no affinity to the true Cetacea, beyond that of being, like them, adapted for the element which they are destined to inhabit.

In his views respecting the situation of the "Cétacés Herbivores," the author accords with Professor Owen, to whom, he believes, is due the merit of having first pointed out their true station.

The arrangement of the class Mammalia, then, will stand as follows:—

CLASS.	SUB-CLASS.	ORDER.	
MAMMALIA. {	Placentalia. {	1. Bimana.	} Teeth simple.
		2. Quadrumana.	
		3. Cheiroptera.	
		4. Carnivora.	
		5. Insectivora.	
		6. Cetacea.	
		7. Pachydermata (proper). ———(aquatic).	
	} Teeth compound.	8. Ruminantia.	
		9. Rodentia.	
		10. Edentata.	
		Marsupialia. 11. Marsupialia.	Teeth variable.

Though the marsupials are here placed as an order, the author inclines to the views of Cuvier, that this order ought to be regarded as a sub-class, parallel to that of the placental Mammalia, and in such a light it will be treated; observations upon it being reserved for appropriate occasions.

As the situation assigned to the Rodentia, below that of the Pachydermata and Ruminantia, may, by some naturalists, be deemed a startling innovation, the motives by which this arrangement has been influenced may require explanation.

The comparative anatomist will bear out the idea, that the structural organization of the rodents is at a low ratio: this organic deterioration

is observable in the almost bird-like condition of the brain, a part of the animal frame important to be considered, in attempting to form an estimate of the rank of groups among the class Mammalia. In accordance with the low structural ratio of the brain, is the ratio of their intelligence. We may tame them, it is true; but they will not obey the voice of their keeper;—we may tame them, but we cannot educate them. The structural inferiority of the rodents is not displayed by the brain alone: the rudimentary condition of the skull—the original parts of the bones, which compose it, remaining distinct, as if by an arrest of ossification, also attests the fact.* Not only is the cranium depressed below the facial portion, but the position of the orbits, with their lateral aspect, is anterior to the cranial cavity; and often, by the imperfection, or narrowness, of the septum, dividing between them internally, as in the Hares, do they remind us of the orbits of a bird; even in the Beaver, where they are separated by the nasal cavity, a probe may be passed at the bottom of the orbital recess (above the alveoli of the molar teeth), through the foramina, from one cavity to the opposite, without entering that of the cranium, or of the nose.

The comparatively contracted volume of the thorax, the general feebleness of the skeleton, and even the number and characters of the teeth, which consist only of molars, and two incisors, indicate a typical inferiority. “*En un mot,*” to use the words of Cuvier, “*l’infériorité de ces animaux se montre dans la plûpart des détails de leur organisation.*” It is true, that the rodents are unguiculate; that many use their paws with a certain share of address, and, consequently, that many, or most, are clavicated: but, be it observed, that the possession of clavicles, and digitated paws, is a circumstance, in itself, by no means indicative of elevation in the rank of being: other qualifications are requisite; for it is evident, that animals having instincts leading them to choose the trees for their abode, must be fitted for climbing; and that animals whose instincts lead them to burrow, must have their organs adapted for excavating the ground; but the possession of these instruments confers, in itself, no positive superiority. When the intelligence of an animal is developed, involving habits in unison with its intelligence, and an according modification of the structure in the extremities, then this organization becomes the index of superiority, in a given sense, but is not the true cause of superiority. We are, indeed, too apt to look upon structural adaptation as the cause of superiority, or of differences in habits and manners; and, because we are accustomed to see certain modes of structure combined with a superiority in the scale of being, to mistake the result for the cause; but it ought not to be forgotten, that the modification of organs does not influence habits: habits are the

* The size of the foramina, for the egress of the nerves, and the magnitude of the nerves, in proportion to the volume of the cerebral mass, are remarkable features in the Rodentia.

result of instinct ; organization is adapted to instinct ; and it is thus that instinct and organization become concomitants. Galen says, "It is not because Man has hands that he is, therefore, the wisest of animals ; but, because he is the wisest, therefore he has hands." The Duck is adapted for swimming ; let the webs of its feet be removed, and still it will betake itself to the water. The tail of the Monkey aids it in leaping with precision, and acts as a balancer among the branches ; but, if its tail be removed, its habits are not perceptibly altered ; it is still arboreal, and still leaps with address. The Squirrel, because it has clavicles and digitated paws, is not, therefore, to be regarded as higher in the scale of being than the Elephant ; it is thus organized only that it may climb ; and, hence, to lay so paramount a stress upon the adaptive form of the organs of locomotion, exclusively of other considerations, as to make them the test of elevation or depression in the scale, is to attach to them an importance beyond what is their due, or what sound philosophy dictates. The division of mammals into unguiculate and ungulate is, therefore, worse than useless—as leading to erroneous conclusions : upon such a principle, we must separate the Hyrax from the Pachydermata, and restore it to its old position, among the Rodentia.

It is laid down as an axiom, by some highly-talented naturalists, that, in animals, the common possession of organic modifications, having a marked and influential bearing on the habits and economy of life (or, in other words, being the cause, and not the consequence, of their instincts and habits)—is the only philosophical principle of zoological classification. That we are to be guided by organic modifications, in zoological arrangement, no one will presume to deny ; and, *cæteris paribus*, it is also granted, that a group, characterized by the common possession of certain structural peculiarities, "should present numerous important coincidences, not only in other parts of the physical structure, but likewise in the mental resources, habits, manners, and, what may be not improperly denominated, the moral character of the animals which compose it." But if, on this principle, carried *ad extremum*, some isolated adaptive character is to be taken as the standard, without considering the bearing of other characters, of more predominance as affecting the totality of an animal's economy, the naturalist will, assuredly, be in danger of mistaking analogy for affinity : and hence have arisen many of the unnatural collocations in what are termed artificial systems.

Cuvier observes : "Les caractères variables qui établissent les diversités essentielles des mammifères entre eux, sont pris des organes du toucher, d'où dépend leur plus au moins d'habileté ou d'adresse, et des organes de la manducation qui déterminent la nature de leurs alimens, et entraînent après eux, non seulement tout ce qui a rapport à la fonction digestive, mais encore une foule d'autres différences relatives même à l'intelligence."

Accordingly, the names of the orders, as instituted by Cuvier, refer sometimes to the characters of the extremities, sometimes to those of the dentition, and sometimes to other organic peculiarities; but, it is clear that no one structural modification ought to be considered in an isolated point of view, nor can the definition of a group rest solely upon a single character. In some groups, the organs of locomotion form the most prominent and tangible grounds of distinction, and suggest the appellation—as *Quadrumana*, and *Cheiroptera*; in others, the condition of the dental system gives rise to the appellation—as *Carnivora*, *Insectivora*, *Rodentia*, *Edentata*. The teeth, indeed, as connected with the form of the skull, the state of the digestive apparatus, and the nature of the diet, and, consequently, as involving the arrangement of the whole animal machine, cannot be regarded as taking a second-rate place among the great characters by which we are to be guided in the classification of the *Mammalia*; nevertheless, they ought not to claim exclusive attention.

It is not, then, from one point of structure that the laws are to be deduced on which the orders and families of *Mammalia* are to be founded; but from a careful estimate of the totality of organization, and the harmony of the parts with each other, proclaiming the direction of instincts, as to habits, manners, and food, and indicating, also, the ratio of intelligence; while the subordinate division into genera is decided by characters of minor importance, such as the number of toes or of teeth, the relative proportions of the limbs, the quality of the external clothing, &c.

MAMMALIA.

THE CLASS MAMMALIA IS DIVISIBLE INTO TWO GREAT SECTIONS,

PLACENTALIA AND MARSUPIALIA:

CONSISTING OF THE FOLLOWING ORDERS:

Order.	Example.
I. BIMANA (Two-handed)	Man.
II. QUADRUMANA (Four-handed)	Monkeys, &c.
III. CHEIROPTERA (Wing-handed)	Bats.
IV. CARNIVORA (Flesh-eating)	Dogs, Tigers, &c.
V. INSECTIVORA (Insect-eating)	Moles, Hedgehogs, &c.
VI. CETACEA (Cete, <i>Lat.</i> Whale)	Whales, Porpoises, &c.
VII. PACHYDERMATA (proper) (Thick-skinned) .	Rhinoceros, &c.
————— (aquatic) ————— .	Duyong, &c.
VIII. RUMINANTIA (Ruminating)	Ox, Deer, &c.
IX. RODENTIA (Gnawing)	Rats, Porcupines, &c.
X. EDENTATA (Toothless)	Sloths, Armadilloes, &c.
XI. MARSUPIALIA (Abdominally-pouched) .	Kangaroos, Opossums, &c.

In the Section, PLACENTALIA, so named from a predominating feature in the reproductive system of the animals comprehended in it, the first ten orders are included.—Fœtus ad uterum maternum annexus, per medium placentæ veræ, diversè conformatæ, diversis mammalibus; vel, in loco illius, membranâ villosâ, et vasculari, *χωρίον* dictâ.

In the Section, MARSUPIALIA, thus denominated from the almost universal possession of an external abdominal pouch, is comprised a group of animals provisionally placed, by CUVIER and others, in an order to which the same title has been given.—Fœtus ad uterum maternum haud intermedio placentæ veræ annexus.

ORDER I. BIMANA.

THIS ORDER CONSISTS OF BUT ONE SPECIES—MAN.

A CONSIDERATION OF THE CLAIM OF MAN TO BE REGARDED AS THE TYPE OF A DISTINCT ORDER.

THE example of Aristotle, who excluded Man from the pale of the animal kingdom, has not wanted followers in the present age. Ray, Brisson, Pennant, Vic d'Azyr, Daubenton, Tiedemann, and Swainson, have protested, more or less strongly, against his introduction into an arrangement of the brute Mammalia.* On the other hand, Linnæus, and the

* Mr. Swainson, after urging the "innate repugnance, disgust, and abhorrence, in every human being, ignorant or enlightened, savage or civilized, against the admission" of any relationship between Man and the lower orders of Mammalia,—proceeds to say: "Now, the very first law, by which to be guided in arrangement, is this, that the object is to be designated and classified by that property or quality which is its most distinguishing or peculiar characteristic. This law, indeed, is well understood, and has only been violated by systematists, when they designate Man as an animal. Instead of classing him according to his highest and most distinguishing property, REASON, they have selected his very lowest qualities, whereby to decide upon the station he holds in the scale of creation. Because, as an infant, he has suckled at the breast of his mother, he is to enter into the class of animals called Mammalia; and, because he has nails upon his fingers and toes, he is to be placed 'among the unguiculated animals;' and, because some of the Apes have an hyoid bone (os hyoides,—a bone common to all Mammalia, though differently modified in each group), Man is to be classed with them in the same group. What are all these but secondary characters, totally unfit to designate his true peculiarities. There is yet another argument against forcing Man to enter within the zoological circle, furnished by the theory upon which that very hypothesis is built. We know that every being in creation has at least two, if not three, relations of affinity; and that these are independent of innumerable relations of analogy. We know, also, that relations of affinity can only be determined, where the object under consideration forms a link in an almost uninterrupted chain of beings, which gradually approach to it on one side, and as gradually recede from it on the other. Now, to prove that Man forms a part of the animal circle, it is necessary to shew, either that he is linked to them by these two series of affinities, or, that there is, at least, no great hiatus between him and animals. Yet, neither of these conditions for establishing an affinity, strictly so termed, has been complied with; on the contrary, the writers in question are obliged to admit the greatness of the gulf between Man and the Orang-outan, the nearest relation, erroneously termed an affinity, which they can discover, to Man. But where is the class to which we are related on the other side of the circle?—where is the double affinity? If this cannot be made out,—if Man alone, of all the created beings on this earth, stands thus isolated,—his relation to the Orang-outan proves to be one of mere analogy. Were it otherwise, and we admitted this resemblance to be an absolute affinity, the presumed type of the animal kingdom would contradict the first great law of natural classification: Man would then

majority of naturalists, place him at the head of the mammiferous kingdom, of which they consider him to constitute an integral part. Linnæus, indeed, associates Man in one great artificial group (the Primates) with the Simiæ and the Bats, observing, moreover, “nullum characterem hætenùs eruere potui, unde Homo a Simiâ internoscatur.”* (*Faun. Suec.*, Pref. p. ii.) Hence, it is not surprising to find him wasting his attention on a (supposed) sort of intermediate being, between civilized or savage Man and the brute, — “Homo ferus, tetrapus, mutus et hirsutus,” — which he raises to the rank of a species, founded either upon the accidental occurrence of idiots, which have strayed into the forests, and lived upon roots, berries, and frogs, † — or, as is more probable, upon the distempered representations of the older voyagers, whose pages teem with marvellous accounts “of long-armed, hairy men,” or of men covered with yellowish hair, navigating the ocean in boats, and bartering parrots in exchange for iron; a species as unreal as the superior kind of Ape dreamed of by Lamarck, evolved, during the lapse of a countless succession of ages, out of a monad, by the agency of two principles, a tendency to progressive improvement, and the force of external circumstance; and destined to a farther degree of elevation.

The arrangement of Linnæus has, however, been adopted by several distinguished naturalists; and, among them, by Mr. Mac Leay, the talented founder of a quinary, or circular system, differing in its principles from that of Mr. Swainson, and equally advocated, by its supporters, as the true interpretation of Nature. Mr. Mac Leay regards the Primates of Linnæus as one of his circles, and Man as forming part of that circle; while, on

possess but a single affinity, while the whole of organized matter presented a double one.” — Swainson, *On the Nat. Hist. and Class. of Quadrupeds*, pp. 8, 9, 10.

It may be observed, that it is upon the physical organization of living bodies, setting aside instinctive or rational qualities, that the laws of arrangement are founded. Mr. Swainson's reasons for the rejection of Man from the animal kingdom, because he cannot bring him into his circular system without the violation of his assumed laws of duplex or triplex affinities, may be very satisfactory to himself, but to others may appear nugatory. He may “know that every being in creation has,” and must have, “two, if not three, relations of affinity;” and that “if Man holds a station in the series of unintelligent beings, he cannot enter into the circle of those that are intelligent, because no being can occupy a station in two distinct circles;” but these positions have never been demonstrated; and, until they be so, Man must be regarded as an animal, with a brain and spinal chord, viviparous and mammiferous, great as is the hiatus between him and the Orang.

* In allusion to this passage, and an expression of like import in the *Systema Naturæ* — “Mirum adeo parum differre stultissimam Simiam a sapientissimo Homine, ut iste geodætes naturæ etiamnum quærendus qui hos limitet,” Mr. Lawrence remarks — “If these representations were correct, zoology would not deserve the rank of a science.” — *Essays, &c.*, p. 92.

† Of these waifs and strays of the wreck of human nature, “withered leaves, which some rude whirlwind has shaken off from the tree of civilization,” as Mr. Ogilby elegantly and aptly terms them, many accounts have been published from time to time; inasmuch, that a goodly volume might be made up by their collection, but as destitute of interest as of facts imparting any new views respecting the human species; for, what “brilliant discoveries in psychology or anthropology” could be expected from the cases of poor idiots? Few will think, with Lord Monboddo, that the appearance of Peter, the wild boy, was “a much more important circumstance than the discovery of the planet Uranus; or than if the astronomers, to the catalogue of stars already known, had added 30,000 new ones.” It is not from such beings that the existence of innate ideas can be determined; or the primeval condition of Man.

the contrary, as already stated, Mr. Swainson does not consider Man within the pale of the animal kingdom. With more reason than the advocates of either of the two quinary, or circular systems, other naturalists have regarded Man as the example of an order *per se*; having characters by which it is distinguished from every other into which the mammal class is divided. Among these, are Illiger and Cuvier. Illiger, in his *Prodromus Systematis Mammalium*, has taken the name of this order from the attitude of the human race, and entitled it **ERECTA**. Cuvier, from one of the structural peculiarities of the race, viz., the possession of two true hands, has termed it **BIMANA**; a title which most naturalists, both Continental and British, have adopted.

The essential characters of the order *Bimana* may be stated as follow:—

ATTITUDE erect, the body being supported on the lower limbs only, which are developed according to the weight to be sustained, and the mode in which that weight is to be supported; feet plantigrade, pentadactyle (five-toed), non-prehensile.

SUPERIOR EXTREMITIES free, clavicated, and terminating in true hands, being organs of touch, and of prehension, and having the thumb so developed as to antagonize with the tip of each finger separately, or with the whole together.

THE HEAD supported by, and nearly balanced upon, the spine; the cranial portion greatly developed in proportion to the face; the lower jaw short, and its symphysis modelled into a true chin.

THE TEETH of equal length, and approximating together, without intervals: incisors, $\frac{4}{4}$; canines, short, $\frac{1-1}{1-1}$; bicuspid molars, $\frac{2-2}{2-2}$; true molars, bluntly quadricuspid, $\frac{3-3}{3-3}$; = 32.

THE CEREBRAL HEMISPHERES OF THE BRAIN greatly preponderating; the mass of the brain being voluminous in proportion to the nerves communicating with it.

GROWTH slow; infancy long; maturity acquired at a comparatively late period.

SKIN smooth: natural weapons, offensive or defensive, denied by Nature.

MAMMÆ two, pectoral.

OS COCCYGIS abbreviated, and incurved.

Species,—*Homo sapiens*, Linn.

The mind of Man—as displayed in the exercise of reason, memory, imagination, hope, retrospection, comparison, imitation, in a perception of the sublime, the beautiful, and the ridiculous, in friendship, love, and the various social affections, and as involving speech, contradistinguished from mere cries or sounds—harmonizes with his physical endowments, and proclaims him the lord of creation: “And God said, Let us make Man, in our image, after our likeness: and let them have dominion over the fish

of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth. So God created Man in his own image."

The right of Man to an isolated station, at the head of the animal kingdom, is founded upon just and solid grounds. Everything connected with his history forces the conviction upon us, that he not only differs from the lower mammals, but is elevated above them. His physical organization accords with his mental endowments, and is befitting a being whose hopes and views are not bounded by mortality. Who that contemplates the personifications of human beauty, embodied in the noble statue of Apollo, or in the lovely figures of the Graces, by Canova, or in the Venus of antiquity, dreams of the affinity of the Orang. The attempt to degrade Man to the level of the Ape, because the Ape has the anterior limbs organized as graspers, or rude hands, is hardly justifiable in true philosophy. Physical differences, of sufficient magnitude,* exist between Man and the Simiæ, to forbid his amalgamation with them; much less with the beings of which any other order is composed: and though Linnæus and others† could find no characters by which to distinguish between Man and the Monkey,—and though the group Primates, of Linnæus, has been revived by modern naturalists,—every arrangement grouping together Man, the Monkeys, and the Bats, carries with it (in spite of all authority), like the statue of clay and metal, the palpable tokens of its own incongruity; and, as Mr. Lawrence well observes, "the principles must be incorrect which lead to such an approximation."

The importance to be attached to the zoological characters afforded by the slighter modifications of structure, rises as we ascend in the scale of being. In the arrangement of Mammalia and birds, for example, minutæ which, among the Invertebrata, would be deemed of little note, become of decided value, and are no longer to be neglected. Even the modifications, however slight, of a common type, now become stamped with a value, the ratio of which increases as we advance from the lower to the higher orders. Hence, with respect to Mammalia, the highest class of Vertebrata, every structural phase claims attention; and, when we advance to the highest of the highest class, viz., Man, and the Quadrumana, the naturalist lays a greater stress on minute grades and modifications of form, than he does when among the Cetacea or the marsupials; and hence, groups are separated upon characters thus

* "Independently of weight and size, Soemmerring observed fifteen visible material anatomical differences between the brain of the common tailless Ape (Magot) and that of Man."—Lawrence, *Lect.* p. 133.

† Lord Monboddo regarded the Orang and Man as specifically identical; but Rousseau seems to have hesitated in his opinion: "Il est bien démontré," he says, "que le Singe n'est pas une variété de l'Homme, non seulement parcequ'il est privé de la faculté de parler, mais, surtout, parcequ'on est sur que son espèce n'a point la faculté de se perfectionner, qui est le caractère spécifique de l'espèce humaine;—expériences qui ne paroissent pas avoir été faites, sur le Pongos et l'Ourang-outang, avec assez de soin, pour en tirer la même conclusion."—*Disc. sur les Causes, &c.*, note 10.

derived, because they involve marked differences in the animal economy, and because it is felt that a modification, in itself of no great extent, leads to most important results. Carrying out the principle of an increase in the value of differential characters as we advance in the scale of being, it may be affirmed that, upon legitimate zoological grounds, the organic conformation of Man, modelled, possibly, upon the same type as that of the Chimpanzee or Orang, but modified, with a view to fit him for habits, manners, and, indeed, a totality of active existence, indicative of a destiny and purposes participated in neither by the Chimpanzee nor any other animal, removes Man from the Quadrumana, not merely in a generic point of view, but from the pale of the Primates, to an exclusive situation. The zoological value of characters derived from structural modifications is commensurate with the results which they involve: let it then be shewn that Man, though a cheiropod (hand-footed),* possesses structural modifications leading to most important results, and our views are at once justified. If, however, the class Mammalia be divided into sub-classes, or subordinate sections, each section including orders, then there is no objection to the application of the term Cheiropoda, Primates, or any other, to a section including the orders Bimana and Quadrumana (except that it renders an arrangement needlessly complicated); as terms, in themselves, are of little importance. It is not against these that the argument is directed; but against the establishment of the Primates as an order including the genera Man, Monkey, and Bat, and, consequently, also, against the inclusion in the order Cheiropoda, of Bimana (Man), Quadrumana (the Old-World Monkeys and Lemurs), and Pedimana (the American Monkeys and the Opossums), as coequal families. It may be answered, that the term, Order, as applied to Cheiropoda, has a much wider, a more comprehensive signification than is allowed it by Illiger or Cuvier, and that its subordinate groups are of the same value as Cuvier's Orders: if so, the use of the term, in any other sense than that attributed to it by the standard authorities, can scarcely be justified.†

* See "Observations on the opposable Power of the Thumb in various Mammals, by W. Ogilby, Esq.," *Proceedings Zool. Soc. L.*, 1836, p. 28.

† Mr. Ogilby observes, that the order Erecta, of Illiger, is "founded upon metaphysical, rather than physiological considerations; and destroys, at once, both the harmony and simplicity of his arrangement. The pride of intellectual superiority and moral endowments has, indeed, frequently induced naturalists to consider Man as forming a distinct and separate order by himself, and to fancy that it would be degrading the lord of creation to associate him in the same group with the Apes and the Monkeys (and, also, the Lemurs and Opossums); but such scientific weakness cannot destroy the numerous affinities which actually characterize the structure of these animals, as compared with our own, or blind the unprejudiced observer to the obvious relations which subsist between the Bimana and the Quadrumana. The metaphysician and the divine may, without impropriety, consider Man apart from the rest of the animal kingdom, and in relation only to his intellectual and moral nature: but the naturalist must view him in a different light: anatomical structure and organic conformation are the only principles which the zoologist can admit as the foundations of natural science; and, in this respect, Man is too closely connected with the Apes, and other Simiæ, to admit of being placed so widely apart from them as he has been in some recent classifications of mammals." "Les diverses

Without dwelling on these points, it remains to explain the differential characters of Man, with a view to prove that the modifications of his structure involve consequences which draw as wide a line, zoologically considered, between him and the *Quadrumanæ*, as between the *Quadrumanæ* and the *Carnivora*.

It is scarcely necessary to repeat that, to Man alone, of all animals, is the erect attitude easy and natural;—that the magnitude and position of the cranium, the structure of the spinal column, the osseous and muscular development of the pelvis and lower extremities, necessitate such an attitude. One advantage gained by this arrangement is the freedom of the superior extremities, the lower limbs being the sole organs of progression. In the *Orang* and *Chimpanzee*, all four extremities are organs of locomotion. The *Chimpanzee*, it is true, can proceed on the ground, supported, or, rather, balanced, on the lower extremities, calling the superior only occasionally into use, except in as far as they are needed to maintain the equilibrium of the body: but Man walks with a free and vigorous step, very unlike the vacillation of the tottering *Chimpanzee*, and with his arms at liberty for action in any way that may be required.

It is usual to designate the graspers, which terminate the anterior limbs of the *Simiæ*, as hands. If, by the term hands, it is implied that they are equivalent to the hands of Man, then their claim to the appellation must be denied. Mr. Ogilby observes, that the extremities of the *Quadrumanæ*, “instead of being mere organs of locomotion, execute the still more important functions of prehension and manipulation.” It is admitted that the anterior hands of the *Simiæ* are capable of grasping; but not in the same way as the hands of Man; for in none of the *Simiæ* is the thumb of the anterior hand fairly opposable to the fingers.* Besides, the Ape has these graspers † not only terminating the anterior extremities, but the

combinaisons qui déterminent rigoureusement la nature des divers mammifères, ont donné lieu à distinguer les ordres suivants. Parmi les onguiculés, le premier qui est en même temps privilégié sous tous les autres rapports, l'Homme, a des mains aux extrémités antérieures seulement; ses extrémités postérieures le soutiennent dans une situation verticale.”—*Cuvier*. If the end of organization be to provide instruments capable of duly administering to the instincts, or the intelligence, or the necessities of animals,—then must the organization of Man, which accords with the unique situation in which he is placed in the great plan of creation, with his intellectual superiority and moral endowments (according to the “law of harmony”), elevate him, physiologically considered, no less than metaphysically.

* While the thumb of the human hand is at a degree and perfection of structural development, which led Albinus to characterize it as the “*manus parva majori adjutrix*,”—the lesser hand the assistant of the greater; we invariably find its analogue in the fore-paws of the *Monkey*, not only comparatively short, feeble, and unopposable, but manifesting a perpetual tendency to degenerate; inasmuch, that, in the *Semnopithecæ* it is merely rudimentary; in the *Colobæ*, it is reduced still farther, appearing as a mere tubercle; and such is also the case with the American genus *Ateles*. The paws of the *Marmoset Monkeys* are squirrel-like: even in the anthropomorphous *Gibbons*, the analogue of the thumb is on the same plane as the fingers, and is an adjunct to them; not by way of antagonizing with them, but by acting with them in the same direction. In short, as Sir Charles Bell observes, “these paws are not approximations to the hand, corresponding with a higher ingenuity, but are adaptations of the feet to the branches on which the animals climb and walk.”

† It may be objected, that this restriction of the term, hands, to the organs of touch in Man, is

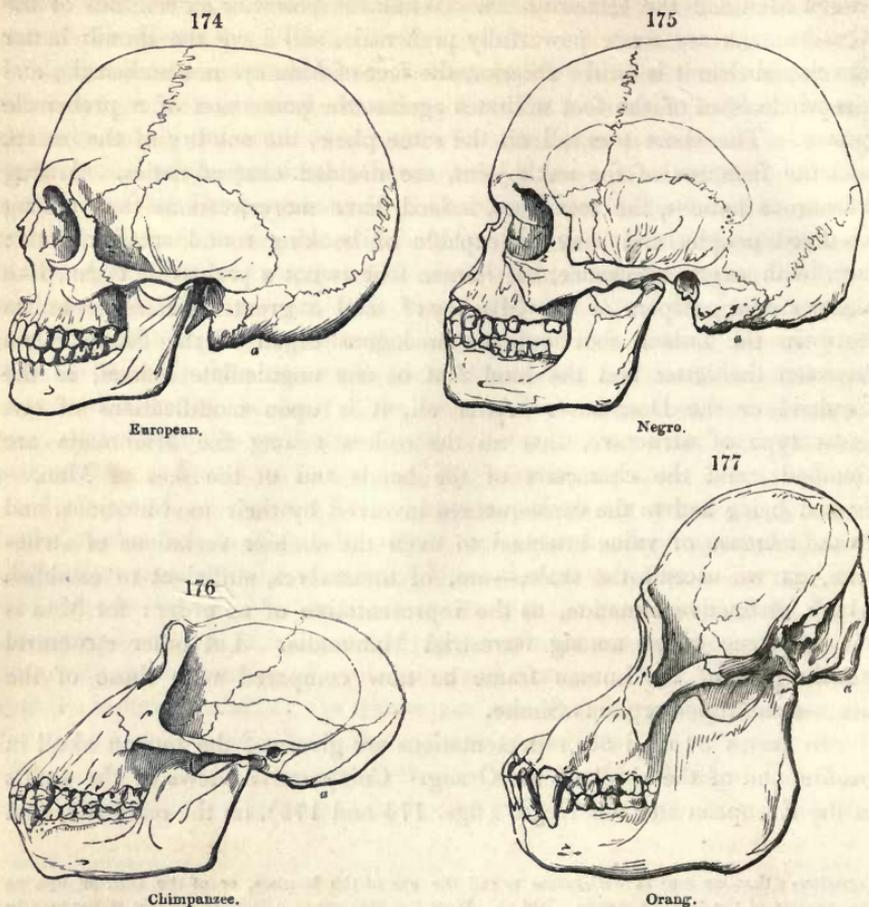
posterior also; and, indeed, the latter approach nearer the human hand, as far as the development of the thumb is concerned, than the anterior. Here, again, an important difference, involving signal consequences, exists between Man and the *Quadrumana*. While the posterior extremities of the *Quadrumana* are more powerfully prehensile, and have the thumb better developed than it is on the anterior, the feet of Man are not prehensile, and the whole form of the foot militates against the possession of a prehensile power. The short toes, all on the same plane, the solidity of the instep, and the firmness of the ankle-joint, are decided characteristics. Among barbarous nations, the toes may, indeed, have more freedom than among civilized people, and may be capable of hooking round small objects; but, with every allowance, the human foot is not a prehensile organ, like the posterior graspers of the *Monkey*:* and a greater difference exists between the human foot and the analogous organ of the *Simiæ*, than between the latter and the hind foot of any unguiculate animal, as the *Squirrel* or the *Dormouse*. After all, it is upon modifications of one great type of structure, that all the orders among the *Mammalia* are founded: and the characters of the hands and of the feet of Man,—regard being had to the consequences involved by their modifications, and to the increase of value attached to even the slightest variations of structure, as we ascend the scale,—are, of themselves, sufficient to establish Man's distinctive situation, as the representative of an order: for Man is the only true biped among terrestrial *Mammalia*. Let other structural peculiarities of the human frame be now compared with those of the nearest anthropomorphous *Simiæ*.

In pages 31 and 50, representations are given of the human skull in profile, and of the skull of the *Orang*. Comparative views of the skulls of the *European* and the *Negro* (figs. 174 and 175), on the one hand, and

capricious; that we may as well refuse to call the eye of the *Monkey*, or of the *Dog*, an 'eye, as the graspers of the *Monkey*, hands. Not so. Were the graspers of a *Monkey* capable of the uses to which the human hand is devoted, and fashioned, osteologically and as to the arrangement of muscles, the same, we should admit the force of the objection. The paw of the *Lion*, the paddle of the *Dolphin*, and the foot of the *Squirrel*, exhibit only modifications of the human hand; yet we do not call them hands: so the graspers of the *Monkey* are modifications of the human hand, adapted for arboreal habits, and, therefore, more prehensile than is the paw of the *Lion*; but they are not, on that account (except for convenience), to be considered as hands. A simply grasping power is not the sole characteristic of a hand; else are the talons of the *Eagle*, and the prehensile feet of the *Parrot*, hands. It is not, however, to the use of the term that we object, but only to the assumption, upon its use, that because both Man and the *Monkey* have hands, they, therefore, stand in close affinity to each other.

* M. Bory de St. Vincent contends that, originally, Man had the great toe of the foot opposable to the other toes, as in the *Simiæ*; that its loss of this power arises from the practice of wearing shoes; and that, therefore, our feet exhibit a structural degeneracy, from which the resin-gatherers in the *Landes* of France are yet happily exempt! It is singular that, among the naked-footed savages of various countries, the great toe should have likewise lost this opposable power; or, that it should not have been perfect and undegenerate among the sandal-clad ancients, or among the bare-footed *Carmelites* of more modern days. It is also equally strange, that M. Bory alone should have observed this fortunate exemption from so universal and lamentable degeneracy, in the happy natives of the *Landes*.

of the Chimpanzee and Orang (figs. 176 and 177), on the other, are here presented; in order that their respective proportions may be the more easily appreciated, and to shew that the differences between the cranium



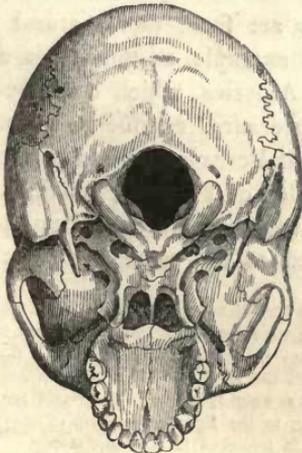
of Man and of these Simiæ are not limited merely to the development of the forehead, the ratio between the face and the cranial cavity, the hiatus between the upper canines and the incisors, the oblique position of the incisors, the length of the canines (though circumstances of great importance), but extend, also, to a variety of other points of structure.

It has been reiterated, that the skull of the Negro forms an intermediate link between that of the European, and of the Orang or Chimpanzee; and one point of approximation, between the former and the latter, is said to consist in the situation of the foramen magnum, *a*. Now, in the skull of a Negro (fig. 175), this foramen differs in position but very little from that of the well-formed skull of a native of England (fig. 174); while the posterior situation of the foramen, both in the skull of the Chimpanzee

and the Orang, is very remarkable. Again, the distance from this foramen to the incisor teeth (which is so considerable in the anthropomorphous *Simiæ*), compared with its distance from the occiput, is nearly the same in the Negro as in the European: and, as Dr. Prichard remarks, the antero-posterior admeasurement of the basis of the skull is, relatively, very much larger, in the Orang and Chimpanzee, than in Man; as is strikingly displayed by the different situation which the zygomatic arch occupies in the plane of the basis of the skull. In Man, the zygoma is included in the anterior half of the basis of the cranium: in the head of the adult Chimpanzee, as well as in that of the Orang, the zygoma is situated in the middle region of the skull, and, in the basis, occupies just one third part of the entire length of its diameter. The extent, besides, of the bony palate, and the greater breadth between the canines than between the last molars, both in the Chimpanzee and Orang, so as to allow of the spreading and want of continuity of the incisors, with respect to each other and to the canines, widely distinguish between the skulls of these animals and those of any of the human race. Both in the Negro and European, the base of the skull, around the foramen magnum, is boldly convex, according to the development of the cerebrum; whilst, in the *Simiæ*, the base of the skull is flat, which form is indicative of a curtailment of the volume of the brain beneath, in accordance with that of the cerebral hemispheres at their upper and anterior aspect.

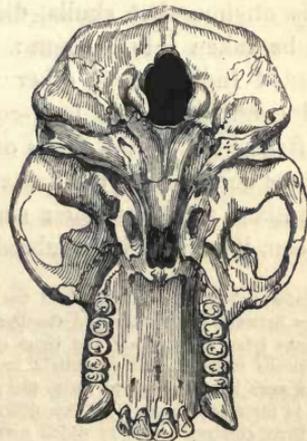
The cancellous mastoid processes, which are so large in the human skull, are scarcely to be discovered in the skulls of the *Simiæ*: these

178



Base of human skull.

179



Base of skull of Orang.

processes are represented, in the Chimpanzee, by a ridge behind each auditory foramen, the internal cellular structure of which, as Professor Owen

observes, is visible through the thin external table: the styloid process of the temporal bone, also, is entirely wanting in the Simiæ. It exists in the Negro, as well as in the European. These important differences may readily be distinguished in figs. 178 and 179, which represent the base of the human skull, and of the Orang.

It has been observed, by Professor Owen, that, in some skulls of Negroes, and in one of an Australian savage, he found the sphenoid bone not impinging on the parietal at its lower anterior angle, as it does in the skulls of Europeans; and that, in this respect, they agreed with the skull of the Chimpanzee, but not of the Orang. This trifling variation does not affect either the form or volume of the cranium: and, besides, it is not a constant character in the Negro, nor even in the Chimpanzee.

The great density of the Negro's skull has been noticed by Paaw, Soemmerring, and other naturalists; but it is not peculiar to the Negro race: in most savage nations the skull is thicker and harder than among civilized races: the ancient Egyptians also were remarkable for the density of the cranium.*

The thickness of the skull of the Negro indicates neither intellectual inferiority nor structural approximation to the Orang or Chimpanzee: in fact, though the crania of the various races of mankind may vary, as compared with each other, throughout an almost unlimited series of minor details, they preserve inviolate their great characteristics of distinction: no intermediate condition is discoverable among them, no half-human half-simian form, indicative of the "*Homo ferus, tetrapus, mutus, et hirsutus*,"—the Caliban of science,—the link which binds Man to the arboreal *Quadrumana*.

It is obvious that skulls, distorted by art from their natural form, cannot be taken into account: such, for example, as the skulls of the flat-headed Indians, and other tribes of America, which owe their unnatural configuration to long-continued pressure, commenced immediately after birth; or the skulls of an ancient Peruvian race, found in the sepulchres occurring in the great alpine valley of Titicaca; which, though Mr. Pentland attributes their singular contour to nature, and not to art, have been, it cannot be doubted, subjected to the same treatment as is

* Herodotus (Thalia), who examined the bones of the Egyptians and Persians slain in one of the battles between the former and Cambyzes, and which were separated from each other, those of the Persians lying in one place, and those of the Egyptians in another, says, "I found the skulls of the Persians so weak, that one might break them with the least pebble; whereas those of the Egyptians were hard enough to resist the percussion of a weighty stone. They told me, and I assented to their experience, that this difference is owing to the Egyptian custom of shaving the heads of their children early; by which means the bone is rendered thicker and stronger, through the heat of the sun, and the head preserved from baldness; and, indeed, we see fewer persons bald in Egypt than in any other country. As, therefore, the skull of the Egyptian is fortified by this method, so the heads of the Persians are softened by a contrary custom; for they are not exposed to the sun, but always covered with caps and turbans. And I observed the same thing at Papremis, in those who were defeated with Achæmenes, the son of Darius, by Inarus, King of Lybia."

still continued among the Columbian tribes, and is also practised by the Caribs of St. Vincent's.*

However ape-like these distorted skulls may be (and the observation applies also to the deformed skulls of idiots), they are not to be regarded as indications of any natural approximation to the Simiæ.

A distinction between the skulls of all nations and those of the Simiæ, upon which much of the character of the human face depends, and which is not destitute of importance, may here be noticed; namely, the elevation, in Man, of the nasal bones, which form the bridge of the nose; while, in the Simiæ,† the nasal bone (for it is single) lies flat and depressed.

Soemmerring, Camper, and Vrolik, have endeavoured to prove that, in the pelvis of the Negro, there is an approximation, in its form, to the lower Mammalia; a degradation in type, imparted, as Dr. Vrolik observes, "by the vertical direction of the ossa ilii; the elevation of the ilia at the posterior and upper tuberosities; the greater proximity of the anterior and upper spines; the smaller breadth of the sacrum; the smaller extent of the haunches; the smaller distance from the upper edge of the articulation of the pelvis, and the projection of the sacrum, or the shortness of the conjugate diameter; the smallness of the transverse diameters at the spines and tuberosities of the ischium, and the lengthened form which the pelvis derives from these peculiarities."‡ All these characters, as he says, recal to mind the conformation of the pelvis in the Simiæ; the elongated shape of the pelvis being, in fact, the character on which this approximation is assumed to depend. To judge by the skeleton of the female of the Bushman tribe, who died at Paris, in 1815, the pelvis, according to Dr. Vrolik, is inferior to that of the Negro, as evidenced by the vertical direction, the length, and narrowness of the ilia.

* Cox, in his *Travels on the Columbia River*, thus describes the method by which the singular flatness and elongation of the skull are produced:—"Immediately after birth, the infant is placed in a kind of oblong cradle, formed like a trough, with moss under it. One end, on which the head reposes, is more elevated than the rest. A padding is then placed on the forehead, with a piece of cedar bark over it, and, by means of cords passed through small holes on each side of the cradle, the padding is pressed against the head. It is kept in this manner upwards of a year; and the process is not, I believe, attended with much pain. The appearance of the infant, however, while in this state of compression, is frightful; and its little black eyes, forced out by the tightness of the bandages, resemble those of a Mouse choked in a trap. When released from this inhuman process, the head is perfectly flattened, and the upper part of it seldom exceeds an inch in thickness. It never afterwards recovers its rotundity. They deem this an essential point of beauty; and the most devoted adherent to our first Charles never entertained a stronger aversion to a round-head than these savages."

† Simia, from *simus*, flat-nosed; and not from *similis*, like, or *similo*, to counterfeit. Hence, *sima*, a rounded or blunt pillar; and *simo*, any person, or animal, with a flat nose.

‡ Vrolik has remarked, that "the pelvis of the male Negro, in the strength and density of its substance, and of the bones which compose it, resembles the pelvis of a wild beast; while, on the contrary, the pelvis of the female, in the same race, combines lightness of substance, and delicacy of form and structure; insomuch that, though the pelvis of the male and female presents, among Europeans, marked differential characters, it does not exhibit such extraordinary differences as obtain in the Negro race."

According to the same writer, the pelvis of the Javanese is remarkable for its smallness, its lightness, and the circular form of the opening of its upper cavity.

According to Professor Weber, the variations of the human pelvis resolve themselves into four forms; and he contends that examples of each occur in all races of mankind, no particular figure being the exclusive or permanent characteristic of any given race: in fact, that every form of the pelvis which deviates from the ordinary type, in whatever race it may occur, finds its analogues in other races of mankind. The four varieties of the pelvis, according to the extensive researches of this anatomist, are the oval, the round, the square, and the oblong; and of each of these he gives European examples, as well as examples occurring among the Botocudo Indians, the Negroes, the Caffres, and the Javanese. Still, according to his researches, it would seem that the form, most frequently occurring among Europeans, is the oval; among the American nations, the round; among the Mongolians and kindred tribes, the square; and, among the races of Africa, the oblong. Admitting, as is doubtless the case, that the pelvis, as well as the cranium, varies among different nations,—yet, even in the form farthest removed from that of the European type, the genuine characters of the human pelvis are found; viz, those connected with the support of the trunk in the erect attitude, with the direction of the thigh bones, and with the volume of the glutæi muscles. In short, the pelvis of the human race, like the skull, is removed by a wide interval from that of the most anthropomorphous of the Simiæ; and the Simiæ, in the form of this part, are far nearer to the Carnivora than they are to the human species. A comparison of the lower limbs, among the various races of mankind, might be here followed out, for these also exhibit slight differential peculiarities; but it is useless to proceed farther. The question recurs—is the naturalist, upon the acknowledged distinctions between Man and the Simiæ, justified in regarding the human being as the type of a distinct order? If Man be the only being endowed with mind,—the only being capable of examining his own formation, and that of other animals,—the only being to whose intellect the paths of science are open,—to whom alone it belongs to learn and practise arts,* and, from an investigation of the

* “We ought to define the hand as belonging exclusively to Man; corresponding, in sensibility and motion, with that ingenuity, which converts the being who is weakest in natural defence, to the ruler over animate and inanimate nature.—The armed extremities of a variety of animals give them great advantages; but if Man possessed any similar provision, he would forfeit his sovereignty over all. As Galen long since observed, did Man possess the natural armour of the brutes, he would no longer work as an artificer, nor protect himself with a breastplate, nor fashion a sword or spear, nor invent a bridle to mount the horse and hunt the lion: neither could he follow the arts of peace,—construct the pipe and lyre, erect houses, place altars, inscribe laws, and, through letters and the ingenuity of the hand, hold communion with the wisdom of antiquity, and, at one time, converse with Plato, at another with Aristotle or Hippocrates.”—Bell, *on the Hand*, p. 17.

laws of Nature to arrive at the knowledge of a Great First Cause ; if it be to his mind, and not to instinct, that he has to resort for the maintenance of his own existence, his safety, and his civil advancement ; and if his bodily organization comport with this possession of mind, and harmonize with it alone,—so that between his mind and body there exist a mutual balance and correspondence ;—then, though the Ape may have an analogy to him, in certain points of its structure, it can claim no real affinity. The anthropoid appearance of the Chimpanzee may, indeed, startle us,—and has led to the assignment to it of a far higher ratio of intelligence than it really possesses ; but, it must be remembered that, from the Chimpanzee to the stupid nocturnal Loris, there is a consecutive chain of gradation ; whilst Man, in the most degraded condition of savage life, stands alone, and is still a being of “ large discourse, looking before and behind.”

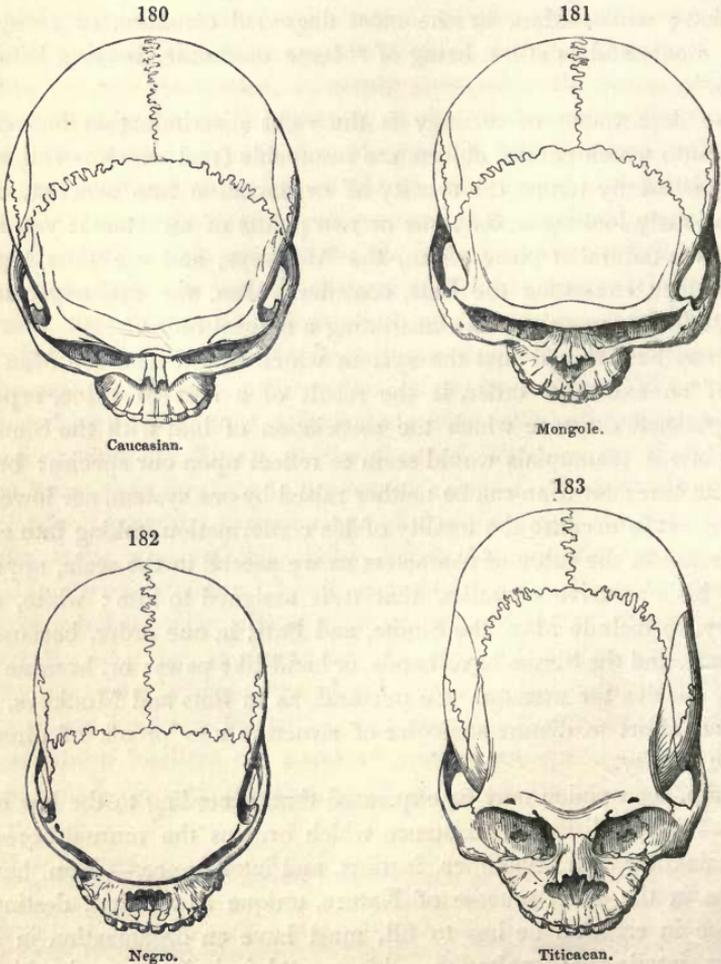
One department of zoology is the right discrimination between the groups into which natural objects are resolvable (and which is rather to be accomplished by taking the totality of organization into account, than by pertinaciously looking at only one or two points of structure): yet, strange to say, one naturalist places Man, the Monkeys, and the Bats together ; and another, excluding the Bats, considers Man, the Monkeys, and the cheiropodous marsupials, as constituting a natural order.

It may be deemed that the system which would establish Man as the type of an exclusive order, is the result of a sort of pride, repugnant to the fancied disgrace which the association of him with the Simiæ and cheiropodous marsupials would seem to reflect upon our species : but such is not the case ; for Man can be neither raised by one system, nor lowered by another. It is because the totality of his conformation, taking into account the increase in the value of characters as we ascend in the scale, appears to justify his exclusive situation, that it is assigned to him : while, on the contrary, to include Man, the Simiæ, and Bats, in one order, because Man has hands, and the Simiæ have hands, or hand-like paws ; or, because in the human species the mammæ are pectoral, as in Bats and Monkeys, seems to be an effort to distort analogies of structure into proofs of direct and positive affinity.

Again, the opinion may be expressed that, according to the law of harmony,—the condition of existence which ordains the mutual accordance of organization with necessities, instinct, and intelligence,—Man, having a situation in the great scheme of Nature, unique as to mind, destiny, and the place in creation he has to fill, must have an organization in unison with his intellectual exaltation—his mental isolation,—and which will furnish data sufficient, if duly weighed, to satisfy the physiologist as to the propriety of his being considered as the representative of an exclusive order.

ON THE MAIN STEMS AND PRINCIPAL BRANCHES OF THE
HUMAN RACE.

It is, to a great extent, upon the differences which the crania of different sections of mankind permanently exhibit, and which thus form important characteristics, that the division of the human race into main stems is founded; and these distinctions cannot be more clearly seen than by regarding the cranium in a vertical aspect: the comparative length and breadth, the degree of prominence in the face, and that, also, of the malar bones and zygomatic arches, are thus at once appreciated. It is,



therefore, to shew the range of variation, in these respects, between skulls which may be regarded as patterns of four distinct varieties of our species, that the above figures are given. The skull of the Titicacan

(fig. 183) is, indeed, distorted by art; but its distortion has only produced an augmentation of its natural characters, which consist in its great elongation, from the superior margin of the orbits to the occiput, and in the depression of its frontal and vertical portions. The narrowness of the frontal portion, and the general elongation of the skull, are also remarkable in the Negro (fig. 182); while, as compared with the symmetrical skull of the Caucasian (fig. 180), the vertical outline of which approaches an oval, that of the Mongole (fig. 181) displays the opposite character, being nearly round, and remarkable for the great breadth between the malar bones and zygomatic arches, which are boldly prominent.

Whether all mankind are the descendants of one common parentage, or whether distinct primitive origins were created, is a subject which has been often agitated, and the advocates on each side of the question have maintained their respective opinions with a degree of dogmatism proportioned to the difficulty and perplexity of the investigation.

While some writers positively deny the original creation of distinct types of our species, others as confidently speak of the Negro, European, Hottentot, Chinese, and American types, as if we had a certain history of the details connected with the primeval condition of our species; or, as though a map of the migrations and wanderings of our race could be accurately drawn out, and the starting-points clearly ascertained. "Il n'est permis qu'à un aveugle," says Voltaire, "de douter que les Blancs, les Nègres, les Albinos, les Hottentots, les Lapons, les Chinois, les Américains, soient des races entièrement différentes."

Nevertheless, the philosopher can only form conjectures, based upon probabilities, deduced from an examination of languages, manners, and customs, and an attentive scrutiny of physical peculiarities; but, after all, uncertainty hangs over every hypothesis, and the most positive dogmata are to be received with caution.

That the human race, as diffused over the globe, is subdivided into distinct varieties, may be inferred from abundant evidences. The inhabitants of various regions differ from each other, not only in language and manners, but also in certain physical traits, and in points of organic conformation, which are transmitted pure and unaltered from generation to generation, unless where they become modified by an intermixture of the occupants of one region with those of another. Almost every nation has its own peculiarities. The English, the French, the Italians, the Spaniards, have each their national stamp of features; but these variations are trifling, and of a subordinate character.* It is not with

* The subordinate variations of the human species, in form, complexion, and language, are almost infinite, and are still undergoing, as they have undergone, continual modifications, according to the advance of civilization, the intercourse of nation with nation, and the extent of international alliances.

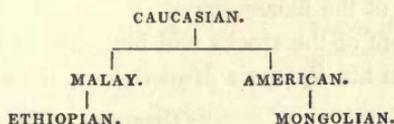
these that the naturalist is immediately concerned; nor yet with the alterations in tribes which a change of food, the adoption of new manners, or an improvement of country by draining morasses, and cultivating its surface, will produce, but which affect not their predominant physical peculiarities;* nor is it with accidental variations in stature or complexion: but with the great stocks, or types of form, to which the multitudinous branches of mankind are respectively referable, and under which the various people of the globe are to be respectively grouped and associated.

Great are the difficulties in the way. It is impossible to trace the progress of the human swarms, which, in remote antiquity, have successively advanced, from various points, spreading as they have proceeded, and mingling with other nations. History throws no light on the subject; nor, indeed, are records extant, affording the least notice of what must evidently have been some of the most important migrations ever undertaken by our species: such as the red colonization of America (to say nothing of the revolutions of states, which, at some remote epoch, appear to have taken place on that great theatre); the colonization of Australia, New Zealand, and the multitudinous islands which bespangle the Southern Ocean,—the colonization of Europe and of our own island—occupied, ere Greece and Rome “had writ their annals,” by races whose origin and progress are buried in oblivion. Let it also be remembered, that the migrations of Man are, for the most part, not single acts, performed by one tribe, and, so to speak, finished at once; but they have generally been like the waves of the advancing tide—the way once open, swarm has followed swarm, the movement has been general, and years have passed, till, at length, the flood has either ceased to roll on, or has taken some new direction. Meanwhile the invaders have become amalgamated with the more ancient possessors of the soil, and their commingled descendants again with other invaders, in their turn. Most nations, besides, if even relics of their early history be by chance preserved, have fondly claimed for themselves a romantic or heroic origin—a descent from gods, or god-like men—have blended facts with fables, between which it is not a little difficult to separate, and have assigned the most extravagant antiquity to their commencement. Hence, then, the difficulty of forming a clear digest of the subject, and of tracing the branches and offsets to their primitive stocks; hence the uncertainty which attends the most plausible hypotheses.

* In savage countries the chiefs are, for the most part, readily distinguishable from the lower classes, by the superiority of their stature; owing, most probably, to an exemption from depressing toil, and to a better supply of food. The stunted, meagre, Bushmen of Southern Africa are examples of the deteriorating effects of want, fear, and innutritious and scanty food: the relics of a Hottentot race, their physical nature seems to have succumbed beneath the pressure of a series of adverse circumstances,—but its zoological characters remain unaffected.

It will not be out of place, here, to give a sketch of the divisions or varieties of mankind, as various physiologists have arranged them.

Blumenbach regards Man as a single species, with five great varieties ; viz., the Caucasian, the Mongolian, the Ethiopian, the Malay, and the American. The Caucasian he supposes to be the primitive type ; the rest, its immediate offsets : on one side he places the Mongole ; on the other, the Ethiopian ; the American intervening between the Mongole and Caucasian, as an intermediate form ; the Malay between the Ethiopian and the Caucasian.



Cuvier considers the branches of mankind to be referable to three stocks, the Caucasian, the Mongole or Altaic, and the Negro or Ethiopian. The following table represents their respective ramifications :—

CAUCASIAN.	{	ARMENIAN.	{	Assyrians.		
				Chaldeans.		
				Arabs.		
				Phœnicians.		
		Hebrews.				
		Abyssinians.				
		Egyptians ?				
		INDIAN.	{	Sanskritic race.	{	Ancient Persians.
				Pelagic ditto.		Hindoos, &c.
				Gothic ditto.		Celtic ? *
				Slavonic ditto.		Greek.
						Latin.
						German and Dutch.
						English.
						Danish, Swedish, &c.
						Russ.
						Polish.
						Bohemian.
						Vendean.
		SCYTHIAN AND TARTAR.	{	Parthians.		
				Turks.		
				Finlanders.		
				Hungarians.		
MONGOLE OR ALTAIC.	{	CALMUCS.				
		KALKAS.				
		MANTCHOUS.				
		JAPANESE AND COREANS.				
		SIBERIANS.	{	Samoiedes ?		
		Laplanders ?				
		Esquimaux ?				

* With respect to the Celtic race, Cuvier seems to think that it may have been a distinct branch of the Caucasian, which, at a very remote epoch, spread over western and southern Europe ; and we agree with him in this conjecture. The Celtic tongue was once very extensive, and the radical derivation of numerous Latin words, to say nothing of other languages, is to be traced to that source.

NEGRO
OR
ETHIOPIAN. }

?

With regard to the affinities of the Malays, the Alfourous, and the Papuans, Cuvier is undecided ;* some doubt, he also observes, hangs over the native races of America ; which, however, he is inclined to refer to the Mongole stock. To this, indeed, they bear considerable affinity, as is sufficiently indicated by the conformation of the skull, the elevation of the malar bones, the boldness of the zygomatic arches, the form of the eyes, and the characters of the hair.

The arrangement of the stocks and branches of the human species, by Fischer, as given in his *Synopsis Mammalium*, is as follows :—

		CAUCASICUS.	{	Caucasicus proper. Georgians, &c. Pelagius. Greeks, Romans, &c. Celticus. Gauls, Scots, Armorics. Germanicus. Germans, English, Danes.
HOMO JAPETICUS.	}	ARABICUS.	{	Atlanticus. { Phœnicians, Numidians, Guanches. Adamicus. { Abyssinians, ancient Egyptians, Jews, Armenians, and Arabs.
Japetic race.		INDICUS.		Hindoos, &c.
		OCCEIDENTALIS.	{	New Zealand, Society, Friendly, Sandwich Islands, &c. Ancient Peruvians, Mexicans ?
H. NEPTUNIANUS.	}	PAPUENSIS.		Papous—New Guinea, Waigou, &c.
Malay race.		SINICUS.		China, Corea, Japan, Tonquin, &c.
H. SCYTHICUS.	}	HYPERBOREUS.		Greenland, Lapland, Ostiacs, Esquimaux.
Calmucs, Mongoles.		PATAGONUS.		Patagonians.
H. AMERICANUS.	}			Indigenes of North America, Eastern Mexico, Antilles, &c.
Indigenes of America.		CAFFER.	{	Southern Africa, between 20° and 42°, and the shores of Madagascar.
H. COLUMBICUS.	}	MELANOIDES.	{	Madagascar, shores of New Guinea, New Eng- land, Bouka, Fejee, Van Diemen's Land, &c.
		HOTTENTOTTUS.		Hottentot race of the Cape of Good Hope.
H. ETHIOPICUS.				
From Senegal to the southern tropics.				Alfourous, Australia, Moluccas, Philippines, the Virzimbers of Madagascar.
H. POLYNESIUS.				

* "Le midi de cette peninsule (the Malay Peninsula) est habité par les Malais, peuple beaucoup plus rapproché des Indiens par les formes, et dont la race et la langue se sont répandues sur les côtes de toutes les îles de l'Archipel Indien. Les innombrables petites îles de la Mer du Sud sont peuplées aussi par une belle race qui paraît tenir de près aux Indiens, et dont la langue a beaucoup de rapports avec le Malai ; mais dans l'intérieur des grandes îles, surtout dans les lieux les plus sauvages, habitent d'autres Hommes à teint noir, à visage de Nègre, tous extrêmement barbares, que l'on a nommés Alfourous ; et sur les côtes de la Nouvelle Guinée et des îles voisines, sont d'autres Nègres presque semblables à ceux de la côte orientale de l'Afrique, que l'on a appelés Papous ; c'est aux Alfourous que l'on rapporte les habitants de la Nouvelle Hollande et l'on assure que ceux de la Terre de Diémen sont plutôt des Papous. Ni ces Malais, ni ces Papous ne se laissent aisément rapporter à l'une des trois grandes races ; mais les premiers peuvent-ils être nettement distingués de leurs voisins des deux côtes, les Indous Caucasiens, et les Chinois Mongoliques ? Nous avouons que nous ne leur trouvons pas encore de caractères suffisants pour cela. Les Papous sont ils des Nègres anciennement égarés sur la Mer des Indes ?

Lesson, in his *Mammalogie*, gives the following arrangement :—

WHITE OR CAUCASIAN STOCK.	Branch.	
	1. ARMENIAN.	{ Assyrians, Chaldeans, Arabs, Phœnicians, Jews, Abyssinians, and, perhaps, the Egyptians.
	2. INDIAN, GERMAN, AND PELASGIC.	{ The Celts, Cantabrians, Persians, &c.
	3. SCYTHIAN AND TARTAR.	{ Scythians, Parthians, Turks, Hungarians, &c. { Variety I. { 1. Malays proper. Malay. { 2. Javanese. 3. Macassars. 4. Amboyna Malays. Variety II. { A branch of the Hindu family spread through the isles of the Southern Ocean. Oceanic. {
YELLOW OR MONGOLE STOCK.	Branch.	
	1. MANTCHOU.	Bucharia, to the frontiers of Japan.
	2. CHINESE.	China and Japan.
	3. HYPERBOREAN, OR ESQUIMAUX.	{ Laplanders, Samoiedes, Labadors, Aleutians, &c.
	4. AMERICAN.	{ Peruvians, Mexicans, Araucans, Patagonians, Caribs, Canadians, &c.
	5. MONGOLE-PELASGIC, OR CAROLINE.	{ Natives of the long chain of islands (the archipelago of the Carolines) from the Philippine to the Mulgrave Islands.
BLACK OR NEGRO STOCK.	Branch.	
	1. ETHIOPIAN.	Senegal, Guinea, Congo, and true Negroes.
	2. CAFFRE.	South Africa and the shores of Madagascar.
	3. HOTTENTOT.	District of the Cape of Good Hope.
	4. PAPOU.	{ Papuan Islands, New Caledonia, Bouka, Wai-gou, &c.
	5. TASMANIAN.	Van Diemen's Land; closely allied to the Papous.
	6. ALFOUROUS-EN-DAMENES.	{ The Negroes "del Monte" of Mindanao, the Virzimbirs of Madagascar.
	7. ALFOUROUS-AUSTRALIAN.	{ The natives of Australia.

Subjoined is Lesson's later arrangement, in *Species des Mammifères* :—

I. WHITE RACE.	Branch.	Family.	
	ARAB.	{ 1. Arab.	
		{ 2. Hebrew.	
		CAUCASIAN.	{ 3. Caucasian.
			{ 4. Greek.
		CELTIC.	{ 5. Turk, or Tartar.
	{ 6. Celtic.		
	TEUTONIC, OR GERMANIC.	{ 7. Scandinavian.	
		{ 8. Slavonic.	
		{ 9. Finnic.	
	II. BISTRE-BLACK OR DUSKY RACE.	HINDOO.	{ 10. Indian.
{ 11. Gitanian or Gipsy.			
CAFFRARIAN.		{ 12. Abyssinian.	
		{ 13. Ovas, or Madecasse.	
PAPUAN.		{ 14. Caffre.	
		{ 15. Papuan, or Negro-Malay.	
ENDAMENE.		{ 16. Alfourou.	
	{ 17. Australian.		

	Branch.	Family.		
III. ORANGE-CO- LOURED RACE.	} MALAYAN.	18. Malay.		
		} MONGOLE.	19. Chinese.	
20. Tongoose.				
21. Calmuc.				
22. Esquimaux.				
IV. YELLOW RACE.	} MONGOLE PE- LASGIC.	23. Tagale, or Caroline.		
		} OCEANIC.	24. Oceanic.	
	25. Dayack.		{ Battas. Alfourous, &c.	
	} AMERICAN.	26. American.	{ Tribe Ando-Peruvian. — Pampas. — Brazilio-Guaranian.	
V. RED RACE.		} CARIB.	27. Carib.	{ Tribe Caribs. — Senecas. — Mohawks. — Chippeways, &c.
	} NEGRO.		28. Ethiopic.	
			} ASIATIC-NEGRO.	29. Mihada or Pou- linda.	{ Bhils of Malva. Coutis of Guzerat. Couriés beyond the Ganges, &c.
	VI. BLACK RACE.			} NIGRITIAN.	30. Aetas.	{ Negroes "del Monte" of Mindanao. Andamans, &c.
} TASMANIAN.		31. Tasmanian or Van Diemen.		
		} HOTTENTOT.	32. Hottentot.	
} BUSHMAN.			33. Bushman.	

Dumeril proposes the following divisions :—

Var. 1. Caucasian, or Arab-European.	Var. 4. American.
— 2. Hyperborean.	— 5. Malay.
— 3. Mongole.	— 6. Ethiopian.

Virey divides Man into two species, each of which is again sub-divided into greater and lesser branches :—

GENRE HUMAINE.	I. Espèce. Angle facial de 85 à 90 degrés.	} 1. Race blanche.	{ Arabe-Indienne. Celtique, Caucasienne.	
			} 2. Race basanée.	{ Chinoise. Kalmouk, Mongole. Lapone, Astraque.
				} 3. Race cuivreuse.	{ Americaine ou Caribe.
	II. Espèce. Angle facial de 75 à 82 degrés.	} 4. Race brun foncée.	{ Malaie ou Indienne.	
			} 5. Race noire.	{ Cafres. Négres.
		6. Race noirâtre.		{ Hottentots. Papous.

Desmoulins' sections are as follow :—

- | | |
|--------------------------|---------------------|
| 1. Celto-Scyth-Arabs. | 7. Papous. |
| 2. Mongoles. | 8. Negro-Oceanians. |
| 3. Ethiopians. | 9. Australasians. |
| 4. Euro-Africans. | 10. Columbians. |
| 5. Austro-Africans. | 11. Americans. |
| 6. Malays, or Oceanians. | |

M. Bory de St. Vincent adopts a series of divisions closely approximating to those of Desmoulins :—

RACES WITH SMOOTH STRAIGHT HAIR, PECULIAR TO THE OLDER CONTINENTS.

- I. JAPETIC STOCK—HOMO JAPETICUS.* The original seat of this stock is in the mountain chains which ramify nearly parallel to the 45th degree north.
- Variety I.* Gens togata. Dress, from the earliest time, loose and flowing. The women generally regarded as the slaves of man. Baldness, from age, generally beginning on the forehead.
- Ramifications :* 1. Caucasian, or western race. (Mingrelians, Circassians, Georgians, by intermixtures with whom the Turks, the Persians, and the Hindoos of Cashmere have become improved.)
- Ramifications :* 2. Pelasgic race. (The ancient Greeks and Romans, together with their colonies.)
- Variety II.* Gens braccata. Dress close. The women regarded as equals, or often as superiors. The head becoming bald, from age, generally on the vertex.
- Ramifications :* 1. Celtic race. (Gauls, ancient British, &c.)
- Ramifications :* 2. Germanic race. (Sub-variety 1. Teutonic. 2. Sclavonic.)
- II. ARABIAN STOCK—HOMO ARABICUS. The men of this stock generally of tall stature; on the contrary, the women small and slender.
- Variety I.* Atlantic race. (The ancient Egyptians, and the people of Atlantica, North Africa.)
- Variety II.* Adamic race. (Hebrews, and other Syrian nations.)
- III. HINDOO STOCK—HOMO INDICUS.
- IV. SCYTHIC STOCK—HOMO SCYTHICUS. The Tartar nations of Bucharica, Daouria, and of the country from the eastern shores of the Caspian to the Sea of Japan and Okok-hokts. Cheek-bones prominent; eyes small, and deeply set, and separated from each other to a great distance; eyelids thick; eyebrows bushy; nose flattened, and rendered apparent only by the nostrils; chin pointed.
- V. CHINESE STOCK—HOMO SINICUS. Not to be confounded with the preceding; original seat, the Thibet mountains; and separated from the Scythic nations by the vast deserts of Cobi and Shamo.
- VI. HYPERBOREAN STOCK—HOMO HYPERBOREUS. Laplanders, Samoiedes, &c.
- VII. NEPTUNIAN STOCK—HOMO NEPTUNIANUS.
- Variety I.* Malays.
- Variety II.* Oceanic nations (New Zealanders, &c).
- Variety III.* Hybrid Papuan race, between the Neptunian stock and the Melanian.
- VIII. AUSTRALASIAN STOCK—HOMO AUSTRALASICUS. Natives of Australia, &c.

PECULIAR TO THE NEW WORLD.

- IX. COLUMBIAN STOCK—HOMO COLUMBICUS. Inhabitants of the plains of the St. Lawrence to the 45th degree, of the eastern borders of Mexico, the Antilles, Terra Firma, Guiana, and the territory of Cumana. To this stock belong also the Canadians, the natives of Jucatan and Honduras, the Caribs, and the Galibis.

* Japeticus, not in allusion to Japhet, the son of Noah, but to Japetus (audax Japeti genus. *Horace*), whom the ancient classics regarded as the progenitor of the race inhabiting the western regions of the world.

- X. AMERICAN STOCK—HOMO AMERICANUS. The inhabitants of the upper plains of the Orinoco, those of the Amazon, Brazil, Paraguay, and the innermost territories of Chili.
 XI. PATAGONIAN STOCK—HOMO PATAGONUS. Natives of Patagonia.

CRISP-HAIRED RACES.

NATIONS COMMONLY TERMED NEGROES.

- XII. ETHIOPIAN STOCK—HOMO ÆTHIOPICUS. Negro, or black races of Central Africa.
 XIII. CAFFRE STOCK—HOMO CAFFER. Caffre tribes of South Africa.
 XIV. MELANIAN STOCK—HOMO MELANINUS. Natives of Madagascar, New Guinea, the Feejee Islands, Van Diemen's Land, &c.
 XV. HOTTENTOT STOCK—HOMO HOTTENTOTTUS. Hottentot and Bushman tribes of South Africa.

Dr. Prichard, whose work, entitled *Researches into the Physical History of Mankind*, is replete with learning, and evidences the indefatigable industry of its author, considers mankind as referable to seven primary stocks, or classes. He observes that, from a comparison of the principal varieties of form and structure presented by the inhabitants of different countries, seven classes of nations appear to be distinctly separable from each other, and to exhibit strongly-marked characters of distinction: among these, the principal, but by no means the only characteristics claiming attention, are peculiar forms of the skull. The seven principal classes, thus established, he considers to be—first, those nations which, in the form of their skulls and other physical traits, resemble Europeans, including many nations in Asia, and some in Africa; secondly, races nearly similar in figure and in the shape of the head to the Calmucs, Mongoles, and Chinese; thirdly, the native American nations, excluding the Esquimaux, and some tribes who resemble them more than the majority of the inhabitants of the New World; fourthly, the Hottentot and Bushman race; fifthly, the Negroes; sixthly, the Papuas, or woolly-haired nations of Polynesia; and, seventhly, the Alfourou and Australian races. The two first classes he respectively terms Iranian and Turanian, instead of Caucasian and Mongolian. Sir W. Jones has shewn it to be extremely probable that the region of Upper Asia, termed Iran, was the primitive seat of those families or nations who have most extensively spread the same type and features; and hence, Dr. Prichard has adopted the term Iranian (instead of Caucasian), as their general appellation. Turan corresponds with Scythia.* “The Scythians,” says Dr. Prichard, “were the nations of the north beyond Mount Imaus, of whom some branches, at an earlier period, had reached the neighbourhood of Colchis. There is enough to identify them with the class of nations which may be comprised under the indefinite, and, therefore, more con-

* “The long and memorable quarrel of Iran and Touran is still the theme of history or romance: the famous, perhaps the fabulous, valour of the Persian heroes, Rustan and Asfendiar, was signalized in the defence of their country against the Afrasiabs of the north; and the invincible spirit of the same barbarians resisted, on the same ground, the victorious arms of Cyrus and Alexander. When Darius advanced into the Moldavian Desert, between the Danube and the Neister, the King of the Scythians sent him a mouse, a frog, a bird, and five arrows—a tremendous allegory!”—*Gibbon*.

venient designation of Turanian. That term will serve the purpose of a general appellation for all the races of men who inhabit the region northward of the Oxus and Imaus; and who display, more or less, the same physical character with the Mongoles and Calmucs, and yet can by no means be identified or connected with them by any proofs of natural affinity. The name Turanian, but for the error of modern writers, who have confounded the real Scythians with the Goths and the Slavonians, and even with the Celts, might be interchanged with Scythian." It would appear, however, that the nomadic Scythian and Tartar tribes, some of which are evidently of a mixed race, intermediate between the Slavonic, or the Tartaric branches of the Japetic, and the Mongole stock (see Blumenbach, *Dec.* xiii., skull of a Kirguise*), are really to be referred to the former.

The following tabular arrangement of the main stems and primary branches of the human race, as it appears upon careful investigation to be resolvable, is submitted by the author of this work. It cannot be expected that the views it embodies will coincide, in every point, with those of others who have entered into this perplexing department of natural history; nevertheless, it is from such as know the mass of difficulties which environ the subject, that the most allowance may be expected.

		EUROPEAN.	Celtic.	{ Of this branch, various nations, speaking different dialects of the same tongue, were spread over Gaul, Lower Germany, Italy, Spain, and the British Islands. { Greeks, Romans, and their colonies. { Various nations of this branch, under the names of Goths, Vandals, Allemanni, Franks, Germans, Angles, &c., occupied the north-western regions of Europe. { Russians, Poles, Croats, Bohemians, Bulgarians, and Cossacks. { Ancient Scythians, Parthians, Tartars, Kirguises, Ousbecks, &c. { Georgians, Circassians, Mingrelians. { Arabs, Hebrews, Assyrians, Chaldeans, Phœnicians, &c. { Hindoo nations. { Ancient Egyptians and Ethiopians, Abyssinians, Berber tribes of Atlantica, Guanches of Canary Islands.
			Pelagic.	
			Teutonic.	
			Slavonic.	
I.—JAPETIC STOCK.		ASIATIC.	Tartaric.	
Head oval; forehead open; nose prominent; cheek-bones either not projecting, or but slightly so, the zygomatic arches being moderately compressed; ears small and close; teeth vertical in their direction; jaws moderate, with a well-formed chin; hair long, flowing, sometimes crisp, never woolly; beard mostly full; colour variable.			Caucasic.	
			Semitic.	
		AFRICAN.	Sanscritic.	
			Mizraïmic.	
The Japetic, Caucasian, or Iranian section of different authors, the Celto-Scyth-Arabs of Desmoulin.				

* See, also, *Dec.* iv., the skull of a Don Cossack: "Habitus in totum horridus."

II.—NEPTUNIAN STOCK.

Head rounded, sometimes compressed at the sides; face sub-oval, with prominent cheek-bones and zygomatic arches; eyes more distant from each other than in the Japetic stock, and more elevated at the temporal angle; iris black; mouth moderate, with a violet tint internally; teeth erect; hair long, straight, black; beard scanty, somewhat rigid; limbs well formed; soles of the feet small; colour tawny, or yellowish brown.

MALAYS
PROPER.POLYNE-
SIANS.

Natives of the Malay Peninsula, and occupants of the coasts of the islands of the Indian Archipelago.
Hovas of Madagascar.
New Zealanders.
Sandwich Islanders.
Society Islanders, &c.
Perhaps, also, the settlers who founded the Peruvian and Mexican empires.

III.—MONGOLE STOCK.

Head large, elevated at the vertex; face flat, broad; the male malar bones and the zygomatic arches boldly prominent and remarkably large; eyes small, narrow, oblique; eyelids tumid; eyebrows arched; nose depressed, with patulous nostrils; chin nearly beardless; the hairs of the head rigid, straight, black; ears large and spreading; mouth wide; teeth erect; colour yellowish brown.

MONGOLE.

HYPERBO-
REAN.

Mongole Tartars.
Mantchoux.
Calmucs.
Chinese.
Coreans.
Japanese, and natives of Thibet, Boutan, Ava, Pegu, Siam, &c.
Ostiaks.
Tongouse.
Samoiedes.
Tschutski.
Laplanders.
Esquimaux, &c.

IV.—PROGNATHOUS STOCK.*

Jaws large, prominent; the alveolar ridge standing obliquely forward, and giving an oblique direction to the incisor teeth; forehead narrow; head laterally compressed; cheeks and zygomatic arches prominent; lips tumid; nose more or less depressed, with spreading nostrils; hair, for the most part, woolly and plicated, sometimes crisp, sometimes harsh and long; beard usually scanty, stiff; colour fluctuating from deep black to yellowish brown.

AFRO-
NEGRO.

HOTTENTOT.

PAPUAN.

ALFOUROU.

Negro and the African varieties, with more or less of the Negro characters.
Caffres.
Namaquas.
Koras.
Gonaquas.
Saabs.
Woolly-haired black tribes of New Guinea, Fejee Island, Van Diemen's Land, Madagascar, termed Papous, &c.
Straight or crisp-haired black tribes of New Guinea, and various Islands of Indian Archipelago, New Hollanders, and Virzimbirs of Madagascar.

V.—OCCIDENTAL STOCK.

Forehead flattened; the vertex moderately elevated (except when depressed by art); cheek-bones and zygomatic arches roundly prominent; eyes linear, usually oblique; nose moderately elevated, sometimes depressed, with spreading nostrils; mouth large; alveolar margin of the jaws slightly oblique; hair long, rigid, black; beard very scanty; colour variable, dusky-yellow, or coppery. The characters not constant, or developed to the same degree in every tribe.

COLUMBIAN.

SOUTH
AMERICAN.

PATAGONIAN.

North American Indians.
Indigenes of Mexico.
Florida, and the Carribean Islands of Yutacan and Columbia, to the equator.
Indigenes of the banks of the Amazon, and of the upper sources of the Orinoco; of Brazil, Paraguay, the interior of Chili; including the Atures, the Ottomaques, the Botacudos, &c.
The gigantic race of Patagonia.

* The term, Prognathous, is adopted from Dr. Prichard, as typically characteristic of this stock of the human family, of which the Papous and the Alfouros are regarded as a branch. The genuine Negro characters are restricted to a small offset.

JAPETIC STOCK.

It has been usual to ascribe to one type, namely, the Caucasian, Iranian, or Indo-Atlantic (as various writers denominate it), a profusion of tribes and nations, spread over Europe, certain districts of Asia, and also of Africa, notwithstanding the many and striking differences which exist between them. They have, indeed, been all referred, by some philosophers, to the Caucasian range of mountains, between the Black and the Caspian Seas, as their original starting-point; but without any definite authority* for the assumption.

Dr. Prichard, indeed, regards the region of Upper Asia, termed Iran, as their original seat; and maintains that there is no truth in the assertion, that all these nations traditionally deduce their origin from Caucasus, which has been the immemorial seat of tribes, as their languages prove, entirely distinct from the Indo-European, as well as from the Semitic nations. The mountains of Asia Minor, of Thrace, and of Hellas, are all famous in Grecian story. Mountains were, of old, in the simple and primitive ages which long preceded the erection of temples, consecrated to the worship of the unseen Power whom all nations venerate; and hence, with Olympus and Mount Meru, Caucasus also claimed its share of the general homage paid to lofty heights enveloped in clouds, and defying access to mortals—the resting-place only of the gods, when they visited this lower world: but there is no authority for assigning the Caucasian range as the centre whence the human family originally radiated. The subject, however, requires, for its elucidation, data which history does not furnish.

The assumption, that the multitudinous tribes and nations, included under the distinctive term Caucasian, or Iranian, are all referable to the same type, rests upon the apparent sameness of the model upon

* "On a appelé Caucassique la race dont nous descendons, parceque les traditions et la filiation des peuples semblent la faire remonter jusqu'à ce groupe de montagnes situé entre la Mer Caspienne et la Mer Noire, d'où elle s'est répandue comme en rayonnant. Les peuples du Caucase même, les Circassiens et les Géorgiens passent encore aujourd'hui pour les plus beaux de la terre. On peut distinguer les principales branches de cette race par l'analogie des langues. Le rameau Araméen ou de Syrie s'est dirigé au midi; il a produit les Assyriens, les Chaldéens, les Arabes toujours indomptés, et qui après Mahomet ont pensé devenir maîtres du monde; les Phéniciens, les Juifs, les Abyssins, colonies des Arabes; il est très probable que les Egyptiens lui appartenaient. C'est dans ce rameau, toujours incliné au mysticisme, que sont nées les religions les plus répandues. Les sciences et les lettres y ont fleuri quelquefois, mais toujours avec les formes bizarres, un style figuré.

"Le rameau Indien, Germain, et Pélasgique est beaucoup plus étendu, et s'est divisé bien plus anciennement; cependant l'on reconnaît les affinités les plus multipliées entre ses quatre langues principales: le Sanscrit, langue aujourd'hui sacrée des Indous, mère de la plupart des langues de l'Indostan; l'ancienne langue de Pélagés, mère commune du Grec, du Latin, de beaucoup de langues éteintes, et de toutes nos langues du midi de l'Europe; le Gothique, ou Tudesque, d'où sont dérivées les langues du nord, et du nord-ouest, telles que l'Allemand, le Hollandais, l'Anglais, les Danois, les Suédois, et leurs dialectes; enfin, la langue appelée Esclavonne, d'où descendent celles du nord-est—le Russe, le Polonais, le Bohémien, et le Vendé."—Cuvier.

which the cranium and the osseous framework generally are moulded :* for, though differences have been noticed, still no broad line of separation can be seized upon, indicating, as in the Mongole tribes, the existence of a distinct type or model. Nevertheless, the gradations of this type, from the perfect and true model, as it is exemplified in the Georgian, Circassian, or Greek, to the semi-barbarous Russ or rude Sclavonian, are not to be overlooked. It is, therefore, rather an assumption than a demonstration, that the nations and tribes in question have branched out from one stock, or that they are of the same type. Soemmerring observes, that there are no well-marked differences between the German, Swiss, French, Swedish, and Russian skulls, except that the orbits are more contracted in the Russian, according to the examples in his collection (a peculiarity delineated, also, in the figure of the skull of a Pole, in the *Decades* of Blumenbach): still, as Lawrence well remarks, the discovery of no striking difference between the skulls of the Caucasian nations, from a comparison of casual specimens of the crania of the various nations, does not authorize the conclusion that no differences really exist; and, he adds, "my friend, Mr. G. Lewis, whose quickness in distinguishing forms, and whose readiness and accuracy in portraying them to the very life, are well known, observed, in a tour through France and Germany, that the lower and anterior part of the cranium is larger in the French, the upper and anterior in the Germans, and that the upper and posterior region is larger in the former than in the latter. He was always struck with the very fine form of the skull in Italians, which coincides completely with what I have seen of them in this country." Every nation, moreover, has its peculiar cast of features: indeed, if we attend only to the natives of the British Islands, distinctions between the Scotch, the Irish, the Angle, and the families of Norman lineage, are clearly recognisable.† But

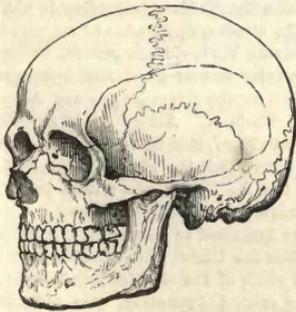
* "From the mountains of Himalaya to the Indian Ocean, including the whole of Hindoostan and the Deccan, as well as Persia and Arabia, and from the Ganges in the east, to the borders of the Atlantic, comprising the north of Africa and the whole of Europe, a similar configuration of body prevails amongst all the inhabitants, with some few exceptions. Of this, the Greeks seem to afford the most perfect model; in which, however, they scarcely exceed the type displayed, as belonging to the ancient Persians, by the sculptures of Persepolis. Complexion does not enter among the characters of this type, since it is of all shades, from the white and florid colour of the northern Europeans to the jet black of many tribes in Lybia and southward of Mount Atlas. In many races the type has degenerated: the ancient Celts appear, for example, to have had by no means the same development of the head as the Greeks, and the Indians display some differences in the configuration of the skull."—Prichard, *Hist. Phys. Mank.* i. p. 262.

† High cheek-bones, small, deeply-set, grey eyes, a large lower jaw, and a prominent chin, characterize the physiognomy of the shrewd, intelligent Scot. In the Irish, the face is broad, the cheek-bones project laterally, the nose is more or less depressed, and the eyes are small and light. An aquiline nose, thin lips, dark eyes, and a tall but slender figure, indicate the descent from a boasted line of Norman ancestry. In the peasantry, especially of our midland counties, the Anglo-Saxon type prevails: an athletic form, blue eyes, light hair, and an open expression of countenance, proclaim the Angle: in the midland counties, where the dialect has not lost its original breadth, and still retains the Anglo-Saxon words in purity, children of the peasantry may be seen, before toil has worn them, which will call to mind the words of Gregory, "Non Angli, sed angeli."

when a wider field of observation is taken, the distinctive characters, as displayed in the national physiognomy, become still more obvious. In the Jew and the Armenian, for example, a long aquiline nose, thick lips, and a long, heavy eye, are almost constant peculiarities. The Italian cast of countenance cannot be mistaken; and what that of the ancient Romans was, their busts and medallions sufficiently demonstrate. A well-formed skull, the forehead remarkable rather for breadth than elevation; eyes moderately large; a raised and usually aquiline nose; full and firmly moulded lips; a large lower jaw; and a prominent chin, distinguish the Roman; and an expression in which pride, sternness, and daring are blended, complete the picture of "broad-fronted Cæsar."

In like manner, correct ideas may be gained of the national features of the ancient Greeks, whose lineaments are not obliterated among their present descendants. In the Greek, the countenance has a more animated expression; the eyes are large; and the forehead advancing, produces a marked, but elegant, superorbital margin, on which the eyebrows are delicately pencilled; the nose, falling straight from the forehead, sometimes inclines to an aquiline form, and is often of rather more than moderate length; the upper lip is short, and the mouth delicately moulded; the lower jaw is not so large as to disturb the oval contour of the face; and the chin is prominent: the general expression, with less of sternness than in the Roman, has equal daring, and betokens intellectual exaltation.

184



Skull of Greek.

Setting aside minor points of variation, the typical characters of the skull in the Japetic, or Iranian type of the human species, may be summed up as follow:—

The cranium, of which that of a Greek (fig. 184) is selected as an example, is greatly developed, the forehead rising with a bold sweep, indicative of the volume of the anterior lobes of the brain. When viewed from above, according to the *norma verticalis* of Blumenbach, the ample swell of the anterior portion of the cranium completely hides the face, so that the facial angle is nearly a right angle. The face is small, its outlines rounded, and no part preponderating so as to disturb the harmony of its symmetrical proportions. The cheek-bones, instead of projecting greatly, as in the Mongole, fall perpendicularly below the external angular process of the frontal bone, and are small and flat, with an obliquely lateral aspect. The alveolar portion of the upper jaw is short, and regularly arched; the lower jaw is moderate, or rather small, with a well-formed chin; and the teeth are perpendicular. The depth and extent of the zygomatic fossa are inconsiderable. Modifications of

this normal form, and degrees of approximation in some branches to the Mongole, in others, even to the Negro type, are, however, to be found; serving to shew that the different ramifications of the human family verge, at certain points, towards each other, losing the strong and decided characters by which the main stems are distinguished.

A few observations may now be offered on the principal branches of the Japetic stock.

CELTIC BRANCH.—The earliest inhabitants of Gaul, Italy, Spain, and the British Islands, as far as history enables us to judge, appear, either in part or in whole, to have belonged to a race now reduced within the limits of a few isolated portions of Europe, and which has received the appellation of Celtic. The Galli, or Gael, the Cymri, Cumri, Umbri,* or Ombrici (Ομβρικοί), the Veneti, the Osismii, the Lexovii, the Nannetes, Morini, Ædui, Averni, &c., were all tribes of this great branch, the original seat of which is to be traced to Asia Minor; but of the influx of which, over the regions it occupied in Europe, no records are extant.

The traces of the Celtic tongue are widely spread, and are to be discovered in languages which might not be suspected to have the remotest connexion with it, but with the radical structure of which, it is, nevertheless, interwoven; and among these is the Latin. † The Rev. Mr.

* "Florus states, that the Umbri were the most ancient people of Italy (Antiquissimus Italiae populus, lib. i. cap. 17); Pliny, that they were deemed the most ancient nation of Italy, (Gens antiquissima Italiae, lib. iii. cap. 17); Dionysius of Halicarnassus, that the Ombrici were a nation of peculiar greatness and antiquity. Herodotus states, that the Lydian Tyrrhenians (according to him, the germ of the Tuscan race), settled among the people called, by the Greeks, Ομβρικοί, and supposed, by some of the writers, to have derived their name from their having survived the general deluge (Ομβρος, Umber, pluvia). We also learn from him, that their country was of great and indefinite extent. In the words of Niebuhr, it stretched to the foot of the Alps, for the rivers Karpis and Alps, one of which is certainly represented by the Inn, flow from the Umbrici. According to Scylax, Umbria included Picenum, as he places Ancona within its limits. From Pliny, it is farther learned, that the Tuscans took no less than 300 towns from Umbri, or, in other words, that the whole Tuscan territory had once been Umbrian. From these authorities, it is evident that the Umbri, at a remote period, occupied the greatest portion of northern Italy. The Ligurians, a nation confessedly Celtic, seemed to have shared the country with them. In historical times, these are described as possessing the upper vale of the Po, the maritime Alps, and the northern Apennines, while the Umbri were confined to the central group, the most important natural fortresses of Italy. The whole of the original population of eastern Italy, with the exception of those who took refuge in the central Apennines, was reduced under the power and influence of the Hellenic colonists, who encircled the southern peninsula with a line of Grecian cities, of surpassing wealth and magnificence,—Sybaris, Crotona, Elea, and Pæstum.

"That the Ligurians were, themselves, Ambrones, or Ombrones, is evident from the story told by Plutarch, in the life of Marius. The Ambrones came on, crying out 'Ambrones! Ambrones!' This they did, either to encourage each other, or to terrify the enemy with their name. The Ligurians were the first that moved against them, and when they heard the enemy cry out 'Ambrones,' they echoed back the word, which was their ancient name. The English reader may not know that the Cumrian name for England, is, to this day, Loigur, or Liguria."—Rev. Archdeacon Williams, *Trans. Royal Soc. Ed.* vol. xiii., 1836.

† "I speak from knowledge, when I say that the Anglo-Saxon is deeply tinged with the language of the Britons of Wales, Cornwall, and Armorica, and that the meaning of countless words, commonly regarded as pure Saxon, will in vain be sought in the forests of Germany, or the wilds of Scandinavia. Even household words, the language of every-day life, without the aid of scholars acquainted with the primitive languages of these islands, must be handed down to posterity as mystic signs, devoid of meaning."—Rev. Archdeacon Williams.

Williams (see his very interesting paper on one source of the non-Hellenic portion of the Latin language; *Trans. Royal Soc. Edinb.* vol. xiii. 1836) has satisfactorily demonstrated, that the original population of central and northern Italy, was Cumrian, or Cimbrian, cognate with the Cumri of our island; and that of this race no small part of the original population of ancient Rome consisted.

It is remarkable that the Celtic tribes of every country in Europe referred to Troy, or Troja, as the primitive seat of their race, and as the place whence they originally migrated.

The claim of the Cumri of Britain, to a Trojan origin, was maintained in the earliest ages, long before the fabrication of Geoffroy of Monmouth; and in this Trojan origin they agreed with the Veneti, the Sabines, the Latins, &c. Asia Minor was, in fact, the reputed birth-place of the Celtic stock, by common consent. With respect to Troy (a city or territory of mystery), the name of which was familiar to nations ignorant alike of Homer and his *Iliad*, the inquirer is lost in vague conjectures. In the time of Homer, 860 years A.C., its history was veiled in fable: and it is not improbable that the traditions, on which he founded his poems, had been carried far and wide by the tide of wanderers from Asia Minor, at a period antecedent to that of his existence.

Of the radical affinity between the Celtic and Latin tongues, this is not the place to treat; those who desire to pursue the subject may consult, with advantage, the excellent paper from which, in the notes, some interesting extracts have been quoted: * all here aimed at is, to prove the extent and originality of the Celtic race, and its unsuspected connexion with a people destined to influence the fates of empires, and to become the masters of the known world.

The physical characters of the Celtic race are as follow:—Hair, varying from the dark brown to pale chestnut, or reddish; eyes, brown, or bluish grey; complexion pale, the skin being white, verging to brown; stature, moderate, but robust, the body and limbs being well-proportioned, and more hairy than in other races,—the men, without exception, and sometimes the females, having the chest and epigastric region thus furnished. The forehead more or less prominent on the sides, but retreating, not ungracefully, to the temples; the nose rectilinear,

* Archdeacon Williams says (having observed that two languages may have a common vocabulary, but different grammars)—“although the grammars of the Latin and Cumrian thus entirely disagree, there is a wonderful similarity in their vocabulary, by no means to be accounted for by a supposed common descent from a Caucasian race, but approaching far nearer than the old Teutonic (or, as it is called, Moesi-Gothic tongue) does to the Homeric language. Giraldus Cambrensis, both a Cumrian and classical scholar, remarked this similarity nearly 600 years ago. It is to be remarked, that almost all the words of the British tongue agree either with the Greek or Latin. It is this strong similarity of features between their own language, and that of Greece and Italy, that has induced so many of my countrymen to scorn all examination which did not commence with this confession.”

and separated from the forehead by a depression, more or less marked, between the eyes; the beard full, and slightly rigid; the mouth moderate. Diodorus says that the Gauls were red-haired, and that they rendered this colour more intense by their habit of washing the head with a sort of lime-water: according to Strabo, the ancient Britons had the hair much less reddish, or yellow, than the Gauls, and were of taller stature. The Celtic dress consisted of tunics, brachæ or pantaloons, and cloaks, of party-coloured woollen cloth, the colours being sometimes in stripes, but mostly in chequers, of which the tartan, still called the garb of old Gaul, to this day, affords an example.

PELASGIC BRANCH.—If the remote history of Italy be so obscure, and bring us into contact with a race now almost forgotten, widely as it was once diffused, the history of Greece is no less shrouded in darkness. The Cyclopean structures, the massive ruins of which still exist, tell of a rude but energetic people, who, ignorant of architecture as a science, trusted to the weight of uncemented blocks of stone, for strength and durability in the structure of their walls and temples. At a later period than that in which the Cyclopean works were erected, we hear of the Pelasgi, and of the Hellenic and Achæan tribes, into which the former appear ultimately to have merged. To the Pelasgi the building of many cities is attributed. The common name of a Pelasgian fortress was Larissa (perhaps from *λαας*, a stone, and *ῥαιω*, *ῥαισω*, to hammer, or hew*), and Fynes Clinton states, that seventeen places, bearing this name, may be traced, most of which, probably all, were built by the Pelasgi. Herodotus says, “The Lacedæmonians were of the Doric, the Athenians of the Ionic race, formerly called Pelasgians and Hellenians, of whom the former had never migrated, the latter often: for, in the time of King Deucalion, the Hellenians inhabited the region of Phthiotis; but under the reign of Dorus, the son of Hellenus, they possessed the country called Histiaëotis, beneath Ossa and Olympus; from which being driven by the Cadmæans, they dwelt near Mount Pindus; thence they passed to Dryopis; and, afterwards, entered the Peloponnesus, where they were called Dorians. What language the Pelasgians spoke, cannot certainly be determined; but, if a conjecture were hazarded, it would be that it was a barbarian tongue. This opinion is supported by the fact, that the remains of the Pelasgians, who inhabit Crotona, a city beyond the Tyrrhenians, and who formerly were neighbours to the Dorians, inhabiting the country now called Thessaliotis, speak a language altogether different from that of any of the surrounding people. The same may be said of those Pelasgians who founded the cities of Placia and Scylace, on the Hellespont, but who once lived with the Athenians; and of the inhabitants of

* The signification of Larissa may be, a fortress of dressed stones, in opposition to the Cyclopean masses, which were superseded by those of the Pelasgians.

other Pelasgian towns, who have changed their names: all these people speak the same language, and which is unintelligible to their neighbours. If this conjecture be well founded, it will follow that the Athenians, who were of Pelasgic origin, lost their original language, and adopted that of the Hellenians, when they came among that people, while the other Pelasgians have retained their language without alteration. Few and feeble when they separated themselves from the body of the Pelasgians, they augmented their numbers and strength, by incorporating with other tribes of barbarians, which the Pelasgians, not doing, have never increased."

Again, he says, "the Ionians, so long as they dwelt in that part of the Peloponnesus now called Achaia, and before the time when Danaus and Xuthus came into Peloponnesus, were, as the Greeks affirm, called *Ægialian Pelasgians*, but afterward Ionians, from Ion, son of Xuthus:" and, further, "the Athenians, when the country now called Greece was possessed by the Pelasgians, were also Pelasgians, and bore the name of *Craanaans*; but, under their king, Cecrops, they were called *Cecropians*; and when Erechtheus assumed the supreme power, they changed that name for the appellation *Athenians*. Afterwards, Ion, son of Xuthus, being their general, the Athenians were, from him, called *Ionians*."

The Achæans, it would appear, expelled the Ionians from the Peloponnesus, or a great portion of it, usurping the twelve cantons, into which the latter had divided it. Pausanias regards the Pelasgi as originally Siceli, *Σικελοί*, who had passed over into Acarnania. Whoever the Pelasgi, the Hellenes, the Achæans, and other tribes of early Greece were, it is vain, now, to pretend to decide. As respects the Pelasgi, indeed, Archdeacon Williams says, that they were everywhere to be found; viz., "in Asia, in Crete, in the other islands, in Thrace, Thessaly, Epirus, Peloponnesus, and Italy; but it is impossible to prove that they were a race distinct in blood from the older inhabitants of these countries. The word, distorted as it has been by various attempts at etymology, seems a very simple compound of the two words, *πελα* (*pela*), the old Macedonian for a stone, and *ασκειν* (*askein*), to work or dress with care. These two words would form *πελασκος* (*pelaskos*), which, by a slight change in pronunciation, would become *πελασγος* (*pelasgos*). It is clear that they belonged to that race—call them Trojans, Pelasgians, Thracians, Phrygeans, or any other equivalent name—who sunk under the superior energies of the Achæan and Hellenic races."

Thus compounded, originally, of distinct tribes, more or less immediately related to each other by consanguinity, appears to have been the population of Greece, which long continued divided into independent states. Of these tribes, and especially of the Hellenic, offsets branched out into Italy, colonizing its eastern portion, and founding cities, now known by name alone: of the earliest of these, were Arpi and Canusium;

of which latter the walls, as appears from the remaining vestiges, must have embraced a circumference of sixteen miles. From the civilizing influence of the Hellenic colonists, the manners, laws, language, arts, and religion of the aborigines of ancient Italy took a deep impression; insomuch that the Lucanians, a mountain tribe and the natural and hereditary enemies of the Greek colonists, acquired the Hellenic language to such a degree, that their ambassador filled the popular assembly at Syracuse with surprise and enthusiasm by his pure Doric: nor, as Niebuhr states, "would the authors of Pythagorean treatises have used the titles of imaginary Lucanians, had it not been notorious that this philosophy had found reception there, or had it been unusual for Lucanians to write Greek." Of the influence of the Hellenic on the Latin nothing need be said.

On the physical characteristics of the Greeks, the typical examples of the Pelasgic section, but few observations are requisite: the beautiful contour of the skull and of the face, and the harmony of their propor-

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Head of Apollo Belvidere.

tions, have been already described: a moderate stature; dark, flowing hair; a white skin, more or less tinged with olive or dusky brown; large eyes, overshadowed by the superciliary ridge, which rather described a transverse straight line, than a double arch; a straight or gently aquiline nose, falling directly, with but a slight depression between the eyes, from the forehead; and a short upper lip,—are among their distinguishing

features. It has been also observed, that, in the ancient statues, the feet are proportionately larger, and the limbs less slender, than comports with our ideas of modern European beauty. As an illustration of the Greek style of head, that of the Apollo (fig. 185) has been selected; not, indeed, that it was a copy of any individual of that nation; but, what is far more important, it embodies the conceptions of the Greeks themselves, with respect to physical excellence, and intellectual greatness; it is an exalted or deified personification of the Greek physiognomy, such as the sculptor contemplated it in his countrymen, and it exhibits all the peculiarities of the Greek type. The forehead is ample and prominent; the superorbital line is boldly marked; the nose, broad between the eyes, falls gracefully from the forehead; and the nostrils, somewhat expanded, as if from intense eagerness, or proud disdain, are large, but delicately turned; the eyes are large, open, and separated to a considerable distance from each other,—this being the contrary to what is observable in the Ape tribe, where the eyes approximate closely: the inner angle, besides, instead of being the lowest, is rather the most elevated; this conformation being the reverse of what is seen in the Mongole style of countenance, in which the eyes are linear and oblique, the outer angle being decidedly the most raised. It is this elevation of the inner angle, to which their dignified expression, so remote from that of low cunning, is mainly to be attributed; and it is a character essential to the pure Japetic model of physical eminence. The mouth is moderate, the lips are beautifully chiseled, and the chin is full and prominent. The lower part of the face is subordinate to the upper part, and to the forehead, so as to produce an expression as remote as possible from that of the brute, but yet to convey no ideas of mental debility, which a retreating chin, an undeveloped lower jaw, and a very small mouth, with lips destitute of a marked outline, infallibly produce. This harmony, between the upper and lower parts of the face, is conspicuous in all the Greek representations of heroes, or of deities.

The Roman countenance was distinguished by the more aquiline form of the nose, and by less delicacy of outline: the depression between the nose and forehead was decided, the lower jaw was larger, and the chin more prominent. The Romans, however, were a people of mixed races, the Pelasgic stock having been ingrafted with offsets from other sources. With regard to the religious rites and opinions of the Pelasgic race, they were, to a great extent, of Egyptian origin.*

* "Almost all the names of the gods came into Greece from Egypt: for, upon inquiry, I found them to be of foreign extraction, and, I think, for the most part, from Egypt; for, as I have said, excepting Neptune, and the Dioscures, Juno, Vesta, Themis, and the Graces, and the Nereides, the names of all the other gods have existed from the remotest ages in Egypt. I report, at least, what the Egyptians themselves told me. And those gods, of whom they profess not to know the names, received appellations, as I think, from the Pelasgians,—except Neptune; for the knowledge of this god came from Lybia, for the name of Neptune existed anciently among no people but the Lybians, who have always honoured him as a god. As to the heroes, the Egyptians do not celebrate their

TEUTONIC BRANCH.—The northern regions of Europe were anciently occupied by various sub-divisions of the Teutonic race, which differed from the Celtic, and was destined to overwhelm the fairest provinces of the Roman empire. The physical traits of the Teutonic race are, blue eyes, light hair, a fair complexion, lofty stature, and an athletic form. The strength and courage of the men rendered them formidable in battle, and often gave them the advantage over troops far better armed and instructed in military evolutions. The native tribes of Germany and Scandinavia were anciently termed Goths (Visigoths, Ostrogoths, Teutones), Vandals (Heruli, Longobardi), Suevi, Allemanni, Marcomanni, Franks, Germans, Saxons, Angles, &c. To particularize the eruptions of these tribes from their northern fastnesses, and trace their southern progress, is the work of the historian, rather than the naturalist. Suffice it to say, that they have gained for their descendants the richest territories in Europe. Their language, in Germany, Holland, Denmark, Sweden, Norway, and England, preserves more or less of its original character; but, in the more southern nations of Europe, it became blended with the Latin, giving birth to the French, Italian, Spanish, and Portuguese.

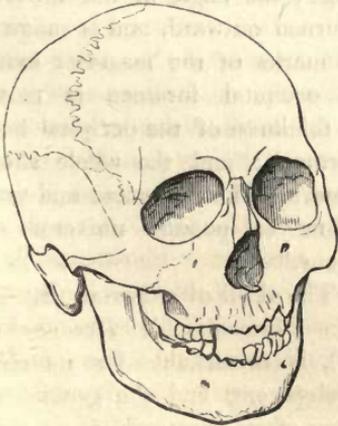
SCLAVONIC BRANCH.—Another distinct race, or nation, is the Sclavonic. From the earliest times the race of Sclavonians have inhabited the regions of Russia, Lithuania, Poland, Moldavia, Wallachia, Bulgaria, and Sclavonia, or ancient Pannonia and Noricum; namely, the wide extent of territory between the Inn, the Danube, and the Save. The tribes into which the Sclavonic race was anciently divided, were very numerous; but their language and physical characters bespoke an origin in common: with regard to the former, it was harsh and irregular. As respects form and appearance, the Sclavonians approached, in some degree, to the Tartar family; from which, however, as Gibbon states, they deviated toward the German, but without attaining the lofty stature and fair complexion of the latter. According to the same authority, 4,600 villages were scattered over the provinces of Russia and Poland; and the huts of which they consisted were hastily built, of rough timber, in a country deficient both in stone and iron. Flocks and herds constituted their chief possessions; but they also cultivated the ground, and sowed millet and panic (*panicum milium*). As a supreme God, they adored an invisible master of the thunder; the rivers and the nymphs obtained their subordinate honours; and the popular wor-

festivals. These, and some other practices, the Greeks received from the Egyptians; but some, also, from the Pelasgians, who first taught them to the Athenians, and they to the rest of the Greeks. For the Pelasgians and Athenians, who were then first numbered among the Greeks, occupied, together, the same region; whence it happened that the former were also reckoned to be Greeks. . . . They designated the gods only as Theoi (founders), because by them all things were established, and distributed throughout the world; but, after a long course of time, they learned the names of the gods from Egypt, and, last of all, that of Bacchus."—*Herodotus*.

ship was expressed in vows and sacrifices. The Slavonians disdained to obey a despot, a prince, or even a magistrate; but their experience was too narrow, and their passions too headstrong, to compose a system of equal law, or general defence. Some voluntary respect was yielded to age and valour; but each tribe, or village, existed as a separate republic; and all must be persuaded, where none could be compelled. They fought on foot, almost naked, and, except an unwieldy shield, without any defensive armour: their weapons of offence were, a bow, a quiver of small poisoned arrows, and a long rope, which they dexterously threw from a distance, and entangled their enemy in a running noose.* In the field, the Slavonian infantry were dangerous, from their speed, agility, and hardiness: they swam, they dived, they remained under water, drawing their breath through a hollow cane; and a river or lake was often the scene of their unsuspected ambuscade. Such were the ancient Slavonians, from which the mass of the population of Russia (in Europe) and Poland has descended.

TARTARIC BRANCH.—Under the Tartaric section of the Japetic stock are included the Turkomanic hordes and Kirguises, in the wilds bordering the east of the Caspian Sea, and surrounding the Sea of Aral, extending from the north of Persia to the mountain chain (the Algydim Schamo Mountains, lat. 50° north), and thence stretching eastward, through Longaria, between the Little Altai Mountains and the Great Altaic chain, which latter forms the northern boundary of the Great Desert of Cobi. To the same section, also, the Turks are assigned, by

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Skull of Kirguise.

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Skull of Don Cossack.

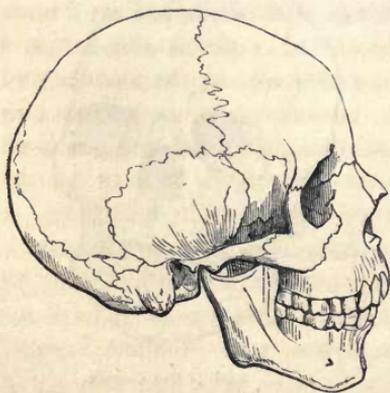
most writers; but this nation will be mentioned hereafter. The Cossack tribes of the Don and Volga seem also to form an offset of the

* This instrument, the lasso of the South American Spaniards, is still employed in the Pampas.

Tartaric branch, or to be a mixed people, between the Tartars and the Slavonians. In physical characters, the Tartaric nations may be regarded as intermediate between the Japetic and Mongole stocks of the human race. Their form is robust and athletic, with the lower limbs short and bowed; their complexion is deep olive; the upper part of the face is broad and flat; the eyes are small, deeply set, and remote from each other; the eyelids are thick; the nose is depressed, and often apparent only by the nasal orifices, which seem as if isolated, in a face wrinkled and furrowed, even in youth; the cheek-bones are very prominent; the hair is long, straight, and black; the eyebrows are bushy; the beard is thick, especially on the upper lip. The whole of the physiognomy is repulsive.

The preceding skull of a Kirguise (fig. 186) is from the *Decades* of Blumenbach (tab. xiii.) The breadth and flatness of the upper part of the face are very conspicuous; as is also the prominence of the zygomatic arches: the forehead is narrower than in most skulls of the Mongole race; the orbits are deeper, and with a more frowning superciliary ridge; the glabella is protuberant; the nasal ridge is narrower and more elevated than in the Mongole. The skull of a Don Cossack (fig. 187), from the same work (tab. iv.), is also very remarkable: "Habitus in totum horridus," is the expression of Blumenbach, and with justice: the orbits are very deep, broad, and depressed; the aperture of the nose is broadly patulous; the superciliary ridges meet at the glabella, which has no smooth hollow, and are boldly prominent; the external orbital processes are salient, and the marginal rim, sweeping from them, and bounding the temporal muscle, forms an acute ridge; the angle of the lower jaw

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Skull of Tartar.

is turned outward, and is rough with the marks of the masseter muscle; the occipital foramen is narrow; the thickness of the occipital bone is enormous; and the whole skull is of marble-like denseness and polish: "Hinc et pondus universi cranii augens."

The skull of a Tartar (fig. 188), from Blumenbach's *Decades* (tab. xii.), is remarkable for its elegant development, and the general symmetry of its form, which approaches the best models of the Japetic stock,

having little of the repulsiveness of the skull of the Don Cossack, or of the breadth and flatness of the upper part of the face, so remarkable in the Kirguise.

The ancient Scythians, so formidable of old, may be regarded as a branch of the Tartaric stock, together with the Alani, a fierce, pastoral people, who, in former times, covered with their tents the plains between the Volga and Tanais, and who penetrated into the wilds of Siberia to the north, and pushed their southern inroads to the confines of India and Persia; but who, after a desperate struggle, sank at length beneath the overwhelming power of the Huns. To the same stock the ancient Getæ and Sarmatians appear to be also referable.

“Among the various branches of the human race,” says Gibbon, “the Sarmatians form a very remarkable shade, as they seem to unite the manners of the Asiatic barbarians with the figure and complexion of the ancient inhabitants of Europe. According to the various accidents of peace or war, the Sarmatians were sometimes confined to the banks of the Tanais, and they sometimes spread themselves over the immense plains which lie between the Vistula and the Volga. The care of their numerous flocks and herds, the pursuit of game, and the exercise of war, or, rather, rapine, directed the vagrant motions of the Sarmatians. The moveable camps, or cities, the ordinary residence of their wives and children, consisted only of large wagons, drawn by oxen, and covered, in the form of tents.” The military strength of the nation consisted of cavalry: their cuirass was composed of polished slices of horses’ hoofs, laid, scale-like, over each other, and sewed on coarse linen; their offensive arms were daggers, lances, and poisoned arrows, the points of which were of bone, and anointed with the venom of the viper.

Of this tribe the most numerous and warlike family was that of the Jazygæ, who, in the time of Pliny, were settled on the banks of the Tibiscus.

The habits of the ancient Scythians are well described by Herodotus: their territories, embracing a square of 4,000 stadia, or 400 Roman miles, were confined, on the west and south, by the Danube and the Palus Mæotis; they were a fierce nomadic people, divided into distinct tribes, and essentially pastoral, subsisting on milk, and the flesh of flocks and herds. According to Herodotus, beyond, or to the north-east of the Scythian territories, after traversing a rude wilderness, a range of mountains occurs (perhaps a branch of the Little Altai), inhabited by a nation said to be bald (perhaps nearly beardless), “with flat noses and broad chins, and who speak a language peculiar to themselves:” in short, as may be presumed, a people of Mongole lineage, but of whom little was known. The same may be said, also, respecting the Hyperboreans, with whose existence [the ancients were acquainted. Many of the usages of the ancient Scythians remind us of those of the indigenes of America. Herodotus states, that every warrior drank the blood of the first man he slew in battle, and cut off the heads of all

overthrown, which he carried to the king ; for, not until he had brought a head, was he allowed to take his share of the booty : they were, also, accustomed to scalp their enemies, preserving the skin with the hair on ; and to make drinking-vessels of their skulls, covering the outside with a piece of leather, and lining the inside (if able to afford it) with gold.

Modern Turkey is possessed by a people descended from the Turkomans, a Tartar race, the name of which, though it long slept in obscurity, was destined to become of fearful celebrity.*

Gibbon thus records their rise, and the circumstances of their migration from the Altaic Mountains ; their original country being that now occupied by the Calmucs.† “ At the equal distance of 2,000 miles from the Caspian, the Icy, the Chinese, and the Bengal Seas, a ridge of mountains is conspicuous,—the centre, and, perhaps, the summit of Asia,—which, in the language of different nations, has been styled Imaus, and Caf, and Altai, and the Golden Mountains, and the Girdle of the Earth. The sides of the hills were productive of minerals ; and the iron-forges, for the purpose of war, were exercised by the Turks, the most despised portion of the slaves of the Great Khan of the Geougen. But their servitude could only last till a leader, bold and eloquent, should arise to persuade his countrymen that the same arms which they forged for their masters might become, in their own hands, the instruments of freedom and victory. They sallied from the mountain (of Irgana-Kon) ; a sceptre was the reward of his advice ; and the annual ceremony, in which a piece of iron was heated in the fire, and a smith’s hammer was successively handled by the prince and his nobles, recorded for ages the humble profession and rational pride of the Turkish nation. Bertezena, their first leader, signalized their valour and his own in successful combats against the neighbouring tribes ; but when he presumed to ask in marriage the daughter of the khan, the insolent demand of a slave and mechanic was contemptuously rejected. The disgrace was expiated by a more noble alliance with a princess of China ; and the decisive

* “ Some tribes of the Turkish, or Tartar race,” says Dr. Prichard, “ display a conformation of features similar to the Mongole class.”—See Prichard’s *Researches*, vol. i. p. 306.

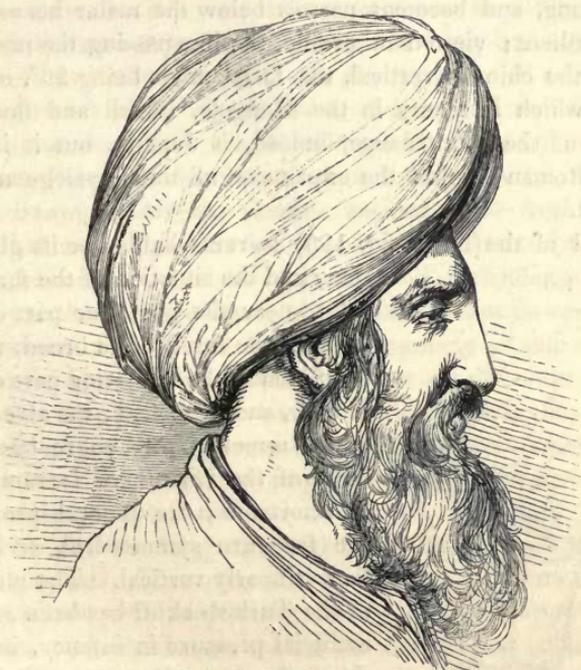
† “ The tradition of the Moguls, of the 450 years which they passed on the mountains, agrees with the Chinese periods of the history of the Huns and Turks (*de Guignes*, tom. i. pt. ii. p. 376), and the twenty generations, from their restoration to Zingis.”—*Gibbon*. “ From the spacious highlands between China, Siberia, and the Caspian Sea, the tide of emigration and war has repeatedly been poured. These ancient seats of the Huns and Turks were occupied, in the twelfth century, by many pastoral tribes, of the same descent and similar manners, which were united and led to conquest by the formidable Zingis.”—*Ibid*. The description of Attila, king of the Huns, whose features bore the stamp of his national origin, is that of a genuine Mongole. Gibbon speaks of an embassy, in the reign of Justin, from Constantinople to the Turkish monarch Disabul. The duration and length of the journey, from the Byzantine court to Mount Altai, he observes, are not stated in the account ; but the reception of the Roman ambassadors is narrated in detail. “ After they had been purified with fire and incense, according to a rite still practised under the sons of Zingis, they were introduced to the presence of Disabul,” &c.

battle, which almost extirpated the nation of the Geougen, established in Tartary the new and more powerful empire of the Turks. They reigned over the north, but they confessed the vanity of their conquest, by their faithful attachment to the mountain of their fathers. The royal encampment seldom lost sight of Mount Altai, from whence the river Irtysh descends, to water the rich pastures of the Calmucs."

The conquests of the Turks were rapid and extensive; till, at length, A. D. 1453, the Byzantine empire yielded to the Ottoman,* Constantinople fell, and the victorious crescent glittered on the dome of St. Sophia.

From this account, we should be led to conclude that the tribe, or people, from whom the modern Turks are descended, were of mixed blood, Tartars and Mongoles; to which latter the Huns certainly belonged—a conclusion warranted by the records, as far as they can be obtained, of their earliest history. How far the characters of the Mongole type were discernible in the tribes which first spread over Asia Minor,

189



Modern Ottoman.

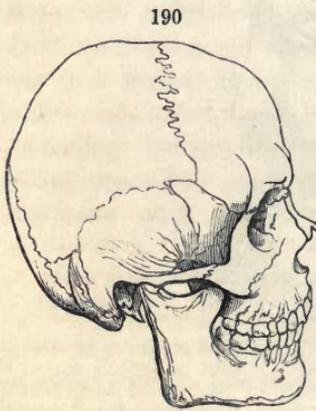
it is impossible to say; but, after their national consolidation, their intermixture with the Mingrelians, Georgians, and Circassians, as well

* The founder of the Ottoman dynasty was Thaman, or Athman, whose Turkish name has become modified into the appellation of the Caliph Othman: he was the son of Orthrogul, a soldier of Aladin. The father of Orthrogul, Soliman Shah, was drowned, in attempting to cross the Euphrates.

as with the natives of Greece, or the Eastern Empire, would soon eradicate the impress of such an origin, if it existed. That the amelioration of their features, as compared with those of the nomadic Turkomans, is thus to be accounted for, there can be but little doubt. The latter, generally supposed to be of the race, if not of the tribe of the Ottomans, are a wild and wandering people, inhabiting the borders of the Caspian, and distinguished by a tall, athletic figure, a flat nose, square face, and swarthy complexion.

The preceding figure (189) gives a good idea of the physiognomy of the modern Ottoman. The forehead is straight, and does not advance so boldly as in the Greek, yet it is well formed; the brow and the interorbital space, or glabella, above the root of the nose, is prominent; the nose is long and aquiline, not elevated as in the Roman, but falling more decidedly in a line with the forehead. The eyes are remote from each other, and large, and the inner and outer angles are on the same level; the upper lip is short, the chin full, but the distance of the chin from the angle of the lower jaw is very inconsiderable: the face, viewed in front, is long, and becomes narrow below the malar bones, which are moderately salient; viewed in profile, the line passing the nose, from the forehead to the chin, is vertical, the facial angle being 90° , or nearly so. The beard, which is scanty in the Mongole, is full and flowing. The whole style of the countenance, indeed, is Japetic, but it is neither of Greek nor Roman mould: the expression of the physiognomy is grave and dignified.

The skull of the Turk (fig. 190) is remarkable for its globular contour, and the situation of the foramen magnum, near the posterior part of the basis cranii; the forehead is broad, the glabella prominent; the posterior part of the head is high, and expanded; the alveolar portion of the upper jaw is abbreviated, and the basis of the lower jaw is remarkable for its shortness; the general proportions of the face are symmetrical, and the facial line is nearly vertical. The globular form of the Turkish skull has been attributed to artificial pressure in infancy, in order that the turban, usually worn, might be more accurately fitted to the head. For this



Skull of Turk.

opinion, however, there appears to be no good foundation.

It may here be observed that the precise distinction between the nomadic tribes which occupied the central deserts of Asia, especially in remote periods, is almost impossible to be ascertained; nor much less so,

when, issuing from their wilds, in successive hordes, and all alike termed Tartars (a word of fearful sound), they overrun the civilized world, which was almost ignorant of their existence, till called to meet them in arms, or purchase their forbearance. To the confusion which the common designation of Tartars has occasioned between nomadic tribes of distinct lineage, and physical characters, there will be again occasion to allude.

CAUCASIC BRANCH.—Under the distinctive appellation of Caucasian is alone included the race, so celebrated for form and beauty, which occupies the Caucasian chain, between the Euxine and the Caspian Sea, and the territories to the south-east, almost to the Euphrates. In the perfection of their form, and the symmetrical and graceful proportions of the skull, the Georgians, Circassians, and Mingrelians have ever been conspicuous; and it is from among the females of these people that the harems of the Turks, the Persians, and the inhabitants of Cashmere, have been supplied with wives and concubines; and to this intermixture these nations owe their physical excellences.

“Le sang de Géorgie (says Chardin) est le plus beau de l’Orient, et, je puis dire, du monde. Je n’ai pas remarqué un visage laid en ce pays-là, parmi l’un et l’autre sexe, mais j’y en ai vu d’angéliques.”

The same observations apply to the Circassians. The face is oval; the eyes large and dark; the eyebrows slender and arched; the nose straight; the mouth small; the hair long, black, and fine; the complexion, especially of the females, white and clear.

SEMITIC BRANCH.—Of the Semitic nations—the Arabs, Hebrews, Assyrians, Chaldeans, &c.—the following are the characteristics: an oval face, with a pointed chin, and elevated forehead, a slender aquiline nose, large dark eyes, arched eyebrows, a well-formed mouth, and long black hair, compose the marked and noble physiognomy of the Arabs: such were, probably, the features of the Israelites of old; but their intermarriages with the females of the nations and tribes they conquered, and of which they often exterminated all the males, doubtless, tended materially to alter their original physiognomy; while, from an opposite cause, namely, their national overthrow, and their captivity in Babylon, their ancient language became obsolete, and that of their conquerors adopted. The early history of the Israelites presents us with a nomadic race of shepherds; and it does not appear that their original habits were abandoned during the first period of their sojourn in Egypt, until the establishment of a new dynasty, when they were treated as slaves, and forced, by the power of a jealous Pharaoh, to labour for the state, or for his pleasure. After their escape from Egypt, they necessarily became predatory and warlike, wandering in the midst of hostile tribes, by whom they were beset on every side, until their establishment in Jerusalem and other cities of Judea, and their inter-

mixture with the previous inhabitants, from which epoch their national consolidation is to be dated. The Arabs were, originally, a fierce nomadic race, and certain tribes* among them have never relinquished their ancient habits: nevertheless, the Arabs founded an empire; attained to a high state of civilization; extended their conquests over Persia, Syria, Egypt, the North of Africa, and Spain. Under the Caliph, Almansor, and his successors, they rose to eminence in arts, learning, and poetry; and, during the period in which Europe was immersed in ignorance, they cultivated, with success, the sciences of astronomy and medicine; that of chemistry may be said to have been born and nurtured among the Saracens. They first invented and named the alembic, for the purposes of distillation; tried the distinctions and affinities of alkalis and acids; and converted minerals into medicines. But the objects of the most eager search among Arabian chemists were, the formation of gold by the transmutation of metals, and the elixir, or balm of immortal health: in these pursuits the reason and the fortunes of thousands were evaporated in the crucibles of alchemy; while the consummation of the great work was promoted by the worthy aid of mystery, fable, and superstition.

The religion of the Arabs was anciently, perhaps, theism; but the worship of the sun, the moon, and the stars, was early adopted; and the Caaba, or celebrated temple of Mecca, was adorned with 360 idols, of Men, Eagles, Lions, and Antelopes, among which was the statue of Hebal, of red agate, holding in his hand seven arrows, without heads or feathers. At length arose the founder of a new religion, Mahomet, the success and wide prevalence of whose doctrine, in Asia and Africa, and the fanaticism of whose followers, it is the province of history to record.

The modern Persians are a mixed race. Persia was overrun by the Arabs, who abolished the Magian worship, and established that of Mahomet; it was overwhelmed by the armies of the Mogul monarch, Holagou Khan, the grandson of Zingis, whose successors possessed the throne till the death of Abosaid, which left the country without a lawful sovereign, and open to the victorious arms of Timour. Of the Guebres, or Guares, the descendants of the ancient inhabitants of Persia, little is known. According to Chardin, they are an ill-shaped, dull race, and of an olive complexion. Their worship is said to resemble that of the ancient Persians, who thought it unlawful to form images, or to construct temples or altars, not believing the gods to be allied to humanity. Hence it was their custom to ascend the highest mountains, and there perform sacrifices to an immortal power, visibly personified in the heavenly bodies.

The old language of Media, according to Anquetil du Perron, and Professor Rask, was Zend, the language of Zoroaster; afterward, the

* The roving Bedouins of the desert are true examples of the nomadic Arabs.

Pahlavi was spoken, and flourished during the reign of the Parthian dynasty. The modern dialect of the Guebres is the Pársí, a language, as Professor Rask affirms, evidently borrowed from the Zend, to which alone the names of beings, implements, ceremonies, &c. belonging to the Pársí religion are to be retraced. The opinion of some writers, and among them Mr. Erskine, that the Zend was a dialect of the ancient Sanscrit, is repudiated by Professor Rask: "The grammatical structure, or system of inflections, in the Zend," he observes, "corresponds not only with the Sanscrit, but, in some instances, with the Phrygian class of languages; that is to say, the Greek and Latin, with their different dialects: in others it is quite peculiar, which seems to shew that it is a distinct language, to be arranged between the Sanscrit and Greek."

SANSKRITIC BRANCH.—Bory St. Vincent regards the Hindoos as forming a distinct species, to which he has given the designation of *Homo Indicus*. The cradle of this species he places among the sources of the Indus and Ganges, among the high chains of the Himalaya, whence they descended along the course of the rivers, peopling the Indian Peninsula. Allowing this not improbable theory, it may be asked, was the Sanscrit the language of this mountain-sprung race, or has its progress been interrupted by a stream of Sanscritic wanderers from another quarter? With respect to the Sanscritic language, the parent of so many of the dialects of India, Professor Rask regards it as of foreign importation; not the aboriginal language of India. It is remarkable, he observes, that many learned men, amongst whom is Sir W. Jones, have supposed that Sanscrit was introduced as a foreign language in India, from Iran; and this is much more likely than that it is an original language of India, on the supposition that the great conquest, or migration, which spread Sanscrit all over the northern and by far the most extensive part of India, had taken place before the existence of historical records; for, according to Professor Rask, all the modern dialects of Hindústán, as well as the Guzeratí and Mahratta, are chiefly derived from the Sanscrit, and, consequently, this must have been introduced into India before those dialects originated, just as Latin must have existed in Spain and Gaul, long before the modern Spanish, Portuguese, and French were formed. The grammatical structure of the Telegu, Tamil, Carnatica, and Malayal'ma, which he regards as those of the aboriginal tribes, agrees exactly with the Finnish and Tartar, in Northern and Central Asia, whence he supposes that one great race of men, which may be styled the Scythian, in the most ancient times, extended from the Frozen Sea to the Indian Ocean, until the chain was broken by a great inundation of people of our own race, which he calls the Japetic, and which, issuing from eastern Persia, took possession of somewhat more than Hindústán. It is remarkable that the above-mentioned Indian aborigines of Malayalam, of Carnata, of

Sholen, of Telingana, &c., are now situated in the southern extremity, and along the eastern coast of the country; and it appears most likely that they were driven into that situation by the torrent of a warlike people from the west. Another circumstance, in the opinion of Professor Rask, tends to corroborate this hypothesis, namely, that although the northern dialects of India are all derived from the Sanscrit, they yet contain a number of words of uncertain origin, most of which will be found in the Tamil and other dialects of the south; and therefore seem to be remnants of the language of the aborigines, who were not altogether exterminated or expelled, although greatly overpowered. In the same way Gallic words occur in modern French, which properly belong to Welch or Erse. (See Prof. Rask on the Zend language; *Trans. Royal Asiatic Soc.* vol. iii. 1835.) Professor Rask's opinion is corroborated by Arrian, who, in his Indian History, says: "The whole country of India is divided into 122 nations, according to Megasthenes. Like the Scythians, the Indians were, anciently, a wandering race,* and until Bacchus, or Triptolemus, made a conquest of them, tilled no lands, and had neither houses, towns, nor temples; clothed themselves in the skins of wild beasts; ate of the fruit of the tala, a palm tree, and of the flesh of animals of the chase. Bacchus built them cities; gave them laws; taught them agriculture, and the use of wine, as he had taught the Greeks, and how to yoke their oxen to the plough. He also instructed them in military-discipline; the worship of the gods, to be performed with drums and cymbals; he introduced the satyric dance, and the custom of suffering the hair to grow." Lieut. Colonel Todd observes, that the Adnat'h or Búdha of the Jains, or Buddhists of India, the patriarch of the Yadu race, is the counterpart of this Bacchus, or Triptolemus, whom they bring from central Asia, to espouse Ella, daughter of Súrya, and sister of Manu, or Menes, the first sovereign of India: and he further remarks that, according to the traditions of the Indians, India was colonized by a race called Yadu, to which they trace the foundation of their ancient cities. Pooru continued to be the patronymic of the Yadu race, until a family of the more distinguished name of Cúru took the lead, whose struggle to maintain their pre-eminence, which was contested by the sons of Pandu, another celebrated chief, caused that civil strife termed the Máhabhárata, which ended in their dispersion. The appellation, Porus, appears to have distinguished more than one of the kings of India, during the Macedonian invasion, and originated from the Poori of Yadu race.

The claim of the Hindoo, or Sanscritic family, to the Japetic, or Iranian stock, appears to be confirmed by most writers who have

* The Bringarees of the present day are a nomadic people, moving with immense herds of cattle, and employing bullocks to carry the grain and necessary provisions of their armies.

entered into the ancient records of India: their earliest legends are interwoven with, or parallelized by, those of Greece; insomuch that, when Alexander invaded India, he found abundant sources of analogy, in the theogonies of the Indians and of his own country, to amuse his veterans.

191



Skull of native of Hindostan.

(For some interesting historical details on the subject, see Lieut. Col. Todd's "Comparison of the Hindu and Theban Hercules," *Trans. Royal Asiatic Soc.* vol. iii. p. 139.)

The annexed sketch (fig. 191) is the skull of a native of Hindostan, which can only be referred to the Caucasian model. It is of light and delicate structure, rather globular, with a prominent occiput, and small cheek bones. A large os triquetrum intervenes between the occipital and parietal bones, but this is merely accidental.

The characters of the Hindoo people may be thus summed up:—In stature they are moderate, or under the middle size; their complexion is yellow, with a tinge of bronze; their figure is delicate and slender; the nose is straight and well formed, never flattened, nor with protuberant nostrils; the mouth is moderate, the lips are thin; the chin is round, and generally dimpled; the eyes are large, with arched brows, and long eyelashes; the iris is usually black; the cornea somewhat yellowish; the ears are of moderate size, and well made, but often distorted with heavy ornaments; the hands and feet are small; the palms of the hands are nearly white; the skin is fine; the hairs of the head are long, black, fine, and glossy; the beard, except on the upper lip, is scanty. Of the people inhabiting the Dukhun, Colonel Sykes states that they have the Georgian form of skull, a low stature, and a complexion of brown, with shades running into yellow—white in the higher classes, and black in the lower.

MIZRAIMIC BRANCH.—The observations on this branch of the Japetic stock, to which is here appropriated the distinctive epithet Mizraïmic, may be commenced by a brief notice of the ancient Egyptians.

The Egyptians of antiquity, respecting whose race and affinities so many opinions have been hazarded, and who have, by some, been regarded as of Negro lineage, or, at least, as appertaining to that division of the human family, are to be referred—if the skulls of the mummies still preserved, and the character of the hair, constitute a criterion—to the Japetic stock.

Herodotus, indeed, assigns to them the physical peculiarities of the

Negro race ; namely, a black complexion, and woolly hair.* Other writers, as Æschylus and Lucian, describe the Egyptians as being black ; the latter, in the description of an Egyptian belonging to the crew of a vessel trading at the Piræus, pictures a genuine Negro,—black, with projecting lips, very slender legs, and with the hair and curls bushed up behind, the indication of a state of slavery. But it may be conjectured that the individual, though, perhaps, Egyptian by birth, was of a tribe very different from the true Egyptians, a tribe held in a state of bondage. Ammianus Marcellinus calls the Egyptians subfusculi, or brownish, and atrati, or blackened ; and in certain documents of a commercial nature, which are still extant (the fac-simile of one of these is at Berlin ; the original of the other, at Paris), one individual is described (for the external appearances of the buyers and sellers are noted) as being *μελάγχρως*, of a black or dusky complexion ; the other, *μελίχρως*, of a tawny, or honey colour. The shape of the nose, and the general cast of the features, are also detailed, but not in terms applicable to the Negro.

In the paintings and sculptures of the ancient Egyptians, which may be at least regarded as national representations, nothing can be discovered positively indicative of the Negro cast of physiognomy, though its expression and contour are peculiar. The colour of the face is usually painted of a bronze red, or light chocolate, verging to tawny yellow in the females. The figures of the men are slender, but well proportioned ; while those of the females are graceful and delicate. Indeed, in the figures, both of the males and females, we are strongly reminded of those of the Hindoos. That other people, besides the true Egyptians, are portrayed and sculptured on the relics of Egyptian antiquity, cannot be doubted. Blumenbach considers that three distinct varieties of physiognomy are to be seen in these works, which may be reduced to an Ethiopian, an Indian, and a Berberine type. The first, in his opinion, coincides with the descriptions given of the Egyptians by the ancients : it is chiefly distinguished by prominent maxillæ, turgid lips, a broad flat nose, and protruding eye-balls. The second is characterized by a long narrow nose ; long thin eye-lids, which incline upward from the bridge of the nose to the temples ; ears placed high on the head ; a short, slender, bodily contour, and very long shanks : this he regards as resembling the Hindoos. The third class of Egyptian

* Herodotus, speaking of the Colchians, says, they plainly appear to be Egyptians, “not merely because they are black in complexion, and have woolly hair, for the same may be said of some other nations ; but rather because, of all men, none but the Colchians, the Egyptians, and the Ethiopians, originally practised circumcision ; for the Phœnicians and Syrians of Palestine themselves acknowledge that they learned this custom of the Egyptians.” Respecting the origin of the oracles of Dodona and Ammon, they are attributed, by the same writer, to two Egyptian females, allegorized, as the Dodonian prophetess related the account, by two black pigeons, which flew from Egyptian Thebes, and which, after a time, spoke with a human voice. The colour of the pigeons is indicative of that of the Egyptian people.

figures partakes, as he says, to a certain degree, of the traits of the two former ; it is characterized by a peculiar turgid habit, flabby cheeks, a short chin, large prominent eyes, and a plump contour of body ; and this he supposes to represent the ordinary form ; the national physiognomy of the people approaches nearly to that of the Berberines. (See *Phil. Trans.* 1794.)

That this latter form is to be regarded as typical of the national physiognomy of the Egyptians, is not very palpable. At all events, the facial characters of the statue of Rameses, and of other personages of

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Head of Rameses.

Egyptian mythology, no less than the sculptured and painted representations of men and women, seem to us, for the most part, referable to the Hindoo type ; and, indeed, Blumembach gives, as an example, the female figure on the back of Captain Lethieullier's mummy, in the British Museum. A copy of the mutilated statue of Rameses, brought from the ruins of the Memnonium, at Thebes, and now in the British

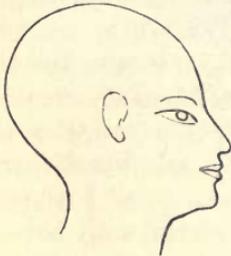
Museum (19, Egyptian Saloon, in Synopsis, 1839, ed. 38th), is here given (fig. 192).

The general expression of the physiognomy of this celebrated statue is calm and dignified; the forehead is somewhat flat; the eyes widely separated from each other; the nose is elevated, narrow, long, and gently arched, with spreading nostrils; the ears are high, the lips large, with the margin broad, flat, and turned out, with sharp edges, points in which the pure Japetic model is deviated from.

In *Case Z. Z. 2* (Egyptian Room), is the mummy of a female, named Mautemmen, a priestess attached to the worship of Amoun. The back part of the head is exposed, and the bandages which cover the face are so thin and close as to render the general style of the features very discernible. The hair is short, of a dark auburn, or reddish brown, and inclined to be wavy; the nose is thin, elevated, and apparently aquiline; the chin prominent; the face oval.

The fresco paintings in the British Museum, illustrative of the domestic habits of the Egyptians, give us portraits both of males and females; the latter, for the most part, wearing large ear-rings, and their hair in long tresses, or platted locks, down the shoulders and back; as we see, also, on some of the sarcophagi, and as the wig of human hair, from a tomb at Thebes, is arranged: some of the men are represented as bald, or nearly so. The countenances, as will be seen by the following outlines (figs. 193, 194, 195), do not appear to be referable to the Negro, though, at the same time, they do not quite correspond with the standard models of the Japetic type: the complexion is copper red.

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As the animals, in these fresco paintings, are admirably delineated, it may reasonably be inferred that the faces of the men and women are faithful national representations also.

With respect to the skulls obtained from mummies preserved in the catacombs of Thebes, and other places, though Soemmerring, out of four examined by him, found two, which, in the extent of space occupied by the temporal muscle, seemed to approach the Negro form, still the united testimonies of Cuvier, Lawrence, Denon, and others, concur in

their general exhibition of the Japetic modèl; and, as far as a judgment can be formed from specimens, their opinion may be assented to. The skulls, figured in the *Decades* of Blumenbach, are certainly of Japetic mould.

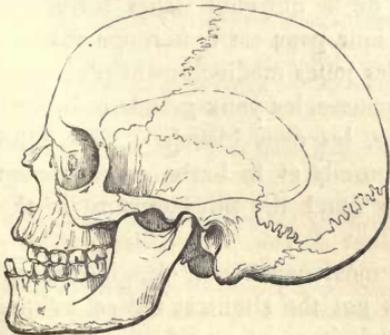
Cuvier states, that he examined, in the various collections of Europe, more than fifty heads of mummies, and that not one among them presented the characters of the Negro or Hottentot. Denon, describing the characters of the female mummies, observes :—" Que leurs cheveux étoient longs et lisses ; que le caractère de la tête de la plupart tenoit du beau style. Je rapportois une tête de vieille femme qui étoit aussi belle que celles des Sibylles de Michel Ange." The embalmed heads, figured in the great French work on the antiquities of Egypt, present the Caucasian character.

In the British Museum is a skull from the tombs of the quarries at Mokattam, and of which the contour is elegant : the forehead is well developed ; the nose is elevated, the ridge, formed by the nasal bones, being thin, or compressed ; the dental ridge of the upper jaw is short, and the auditory foramina are in the ordinary situation. The lower jaw is wanting.

In the Museum of the Royal College of Surgeons, is the skull of an Egyptian mummy, which is, also, essentially Japetic in its contour.

There is, also, in the same collection, another skull from the quarries at Memphis, of which the annexed figure (196) is a sketch. Its contour is oval ; the forehead is high and well-formed. Compared with the skull of an ancient Greek, the alveolar ridge, which is short, is a little more prominent ; its base, from one mastoid process to the other is proportionately narrower ; the occiput is more prominent, and the palate narrower anteriorly, the alveolar arch being more acute in front. The auditory foramina appear in their usual situation.

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Egyptian skull from Memphis.

To enter into any disquisition on the language and the mythology of the ancient Egyptians, or Mizraïm, on the palpable connexion between them and the Hindoos, with respect to civil and religious institutions, social habits, and physical characteristics, or to speculate upon the causes of the acknowledged resemblance between these two distant people, in all except language, would lead from the present design. Those who desire to pursue the subject, may consult

Dr. Prichard's *Researches* (vol. ii.), in which the point is ably treated.

The modern Copts are generally supposed to be the relics of the ancient

Egyptians; who, through the revolutions and changes to which their country has been subjected, have, nevertheless, maintained a certain degree of distinctness, and have never thoroughly amalgamated either with the Greek, Roman, or Moslemin strangers, under whose dominion Egypt has successively passed.

The general complexion of the Copts is dusky yellow; but some, according to Belzoni, are almost as fair as Europeans: their physiognomy, as Denon remarks, strikingly resembles that of the heads of the ancient Egyptians, as displayed in their statues and paintings; but his description—"flat foreheads; eyes half closed and elevated at the angles; high cheek bones; a broad, flat, and very short nose; a large flattened mouth, placed at a considerable distance from the nose; thick lips; a scanty beard; a shapeless body; crooked legs and long flat feet,"—does not agree, in all particulars, with the ancient monuments: it accords, however, with Volney's picture of the Copts, and, in some degree, with that of Baron Larrey, but not with that of M. Pugnet. The last author (see *Mémoires sur les Fièvres Pestilentiellles, &c. du Levant*) draws a strong contrast between the Fellahs, and other Arabian people of Egypt and the Copts:—"La taille des Arabes est de cinq pieds deux ou trois pouces; leurs membres secs, leur peau enfumée, et l'irrégularité de leurs traits les font assez ressentir entre tous les habitans de l'Égypte. Ils ont la plupart, le front saillant, les yeux petits et enfoncés, le nez droit et aigu, les joues plâtes et sillonnées, les lèvres minces, et un aspect sévère. Rien de plus frappant que le contraste qui règne entre eux et les Qoubtes. Autant les Arabes sont petits et maigres, autant les Qoubtes sont gros et grands. A l'extérieur chetif et miserable des premiers ceux-ci opposent un air de majesté et de puissance," &c. His description of the Copts of pure blood, unmixed with Greek or Roman, the supposed descendants of the Mizraïm, is as follows:—"Les Egyptiens sont en général d'une taille au dessus de la moyenne, leurs formes se prononcent vigoreusement, la couleur de leur peau est d'un rouge obscur; ils ont le front large, le menton arrondi, les joues médiocrement pleines, le nez droit, les ailes nasales fortement sinueuses, les yeux grands et bruns; la bouche peu fendue, les lèvres grosses, les dents blanches, les oreilles hautes et très détachées; enfin les sourcils et la barbe extrêmement noires;"—a portraiture which calls to mind the physiognomy of the Egyptian statues of antiquity.

According to the authority of those most capable of forming an accurate opinion, the Coptic language has not the slightest radical affinity with any of the Semitic dialects, though it contains a few words borrowed from the Hebrew and Arabic. Jablonski, Lacroze, and Michaëlis, are of this opinion; the latter, indeed, expressly states that the assertions of those who have claimed the Coptic as a member of the Semitic

family of languages, have arisen purely from ignorance, or an extremely superficial acquaintance with that language; and that every person competent to form an opinion, knows that Coptic and Hebrew have not the slightest radical affinity; and that, although some words occur in the former which resemble Semitic vocables, they are to be attributed to the influence which the proximity and intercourse of Semitic nations has exercised on the idiom of the native Egyptians.

That the Coptic is essentially the language which was spoken in Egypt before and during the time of Moses, although it has undergone many modifications during the succession of ages, and through the influence of various causes, is generally admitted. Many Coptic words have been recognised in the Book of Genesis, not as Hebrew words, but as borrowed terms, to denominate some of the natural productions of Egypt, and the local peculiarities of that country—a circumstance corroborative of the opinion.*

If the ancient Egyptians, or Mizraïm of the Scriptures, be regarded as constituting a branch (though not a normal branch) of the Caucasian or Iranian stock, to the same stock the ancient Ethiopians, or Cush, must also be referred, since the consanguinity of the two people is allowed by all authorities. Each nation, indeed, claimed the distinction of the elder,—the honours of the parent stock, whence the other had branched off,—so that Cush and Mizraïm were rivals as well as brothers.†

* Under the general term Coptic, are included the Bashiric, or Memphitic dialect; the Sahidic, or Theban, and the Bashmuric. Both the Memphitic and Sahidic dialects have been long extinct; the latter was, however, in use in the ninth century of the Hegira, but the former had generally ceased to be spoken in the twelfth century of our era. The Sahidic was much softer than the Memphitic, destitute of harsh aspirations, and intermixed more fully with Greek words. At what period the Scriptures were translated into Memphitic and Sahidic is not very clear. Georgi and Michaëlis consider that a translation in the dialect of Upper Egypt existed in the third century. Of the Bashmuric nothing is accurately known; according to the Coptic grammarians, and among them Athanasius, Bishop of Kús, it was a distinct language from the Coptic, or, at least, had little in common with either of the above dialects. Georgi, however, considers it to have been that of the Ammonians, and identical with a dialect intermediate between the Memphitic and Sahidic, the only relic of which is preserved in the fragment of a version of the New Testament, and part of the First Epistle to the Corinthians, now in the library of Cardinal Borgia. Though this newly-discovered dialect may be the Ammonian, it is not likely, if we credit the statements of the Coptic grammarians, that it is the Bashiric, or Psammyrian. The Ammonians were converted to Christianity in the reign of Justinian, and were under the ecclesiastical government of a bishop, certainly in the year 553. They inhabited the Oasis of Augila, and, as Herodotus says, were “a colony of mingled Egyptians and Ethiopians, using a language compounded from those of both people:” their name had reference to Ammoun, or Jupiter, whom they specially worshipped. The utter loss of an army sent against the Ammonians by Cambyses, which was overwhelmed by a whirlwind of sand in the desert, is related by the same author.

† “The name of Cush,” says Dr. Prichard, “in the Hebrew Scriptures, is rendered by the Septuagint *Αἰθιοπες*, or Ethiopians. The people generally so termed in Egypt were the Ethiopians of Meroe, the subjects of Queen Candace; but the same name, as we learn from its use by Diodorus, was extended to some of the neighbouring nations, but always restricted to black people. Cush, in the older historical parts of the Old Testament, is, however, applied evidently to nations living to the eastward of the Red Sea. Hence an ambiguity of meaning in some passages. The subject has been discussed by Bochart and Michaëlis. Among the Hebrew writers of later times, there can be no doubt that this name belongs exclusively to African nations. The Ethiopians, who were connected with Egypt by political relations, are termed by these writers Cush. Thus Tirkahah, the Cushite invader of Judah, may be identified with Tearchon, an Ethiopian chief mentioned by Strabo, and

Of the Ethiopic language of antiquity little is accurately known ; probably it was intimately related to the ancient Egyptian ;* the same system of hieroglyphics was used by both ; both people practised the art of embalming the dead, were divided into castes, and had similar institutions, political and religious, and analogous festivals and ceremonies. It would seem that the ancient Ethiopians were much darker than the Egyptians, if not black ; and Hamilton, with others, inclines to the opinion, that the groups of black figures, in the delineations extant on the temples of Upper Egypt, where they often appear led in bonds by groups of red figures, or Egyptians, are intended for Ethiopians ; in other instances it would seem as if the design were to commemorate the relationship between the black and red castes, or the transmission of religious observances from one to the other ; for, in many cases, black figures are represented as conferring on the red the symbols and instruments of the sacerdotal office, both sets having the habiliments of the priesthood ; but the distinction of colour is very decided. Representations, indicating the affinity between the red and black castes, are given in the plates of the *Description de l'Egypte*.†

For an account of the sculptures of the ancient Ethiopians, and the differences between those of Upper Nubia, or the kingdom of Meroe, and of Lower Nubia, from Assouam southward to Solib, the reader is referred to K. Otfried Müller, and to Dr. Prichard, who follows Müller in his opinions. The subject is not within the immediate province of the naturalist.

Setting aside the Arabs, the present inhabitants of Ethiopia, or Nubia,

both are probably identical with Tarakos, who is set down by Manetho as an Ethiopian King of Egypt. In the earlier ages the term Cush belonged to the same nation, or race ; though it would appear that the Cush, or Ethiopians, of those times occupied both sides of the Red Sea. The Cush mentioned by Moses are pointed out by him to be a nation of kindred origin with the Egyptians. In the Toldoth Beni-Noach, or archives of the sons of Noah, it is said that the Cush and the Mizraïm were brothers, which means, as is generally allowed, nations nearly allied by kindred."

* The Gheez, commonly called the Ethiopic language, into which the Scriptures were translated, and which was spoken in Tigré as late as 1300 years after the Christian era, is a Semitic dialect, allied to Arabic and Hebrew, and is now a dead language, no longer in ordinary use, but consecrated to religion and literature. Gheez is supplanted by the Amharic, or modern Abyssinian, an ancient African language, into which many Gheez words, and some grammatical forms, have been ingrafted ; but the Gheez was not the language of the ancient Ethiopians, it was only that of an Abyssinian people of remote Arab descent, who formerly ruled in Abyssinia, Axum being the seat of government.

† M. Pugnet, in reference to the ideas conveyed by some of these delineations, says, " Quoique je ne veuille me livrer ici à aucune conjecture sur leur origine (celle des Egyptiens), je crois devoir retracer un tableau que m'a offert l'un des tombeaux des Rois, Bab-el-Melouk. Stant plures virorum effigies, a quibus planè ostendit pictor, gigni Homines e terrâ. Qui gignuntur colore rubro sunt, parentes nigerrimi. Ce langage hieroglyphique n'exprime-t-il pas ce que pensaient les anciens que l'Homme rouge est né de l'Homme noir ? L'Homme noir est certainement un Ethiopien, et l'Egyptien s'est peint toutes parts sous la couleur rougeâtre qu'il retient encore aujourd'hui. On voit ailleurs des groupes de l'une et de l'autre couleur se rendre au même hommage à des divinités noirs, mais bientôt les Hommes rouges se séparent des autres pour se rendre, non loin d'eux, après d'une divinité qui leur ressemble. Ailleurs, enfin, on reconnaît l'Héliotrapèze d'écriture par Homère : des Hommes rouges transportent leurs dieux sur les confins des Hommes noirs et y célèbrent un festin commun."—*Mémoires sur les Fièvres, &c.*

from Egypt to Sennaar, excluding Darfoor and Fezzan, are termed Barábra, or Berberines, and by the Arabs, Núba:* they are divided into several tribes, as Kenous, Dongolawi, &c., speaking different dialects of the same language. Their colour varies from a deep copper shade to black, and their features have no resemblance to those of the Negroes.†

Dr. Rüppell says, that the inhabitants of Dar Dongola are divided into two principal classes; viz., the Barábra, or the descendants of the old Ethiopians, and the races of Arabs who have emigrated from the Hedjaz. Though the ancestors of the Barábra, who, in the course of centuries, have been repeatedly conquered by hostile tribes, must have undergone some intermixture with people of foreign blood, yet he considers that, on an attentive examination, the old national physiognomy, which their forefathers have marked upon colossal statues, and the bas-reliefs of temples and sepulchres, will not fail to be perceived. A long oval countenance, a beautifully curved nose, somewhat rounded towards the top; proportionately thick lips, but not protruding excessively; a retreating chin, scanty beard, lively eyes, strongly frizzled, but never woolly hair; a remarkably beautiful figure, usually of middle size, and a bronze colour, are the characteristics of the genuine Dongolawi. The same traits of physiognomy are generally found among the Ababdi, the Bisheri, and a part of the inhabitants of the province of Schendi, and partly, also, among the Abyssinians. Dr. Rüppell had, as he says, no opportunity of inquiring into the relationship which the languages of these different races bear to each other; but he adds, that the Barábra language, which is spoken from Gebel Deka to Wadi Ibrim, and through the whole of the Wadi Kenús, is to be looked upon as a Núba or Negro tongue, both from its words consisting of a few syllables, nearly all ending in vowels, and from its harmonious and soft modulation; a conclusion which is confirmed by the fact that some words in the Barábra tongue, and in the Kordofan idiom of Haraza, Gebel Atgiau, and Koldagi, are identical; and he assigns this circumstance as, in part, the reason why the Arabs

* The natives of Kordofan are also termed Núba, or Noubá, by the Arabs; and Dr. Rüppell considers them as allied to the Berberines, an opinion which he founds on the affinity of their languages, though, at the same time, he regards the Berberines as the descendants of the old Ethiopians. Burckhardt says, "the name of Noubá is given to all the blacks coming from the slave countries to the south of Sennaar, but that they are to be distinguished from Negroes by the softness of their skin;" adding, that "their noses are less flat than those of the Negroes, their lips less thick, and their cheek-bones not so prominent. Their hair is generally similar to that of Europeans, but stronger, and always curled; sometimes it is woolly. Their colour is less dark than that of the Negro, and has a coppery tinge." M. Cailliaud's description of the Noubá slaves, brought from Bertat to the south of Sennaar, is the same. They are not, in short, genuine Negroes.

† "La couleur des Barábras tient en quelque sorte le milieu entre la noir d'ébène des habitans de Sennaar et le teint basané des Egyptiens du Sayd. . . . Les traits des Barábras se rapprochent effectivement plus de ceux des Européens que ceux des Nègres; leur peau est d'un tissu extrêmement fin; sa couleur ne produit point un effet désagréable; la nuance rouge qui y est mêlée leur donne un air de santé et de vie. Ils diffèrent des Nègres par leurs cheveux qui sont longs et légèrement crépus, sans être laineux."—*Costax*.

settled in the country designate the proper inhabitants of the province of Dongola, and especially the natives southward of Assuam, whose mother-tongue is the Barábra, by the general name of Núba—a term which the Barábra never use themselves, it being the national name of the free Negroes of Kordofan.*

The origin, at a remote epoch, of the Barábra from the Kordofan Nouba race, is an opinion, observes Dr. Prichard, countenanced by the testimony of ancient writers. “In the time of Eratosthenes, nearly three centuries before the Christian era, the Nubæ were a distinct and powerful race; they inhabited the left bank of the Nile from Meroe, the Atbara of modern geography, to the ἀγκῶνες, elbows, or angular windings of the Nile. It is scarcely probable that a rude people, separated, so long ago as this account would imply, from the great body of their African kindred, could retain an oral language with such constancy that its resemblance to the dialect of the Nouba, or Koldagi, could still be recognised; but we have proof that subsequent emigrations were made from the countries in the northern desert. Procopius states, that when the Emperor Diocletian visited Ethiopia, finding that the country above Egypt yielded a scanty revenue, and was not worth the trouble of defending, he gave up a territory, of seven days’ journey in extent, to the Nobatæ. The whole region from Auxomis (Axum), to Elephantine, which an expeditious traveller might traverse in thirty days, was, at that time, principally inhabited by two nations, the Nobatæ and the Blemmyes, the latter of whom harassed the Roman frontier. The Blemmyes dwelt in the inland parts, at a distance from the Nile: the Nobatæ were brought by Diocletian from their former abode, the city of Oasis, and were induced to settle in the valley of the Nile, immediately above Elephantine. The Blemmyes, as we shall find, were the ancestors of the Bishari, and there can be no doubt that the Nobatæ are the Nouba, so called by the Arabs, or the Barábra. It has been conjectured that the Oasis, here described as the original country of the Nobatæ, may have been Abu-Haraza, where the Koldagi language and people are still predominant,—or even Kordofan itself. The difference of names between Nubæ and Nobatæ is probably the result of accident.”

The Bishari, or Bejawy race, is spread through the eastern deserts of Nubia, and the mountain districts eastward of Egypt, along the borders of the Red Sea. It is divided into different tribes, or nations, of which one, the Hadharebe, subdivided into numerous clans, occupies the country

* “The population of Kordofan consists of three different races, who are distinct, and speak different languages:—1. Bedouin Arabs from the Hedjaz. 2. Colonists from Dongola. 3. The original natives of the country, who are Nouba, or Negroes.” The latter are divided into the free Pagan Nouba, who inhabit the hill country southward of Obeid, and the conquered Mohammedan Nouba of the plain-country, near Obeid, and to the northward, and who, though they speak their own language, affect the Arabic. Their native language is identical with that of Haraza and Koldagi.

near Souakin; another, the Bishari Proper, occupies the country from the north of Abyssinia along the course of the river Mareb, which flows through the northern forests of the Shangalla, to the Belad-el-Taka and Atbara, where dwell the Hadendoa and the Hammandab, powerful Bisharine tribes: other tribes extend northward, as far as Gebel-el-Ottaby; others occupy the hilly country from Sennaar to Dar Berker and to the Red Sea, the territory of the ancient Blemmyes; and a tribe, called Ababdeh,* occupies the country to the northward of the Bishari, from the parallel of Deir to the frontiers of Egypt, extending into the eastern desert as far north as Kossier, on the Red Sea.

These tribes are all nomadic, fierce, and inhospitable; they speak different dialects of one language, and have the same physical characters. Hamilton describes the Bishari as shrewd and intelligent, of small stature, but active, and with a prepossessing countenance,—some with a cast of the Negro, others with a very fine profile. Their complexion is nearly black. Rüppell observes that the physical character of the Bishari closely resembles that of Barábra; and Burckhardt describes them as a bold and handsome race of people, who go constantly armed, and are seldom free from quarrels. The females are even beautiful, of a dark brown complexion, with fine eyes and teeth, and of slender and elegant symmetry. The portrait on the succeeding page (fig. 197) represents a Suakiny, or Hadharebe, tribe of the Bisharene family.

Sennaar, which intervenes between Ethiopia and Abyssinia, is inhabited by true Negroes—the Shangalla, the Doba, the Shilúkh, the Faungi—and also by nomadic Arabs; but, in Abyssinia, the mass of the population is not referable to the Negro stock. Tribes of the Shangalla inhabit the low forest lands, especially on the borders of the country; but the elevated levels of Tigré and Amhara, and the platform of Baharnegash, are tenanted by the Habesh, or Abyssins, divisible into several distinct tribes, speaking different languages, but intermarrying and agreeing with each other in general physical characters. The principal tribes of Abyssinia are the Tigrani, or Abyssins of Tigré, the Amharas, the Agows, the Falasha, the Gafats, and the Gongas and Enareans; while the Gallas occupy the southern border, the Danákil the east, the Somauli the maritime borders of the Gulf of Aden: along the borders

* M. du Bois-Aymé thus describes the Ababdeh: “Les Abâbdeh diffèrent entièrement par leur mœurs, leur langage, leur costume, leur constitution physique, des tribus Arabes qui, comme eux, occupent les déserts qui environnent l’Égypte. Les Arabes sont blancs, se rasent la tête; sont vêtus; les Abâbdeh sont noirs, mais leurs traits ont beaucoup de ressemblance avec ceux des Européens. Ils ont les cheveux naturellement *bouclés*, mais point laineux. Ils les portent longs, et ne se couvrent jamais la tête. Ils n’ont pour tout vêtement qu’un morceau de toile, qu’ils attachent au-dessus des hanches, et qui ne passe pas le milieu du corps. Ils enduisent tout le corps de graisse.” Belzoni says, that these people are of small stature, but have fine eyes, and that many of the women wear their hair in long curls, matted with grease. Their complexions are dark chocolate. ;

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Suakiny chief.

of the Red Sea, north of the Danákil, tribes of the Hazinta and Shiho tenant the mountains.

The physical characters of the Abyssinians closely approximate to those of the Copts, and are distinct alike from those of the Arab, on the one hand, and the Negro, on the other. The Abyssinians have large eyes, elevated at the angle; the expression of the countenance is fine and manly; the lips are thick, but not protruding as in the Negro; the nose is raised; the cheek-bones are elevated; the angle of the jaw, acute and marked; the teeth are well formed and regular, the alveolar edges being less projected and extensive than in the Negro: the complexion varies, but is usually of a dark copper colour. Speaking of the crania of the ancient Egyptians, Baron Larrey says, "Je les ai comparé avec ceux des autres races, surtout avec ceux de quelques Abyssins et Ethiopiens, et je me suis convaincu, que ces deux espèces des crânes présentent à peu près les mêmes formes." The hair of the Abyssins is not woolly, like that of the Negro, but crisped (which some have described as almost woolly), and often almost straight. Pearce says the Abyssinians vary much in colour; some being very black, with nearly straight hair; others copper coloured,

with hair not so straight; and some much fairer, with almost woolly hair; and some of the same complexion, but straight haired: and he farther observes—"In the towns of Abyssinia you may find mothers with five, six, or more children,—the father of one having been an Amhara; of another, an Agow; of another, a Tigran; and of a fourth, a Galla;"—a circumstance which, as Dr. Prichard observes, affords no explanation of the variations of colour and hair described; since the various tribes, separately considered, display no remarkable difference of physical character; the Agows, Amharas, the Tigrans, and even the Gallas, belonging to the same family. The Jesuit, Tellez, speaking of the complexions of the Abyssinians, says that their usual colours are black, brown, and olive; others are red (*vermelhos*), and some white; but the white is bloodless and unpleasing (probably that of albinism). Burckhardt and other travellers have noticed the beauty of the Abyssinian females.

The following head (fig. 198) of an Abyssinian bishop is from Denon's work on Egypt, and presents a characteristic example of the

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Abyssinian bishop.

national physiognomy. It may be compared with the subjoined portrait (fig. 199), from Salt's *Travels in Abyssinia*, of an Edjow Galla. The Gallas, who, as Bruce informs us, first appeared in Abyssinia in 1537, have been, since then, making a gradual progress northward.

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Edjow Galla.

They are divided into numerous independent tribes, of which the Edjows are one of the most considerable. Their national complexion is dark brown, sometimes verging upon black; the nose is raised and arched; the hair is long and black.

The Danákil (of which the Adaiel are a branch), occupy the maritime lowlands to the east of Abyssinia, between the mountains and the Red Sea: they are divided into many tribes, independent of each other; as the Dumhoeta, the Taieméla, the Hadharem, &c.; their habits are pastoral; and they are said to construct their tombs in the form of rude pyramids; their features are well formed; their hair is crisp, and dressed out with grease and a brown dust. The Somauli occupy an extensive region, from the Gulf of Aden to Magadoxa, on the coast of Ajan: they are a pastoral people; but, also, carry on a considerable traffic in

gum, myrrh, gold, ivory, slaves, and beasts of burden, procured from the countries of the interior: they possess seaports, and apply themselves to navigation, but they do not allow the entry of Arab vessels into their harbours: Barbara is their principal seaport and here they hold an annual fair: they are pacific, and contrive, with no ordinary political address, to maintain peace with the fierce tribes, the Gallas and others, in their immediate neighbourhood. Prichard suspects them to be of Galla origin. M. de Rienzi describes them as a handsome race of people, with fine features: they stain their hair, which is naturally black, soft, and flowing, of a yellow colour, by means of lime, in imitation of the fleeces of their sheep. Mr. Bird ("Observations on the Coast of Arabia, and Shores of the Red Sea;" *Geogr. Journ.* vol. iv.) describes the Somauli traders from Barbara as having fine regular features, and wearing their soft hair, artificially changed to a flaxen colour, in ringlets flowing negligently around their shoulders; the contrast between them and the Suhailis of Ajan, with their jet black complexions and woolly hair, being very striking.

The Hazorta and Shiho are pastoral wanderers; and their language agrees, in many respects, with that of the Danákil; their physical characters are identical with those of the neighbouring nations.

With respect to the language most extensively spoken in Abyssinia, viz., the Amharic, it is a language radically distinct from the Gheez, or old Ethiopic: the Gheez, now a dead, or learned language, and into which the Scriptures were translated, was, formerly, the vernacular language of Tigré; and is, as competent judges assert, a Semitic tongue, allied to the Arabic and Hebrew: this circumstance, consequently, involves a Semitic, and not an Ethiopic origin for the ancient Abyssinians; or, at least, for the ancient inhabitants of Tigré, the capital of which was Axum, the old seat of government: and Dr. Prichard considers them to be a branch of the Arabs of Hamyar, who, at an early period, some centuries antecedent to the Christian era, passed the Straits of Babelmandeb, and gained possession of Axum, where, through intercourse with Egypt, and the Ethiopian cities of the Nile, they acquired some knowledge of the arts, and of Greek literature; but who have ultimately become assimilated in their complexion and physical characters with the Amharas and native races of Abyssinia. Salt, and Professor Ritter, however, contend that the Abyssinians were an ancient people of Ethiopia, not immediately of Arabic origin, but a cognate branch of the same family of which the Hebrews and Arabians were members. However this may be, Uranius, a writer on Arabic geography, cited by Eustathius and others, noticed a people, called *Αβασήνοι*, on the coast of Arabia, nearly in the situation of Hamyar.

From Morocco to Egypt, along the northern coast of Africa, extends

an elevated chain of mountains, or highlands, which may be termed the Atlantic range, traversing Morocco, Algiers, Tunis, Tripoli, and branching through Lybia: on the south, this range of highlands, intersected by valleys and rivers, is bounded by a sea of sand, the Great Desert of Sahara; the Mediterranean flows to the north; and the Atlantic Ocean, between Spain and the Canary Isles, washes its western declivities. The pine, the oak, and the oleander compose the noble forests of the hills; and on its maritime tracts flourish the olive, the orange, and the date. Among its Mammalia are the Lion and the Panther; and the Magot is abundant in the woods and among the crags of the mountains.

Throughout this highland chain is spread a race of people, divided into many tribes, distinct from the Moors and Arabs,* claiming to be the ancient possessors of this region, prior to the settlement of the Phœnicians, and which have maintained, in the remote mountain tracts, and the bordering regions of the Desert, their lineage and their tongue, through the reiterated revolutions to which their country has been subjected. Their general appellation is that of Berbers, or Berebbers,† including the

* The Arabian tribes of Atlantica, and the Desert of Sahara, may be divided into two classes, Arabs of pure blood, and Moors. The Arabs are divided into many tribes, or families, of more or less noble descent; their dialect is the Maughrebin Arabic, and their emigration, from the East, is referred to the first ages after the Hegira. The Moors are partly of Arab, and partly of Berber, or of African blood: they are extensively distributed in tribes through northern Africa, and are distinguished by different appellations: the men are, generally, large, well-made, and vigorous; the females would be handsome, were it not for their superabundance of flesh, which, however, passes for perfection in the eyes of the men. Arabic is the language of most of the Moorish tribes; and where other languages are spoken, it is read and understood. "The immigration of the Arabians into Africa," says Dr. Prichard, "is generally considered to have commenced after the Hegira, and the conquest of Egypt and Lybia by the Mohammedans; but there is reason to believe that the same people, or tribes nearly allied to them in origin, had begun to direct their movements towards the same quarter, from much earlier times. . . . The migratory movements of the Semitic tribes into Africa appear thus to have preceded the first dawning of history. The oldest account, expressly recording such a migration, is Manetho's narrative of the invasion of Egypt by the Arabian shepherds. It appears to me clear that Manetho connects the exode of the Beni-Israel with the departure of the shepherds: but even before the age of Abraham, Egypt must have been already opened to the inwanderings of a nomadic people from Asia; otherwise the patriarch, with his horde, could not have passed so easily to the residence of an Egyptian sovereign, who, though styled Pharaoh, may have been one of the shepherds of Egypt, or a native prince reigning under their sway." After the sojourn of the Israelites in Egypt for a considerable period, "there arose up a new king, who knew not Joseph;" a king of a different dynasty—not of the Semitic race (as were the Israelites); and, therefore, a stranger to the descendants of the house of Abraham, and jealous of their influence and power; jealous, perhaps, also, of the close connexion which existed between the chiefs of the Israelitish house and the sovereigns, or rulers, of the preceding dynasty.

† From this word, Berber, the name of the country called Barbary, or Barbaria, seems to be derived; its application to the northern region of Africa is, however, of comparatively modern date, not antecedent to the Mahommedan conquest. On the east of Africa, a province, supposed to be Ajan, was, anciently, called Barbaria, and the people, Barbari, a name still preserved in the port of Barbara, and to be recognised in the Berberines, or Barábra of Nubia. Leo derives the word Barbar, or Berber, either from the word, barbara, which, in the Berber tongue, means to murmur, or from the Arabic, bar, a desert. Dr. Prichard, however, observes, that *βερβερ*, in Coptic, signifies hot; and *βορβερ*, or *βερβωρ*, to cast out. The term, barbari, or *βαρβαροι*, barbarians, from whatever source it arose, was used, in early times, by the Greeks, as a common appellation for persons who did not speak the Greek language, or for rude nations; according to Professor Wilson, the Sanscrit, *varvvarah*, means 'a low man, an outcast, or barbarian; and, in another sense, woolly or curly hair, as the hair of an African. Did not the Greeks borrow the word Barbari from the Egyptians, and apply it to any rude people, re-

Shoulouh, the Kabyles, and the Tuaryk. The Berber language is spoken, according to M. Venture, from the mountains of Souse, which border the Atlantic Ocean, to those of the Ollelétyts, which rise above the plains of Kairoân, in the kingdom of Tunis. The same idiom, with a slight difference, is likewise spoken in the Isle of Gîrbéh, at Monâstyr, and in the greater number of villages spread through the Sahara; and, among others, in those of the tribe of the Beni-Mozâb. The tribes have different names: those of the mountains belonging to Morocco are termed Shoulouhs; those who inhabit the plains of the empire, dwelling under tents, in the manner of the Arabs, are named Berbers; and those of the mountains belonging to Algiers and Tunis call themselves Cabaylis, or Gebalis. It is the opinion of Mr. Hodgson, and Dr. Prichard assents to it, that the Berber language was learned by the Phœnicians, and spoken by them, in addition to the Punic, their mother tongue; and that it is from this circumstance that Virgil terms them "Tyrii bilingues,"* the secondary meaning of the word, "bilingues" (deceitful), aptly coinciding with its primary and literal signification.

The Berbers of the higher Atlas are an athletic, hardy race, with strongly-marked features; they shave the fore part of the head, but suffer the hair to grow from the crown as far behind as the neck: their dress is a woollen garment, without sleeves, belted round the waist; they lead an independent life, in their mountain villages, where they feed cattle, and occupy themselves with the chase. The Shuluh, or Shoulouh, of the southern parts of Morocco, resemble them in manners: they speak a dialect of the Berber idiom, which they term Amazigh. The Kabyles, or Quabâily, who occupy the hills of the lesser Atlas, also speak the Berber, and are said to be a hardy, industrious people, tilling the ground, and working in the mines. To the south of Tunis and Algiers, the country of the Gætuli, four Berber tribes are said to exist, named, according to Mr. Hodgson, Mozabies, Biscaries, Wadriagans, and Wurgelans. The Tuaryk tribes are widely spread through the Desert of Sahara, where they exist as a nomadic people, distinct, however, from the nomades of Arabian origin. It is to M. Hornemann that the discovery of this wandering race is owing: their language, as Mr. Hodgson states, is pure Berber, differing from that of the Berbers of Atlas only in a slight accent. The Tibboos, another wandering people, occupy the desert to the east and south of Fezzan; but their language is said to differ radically from that of the Tuaryks.

The Tuaryks vary in complexion from white to black; and a similar difference exists among the Kabyles of the Tunisian country. Hornemann

sembling those to whom it rightly belonged, as a proper name, in the same way as we use the term Goth, or Turk?

* "Quippe domum timet ambiguum, Tyriosque bilingues."

describes the Tuaryks as a handsome race of people, with European features, which are preserved among the darkest tribes; and Capt. Denham corroborates the statement:—"The women have a copper complexion; eyes large, black, and rolling; noses plain:" they wear their hair long and loose. In some instances he observed faces like those of the ancient Egyptians; the nose, especially, having the same contour as those of the Egyptian statues.

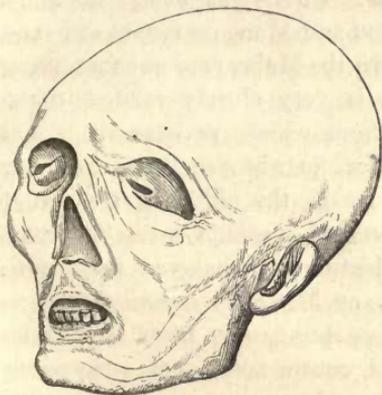
The Tibboos, or Tibbos, are dark coloured, or black, but have not the Negro countenance, nor the Negro hair: their figure is slender, their limbs are well turned, and their gait free and active. Captain Lyon says, that the Tibboo females are light and elegant in form, and wear a graceful costume, quite different from that of the Fezzaners: "they have aquiline noses, fine teeth, and lips formed like those of Europeans; their eyes are expressive, and their colour is of the brightest black: there is something in their walk, and erect manner of carrying themselves, which is very striking: their feet and ankles are delicately formed, and are not loaded with a mass of brass or iron, but have merely a slight anklet of polished silver, or copper, sufficient to shew their jetty skin to more advantage: they also wear red slippers: their hair is plaited on each side, in such a manner as to hang down on the cheeks like a fan, or, rather, in the form of a large dog's ear." Clapperton and Denham describe the Tibboos of Bilma, in lat. 18°, 19°, in very similar terms.

Opposite to the coast of Morocco, at its southern extremity, is a group of islands (lat. 28° and 29°), now termed the Canary Islands; anciently, the Fortunate Isles; which, in the time of Juba, were very partially, if at all, inhabited: on one island, indeed, Canaria, so called from the huge dogs it contained, were found the remains of dwellings; but, on Ombrion, no vestiges of man appeared.* From the days of antiquity, to the early part of the fourteenth century, the Canary Isles were lost to the civilized world; and their re-discovery was owing to the shipwreck of a French vessel on the coast of one of them. They were then inhabited, but the population has now utterly perished: at the beginning of the sixteenth century, few or none were left to speak of the avarice and cruelty of their merciless invaders. The extermination of the Guanches, by the Spaniards, after a long struggle, is one of the fearful tragedies of modern history, in which a Christian nation has acted a conspicuous and atrocious part. Of the origin of the Guanches we have no authentic details: their name is said to have signified, in their own language, the sons of men; and they described themselves as the descendants of a great and powerful people of antiquity. They were simple in their manners, possessed of but few arts, believed in a future state, and in good and

* These islands were respectively termed Ombrion, Junonia, Capraria, Nivaria, and Canaria. They abounded in fruits, birds and beasts, and large lizards.

evil spirits, and had the institution of marriage, and various moral and social observances. We learn that their stature was large, and their frames robust and powerful: their history proves them brave and determined. One of their customs was the preservation of their dead, by means of a process of embalming; and it is from these mummy relics that our knowledge of the physical characters of the race is obtained. They deposited the mummies, when dry, in caves in the sides of the mountains, placing them erect upon their feet, the chiefs having staffs in their hands, and a vessel of milk standing by them: the bodies were decorated with small laces, from which were suspended little discs of baked clay, and also with strings of coral. M. Golberry, who accurately investigated the mode in which these mummies were prepared, describes one, which he selected from many others, in the mummy-caves at Teneriffe, as having long, black hair: the skin was dry, flexible, and of a dark-brown colour; the back and chest were covered with hair, and the inside was filled with a kind of grain, resembling rice; the body was wrapped in bandages of goat's skin. The complete exsiccation of these mummies is surprising.

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Head of Guanche.

One, described by Blumenbach, apparently that of a female, weighed only seven pounds and a half, although all the fleshy parts and the viscera were preserved. The entire head of this specimen is figured in the *Decades*, from which a copy (fig. 200) is here given. It closely resembles the head of an ancient Egyptian.

The time when, and the circumstances under which the Guanches separated from the Atlantic Berber race, traversed the intervening sea, and peopled the Canary Isles, are alike unknown; but that they were a Berber offshoot, is sufficiently proved by a comparison of the remains of their language with that of the latter people.

NEPTUNIAN STOCK.

MALAYS PROPER.—India, according to Prichard (*Disp. inaugur. de Variet.* p. 85), is inhabited by a mixed race; consisting of the aborigines, and of others, whom the pursuits of war and conquest have at various times brought there: among these latter are to be enumerated the Mongoles, who, at a comparatively recent period, entered and conquered the country.

These mixtures have tended to efface the peculiar characters of the original inhabitants, which must, therefore, be now sought for in the islands protected by their situation from such visits. The islands of the Indian Sea, he remarks, contain two* races of men, differing, in many respects, from each other. In one of these, the blackness, or nearly the blackness, of the Negro, is a marked character; the hair is curled and woolly, the body slender, the stature short, the disposition barbarous and cruel. The other resembles more closely the Indians of the Continent; has a fairer skin, larger limbs and stature, better proportions than the former, and exhibits some marks of humanity and civilization. Forster supposes that the black race, whom he considers to be the aborigines, have retired to the middle and mountainous parts of many islands, leaving the coasts and plains to the more recent colonists. These colonists are the Malays, a race widely distributed, occupying, not only the Malayan Peninsula, and, though not exclusively, the islands of the Indian Archipelago, but which has penetrated into Madagascar, where it constitutes the Hova portion of the population, and spread itself throughout the islands of the Pacific, from New Zealand, the Society, the Friendly Isles, and the Marquesas, to the distant Sandwich and Easter Isles. Cuvier, as before stated, is inclined to refer the Malays to the Hindoo and Mongole families: † and Fischer, though, like M. Bory, he sets down the Malay race as constituting a distinct stock, observes—“this race is very closely related to the Indian variety of the Japetic species, from which, perhaps, it is not radically distinct.” ‡ That the Malay race, to whatever cause we are to attribute its occupation of the portions of the globe over which it has spread, is of Asiatic origin, not unmixed, perhaps, with Sanscritic offsets, there is every reason to conjecture. Whatever may have been its starting-point, it is certainly, as M. Bory describes it, essentially shore-dwelling (“riveraine”), peopling only islands, or such portions of the Continent as border the ocean, and never penetrating into the interior, or passing the mountains, which, running parallel with the coast, divide the maritime districts from the inner and more fertile regions. It is in maritime occupations that the energies of the Malay people are most conspicuous; and it is to this maritime predilection that their extensive diffusion is to be attributed. Nevertheless, it would appear that their occupation, both of the Malay Peninsula and

* If the Alfourou and Papuan be distinct, three races.

† The Malays, termed *Hindo-Chinese* by some, are regarded, by certain writers, as distinct alike from the Hindoo and the Chinese; and, though intermingled with offsets from them and other Sanscritic nations, to exhibit traces of a distinct origin.—See Dr. Lang, *On the Migrations of the Polynesian Nation*.

‡ “The people termed Malays, have been hitherto grouped together under the head of a distinct race; namely, the ‘Malay race,’ although they scarcely differ at all from the Hindoos, of which people they only form a variety, presenting four types—the Malays Proper, the Javanese, the Macassars, or Budjis, and the Amboinians, or Timorians.”

of the Indian Islands, is but comparatively recent, since, in all the Indian Islands, with the exception of Sumatra, they occupy only the coasts, and have made but trifling advances into the interior, which yet continues to be possessed by tribes approaching the Negro in many of their physical characters. With respect to the Malay Peninsula, now the stronghold of the race, Mr. Marsden considers it to be fully established, that their occupation of this territory is not to be dated earlier than the twelfth century: their migratory course was from Sumatra to Malacca; and the indigenous inhabitants, of a stock entirely different from the invaders, and approaching, as Mr. Marsden says, to the Negroes of Africa in their physical characters, were gradually driven by them to the woods and mountains. These origins are, probably, Alfourous; but Papuan tribes* also exist in Malacca: still, the population was probably inconsiderable, antecedently to the influx of the Malays; since, according to Raffles, if an inconsiderable race of Caffres (Papous) be excepted, who are occasionally found near the mountains, and likewise a few tribes of the Orang Benua (aborigines), a vestige of a nation anterior to the Malay does not exist in the whole Peninsula. Raffles states, that the tribes frequenting the hills are termed Semang, and are woolly-headed; those on the plain, Orang Benua, or people belonging to the country.† “I had an opportunity,” he adds, “of seeing two of these people, from a tribe in the neighbourhood of Malacca; it consisted of about sixty people, and the tribe was called Jokong. These people, from their occasional intercourse with the villages dependant on Malacca, speak the Malay language sufficiently to be generally understood. They state that there are two other tribes, the Orang Benua, and the Orang Udai. The former appears the most interesting, as composing the majority; the latter is only another name for the Semang, or Caffres. From the vicinity of the Jokong tribe to Malacca, and intercourse with its inhabitants, the people of this tribe have adopted many Malay words, not originally in their language. The men are not circumcised: they are well formed, rather short, resembling the Malay in countenance, but having a sharper and smaller nose: they marry but one wife, whether rich or poor, and appear to observe no particular ceremony at the nuptials.” The Malays, in fact, are not the aborigines of the Peninsula of Malacca, or the adjacent islands; and, of these islands, Sumatra is the only one in which they possess an inland state, or territory. This latter island, as well as those of Java, Jana Uyi, or Bugeland (Celebes), Sulu, and the Moluccas, which, together with Borneo, compose what may be properly termed the Malayan group, are peopled,

* To these races reference will be made hereafter.

† “The word Benua is applied by the Malays to any extensive country, as Benua China; but it appears to be a sort of Malay plural to the Arabic word, ben, or beni, signifying a tribe: the early adventurers from Arabia frequently make mention in their writings of the different tribes they met with to the eastward: from them, most probably, the Malays adopted the term, Orang Benua.”

according to the same authority, by nations radically distinct from the Malays; speaking languages entirely different, and using various written characters, original and peculiar to each. These nations are governed by their several laws and institutions: and, excepting the state of Menangkabu, in the Island of Sumatra, it is on the shores of these islands only, and in the Malay Peninsula, that the Malays are to be found. Besides the state of Menangkabu, in the interior, Sumatra has on its eastern side the Malay states of Acheen, Siak, and Palembang. In the Peninsula, the principal Malay states are, Queda, Malacca, and Johore, on the western; Tringano, Patani, and Pahang, on the eastern side. However the Malay nation may have originated, it has spread itself far and widely; and its tribes have ever acquired a predominance, the result of mental vigour and energy of character, over the aborigines of the districts, or islands, appropriated by right of conquest. At one time the Malay power in the Indian Archipelago appears to have been far greater than at present. That the Malays once occupied a high and commanding political station in these seas, appears (as Raffles observes) to be beyond a doubt; and that they maintained this position until the introduction of Mahometanism, seems equally probable. "From the geographical situation," he adds, "of the more important countries then occupied by them, they were the first to come in contact with Mussulman missionaries, and to embrace their tenets; to which circumstance the dismemberment of the empire, and the decline of their power, previously to the arrival of Europeans in these seas, may, perhaps, be attributed. At that period, however, the authority of Menangkabu, the ancient seat of government, was still acknowledged; and the states of Acheen and Malacca long disputed the progress of the Portuguese arms. The whole of Sumatra, at one period, was subject to the supreme power of Menangkabu; and proofs of the former grandeur and superiority of this state are still found, not only in the pompous edicts of its sovereigns, and in the veneration and respect paid to the most distant branches of the family, but in the comparatively high and improved state of the cultivation of the country, and in the vestiges of antiquity which have been recently discovered in it." At what time the people of Menangkabu embraced the doctrines of the prophet, Sir S. Raffles could not correctly ascertain: the conversion of Malacca and Acheen took place in the thirteenth century; but it is very doubtful whether Menangkabu was converted previously to this date; although the Mahometan faith is said to have been promulgated at Sumatra as early as the twelfth century. It was about this latter period (1160), according to the same authority, that a colony, issuing from the interior of Sumatra, established the maritime state of Singapura, at the extremity of the Malay Peninsula, where a line of Hindu princes continued to reign until the establishment of Malacca, and the adoption of the Moslemin tenets, in 1276. Whatever, in more re-

mote times, may have been the nature of the intercourse between foreign nations and Menangkabu itself, it is known that Singapura, during the period noticed, was an extensively maritime and commercial state; and that, on the first arrival of the Portuguese at Malacca, Menangkabu, as an emporium, embraced the largest portion of the commerce between eastern and western nations. With the progress, and ultimate supremacy, of the Europeans, is associated the decline and fall of the Malay states of Malacca and Acheen: but long previously had the maritime and commercial enterprise of the people conduced to their wide dispersion through the Archipelago: yet the power and policy of their European visitors, by breaking down their larger settlements, contributed to their still wider diffusion; and, consequently, to the formation of various small establishments beyond the territorial limits subjugated by their new enemies. (See *Append. to Life of Sir T. S. Raffles*, for much valuable information.)

The Malays are of moderate stature, and of a bronzed or coppery complexion, with long black hair; the vertex is round, the face oval, the forehead open, the zygomatic arches somewhat prominent; the eyes are rather more distant from each other than in the European, and the outer angle is more elevated; the nose is prominent; the mouth moderate or large, the alveolar arch but slightly oblique; the lips are thin; the inside of the mouth is violet or purple; the beard is moderately stiff, and thin; the general contour of the body graceful, and indicative of strength. The Hindoos are usually of smaller stature, and of more delicate contour, with long, black, glossy hair, a rounded vertex, and somewhat oval face; the eyebrows are arched and slender, the nose prominent, and the mouth moderate, with thin lips, and the beard thin.

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Skull of Malay.

In the Malay skull, from which the representation (fig. 201) is taken, the forehead is narrow, and laterally compressed, and the frontal sinuses are well marked; the external orbital processes are bold; the orbits sweep downward and outward, throwing out the malar bones; the occiput is prominent, whence there is an oblique ascent up to the vertex, just behind the coronal suture, where the cranial arch is at its greatest elevation.

It still remains to offer a few observations on the Polynesian Branch of the Malays, of which the New Zealanders constitute an example.

POLYNESIAN BRANCH.—Lesson restricts the term, Polynesian, to the islands contained in, or immediately bordering on, the Malayan Archipelago; applying the term, Oceanic, to the numerous groups of islands with which the Pacific is studded, from New Zealand to the remote Sandwich Isles. Far preferable is the application of the term, Poly-

nesian (πολύς, multitudinous, νῆσος, an island) to the Oceanic groups; and of Malayan, to the islands adjacent to the Peninsula of Malacca.

It would appear that, with certain exceptions, namely, New Guinea, and the islands to the eastward, New Britain, New Ireland, Solomon's Isles, New Caledonia, the Fejee Isles, and, perhaps, a few others, the whole of these islands are peopled by a tide of Malayan origin; certainly not altogether unblended with streams from other sources. Throughout this vast range the Malay language is spoken, in different dialects, and in various degrees of corruption; and the natives are distinguished by the bronzed, or coppery, complexion of the Malayan race.* In New Zealand, as in other islands, traces of a mixture are to be detected. Crozet divides the New Zealanders into whites, browns, and blacks; † the last being derived, as he conceives, from New Holland (Alfourous); and who, by their mixture with the white race, still the most prevalent, have produced the intermediate brown. Cook, in his first voyage, notices the fact, that people about the Bay of Islands are darker than those of the more southern parts; and afterward, in his third voyage, he states, that their colour varies from a "pretty deep black" to a "yellowish or olive tint." ‡ Mr. Marsden also remarks, that the people of Shukehangou are much fairer than those on the east coast; and both Cruise and Crozet observe, that the dark-coloured portion of the population are characterized by a more diminutive stature than the fairer race. Whether the black (or Alfourou?) portion is of more recent introduction than the lighter, bronzed stock, or whether we behold in it the relics of a people of ancient denizenship, which have been almost extirpated by the arms of a race overwhelming their territories, admits of a question: the latter opinion appears to be the most plausible.

The Malay dialect, spoken in New Zealand, is nearly the same as that spoken in the Society and the Friendly Islands. The unfortunate Marion, and our great navigator, Captain Cook, noticed the resemblance it bears to the language of Tahiti (Otaheite), and its dissimilarity to that of Solomon's Islands. On Cook's first visit to New Zealand, he found, that a native of Tahiti could make himself perfectly understood by speaking his own tongue; and Omai, whom Cook brought from Tahiti, on his second visit, easily learned to converse with the New Zealanders, as well as with the people of Tonga; the difference between the New Zealand

* Lesson says, that the Oceanic Branch, "which authors place in the Malay race, is only an offset of the great Hindoo family, of which it has all the characters: it is disseminated through the islands, scattered in the immense southern ocean, and peoples, in great part, all the Oceanic lands, from the Sandwich Isles to New Zealand and Easter Island."

† By the term, white, is to be understood a complexion no darker than that of the swarthy inhabitants of southern Europe. The inhabitants of Tahiti are very fair, and instances of yellow hair are not unfrequent among them. The fairness of the Sumatrans is also remarkable.

‡ A dusky black, tinged with yellow, is the complexion of several New Zealanders, from the neighbourhood of the Bay of Islands, who had been lately in London.

language and that of Tahiti being, as Cook states, not greater than that between the dialects of the northern and western parts of England.*

The New Zealanders believe in the existence of spiritual powers, and, among them, in a malignant demon, whom they term Atua,† an immortal shadow, as a native explained it to Mr. Marsden. The custom of tattooing‡ is universally practised, as it is now among the most savage nations ;

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A native of New Zealand.

* The testimony of La Perouse is to the same effect :—" At first," he says, " we perceived no resemblance between the language of the people of the Navigator's Islands and that of the people of the Society and Friendly Islands, the vocabularies of which we had with us ; but a closer examination taught us that they spoke a dialect of the same tongue. A fact which may tend to prove this, and which confirms the opinion of the English, respecting the origin of these people, is, that a young Manilise servant, who was born in the province of Tagayan, on the north of Manilla, understood and interpreted to us most of their words. Now, it is known that the Tagayan, Talgal, and all the dialects of the Philippine Islands, in general, are derived from the Malay ; and this language, more widely spread than were those of the Greeks and Romans, is common to the numerous tribes that inhabit the islands of the South Sea. To me it appears demonstrated, that these different nations are derived from Malay colonies, who conquered these islands at very remote periods ; and, perhaps, even the Chinese and Egyptians, whose antiquity is so much vaunted, are modern, compared to these."

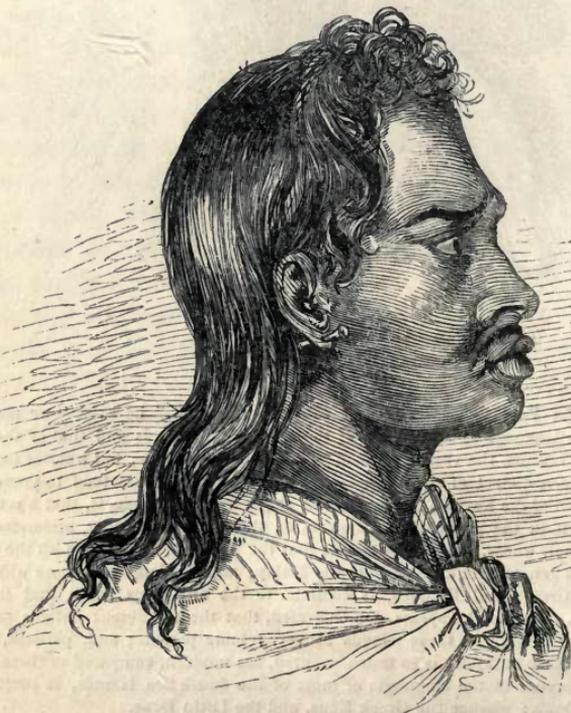
† This word, which occurs in the languages of most of the South Sea Islands, is conjectured to come from the Sanscrit Dewa ; whence the Greek Zeus, and the Latin Deus.

‡ Tattooing is called moko, or amoko, in New Zealand. The word tattoo, used in most of the islands of the Pacific, is derived from ta, to strike.

and, also, was among the ancient Scythians and Britons. The hair, which is long, black, and flowing, is worn tied up on the crown of the head, as it is among the Javanese: their weapons are spears and a stone war-club (of hard, polished, green talc), called mery, or mearee. Tabooing, or rendering persons or things sacred, and not to be touched, is also one of their practices. Their cannibalism is too well authenticated to be denied; still, they do not devour the bodies of friends, or of persons who have died from disease, but of enemies, killed either in battle or afterward, and of slaves, slaughtered on purpose to afford a banquet. The New Zealanders are brave, warlike, intelligent, and enterprising; but treachery, and an indomitable spirit of revenge, cannot be excepted from among their moral composition. When excited, their rage amounts to frenzy, and they display it in the most frightful gesticulations and contortions of countenance. They carry all their feelings, in fact, to an extreme; insomuch that, when they meet friends or relations, from whom they have been for some time separated, they cut themselves, in token of joy, with flints, or shells, on the arms, breasts, and faces.

The following representations of the physiognomy of the natives of

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A native of Tahiti.

Tahiti (fig. 203), the Sandwich Islands (fig. 204), and of Ombai Island (fig. 205), near Timor, are interesting and characteristic. The physiognomy is strongly marked in each by sternness and ferocity; but, as is universally found to be the case, the expression of the features becomes ameliorated by civilization, and by mental and moral culture. Mr. Darwin speaks in very favourable terms respecting the natives of Tahiti, and regards them as far superior to the New Zealanders, both mentally and physically; a superiority to be attributed to the humanizing influence of British exertions, in reclaiming them from the barbarous habits and customs which, till recently, placed them amongst the most degraded of the human race, and which still predominate among the natives of other islands, where cannibalism, and the most barbarous rites and practices, are continued; and where sanguinary deeds of revenge, and atrocious cruelties, are incessantly perpetrated.

With regard to the conformation of the cranium, in these Oceanic tribes,

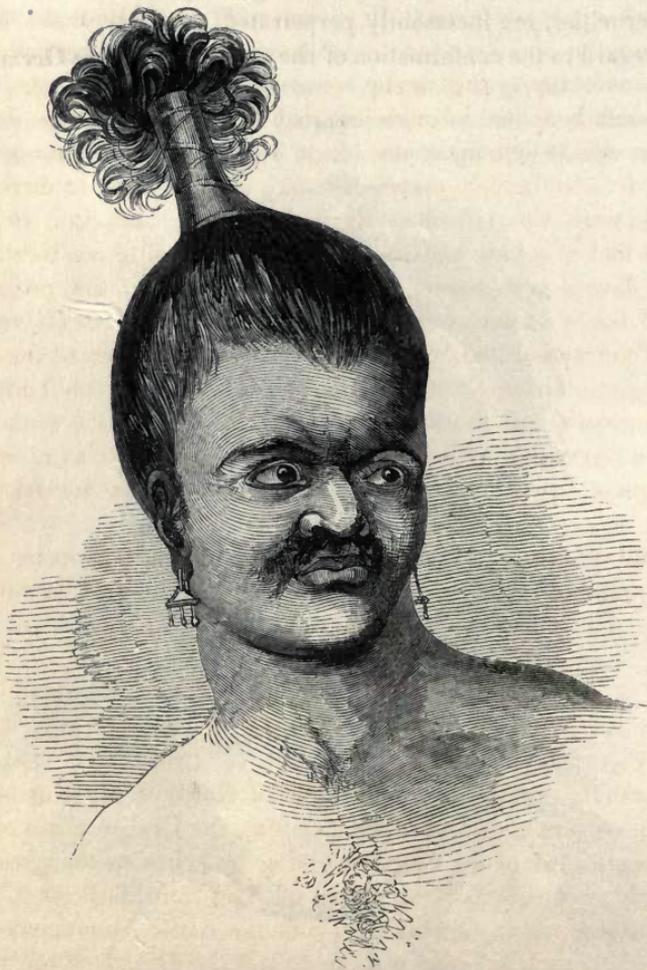
204



A native of the Sandwich Islands.

Lesson remarks, that "the coronal bone of a New Zealander is less bulging than that of a European. The external orbital angles are much thicker, and the crooked line, which separates them, is also more projecting. The alveolar arches, also, are a little more developed; and the external occipital protuberance is more strongly marked. The summit of the head is produced a little in the shape of a sugar-loaf, as in that of the Alfourous. The bridge of the nose has no peculiarity; the anterior part of the body of the lower jaw is placed much as in the European, from which it only slightly differs in the rounding of the angles, and in the slight bend of the basis. Lastly, the bones of the cranium of the New Zealander are remarkable for their great thickness."

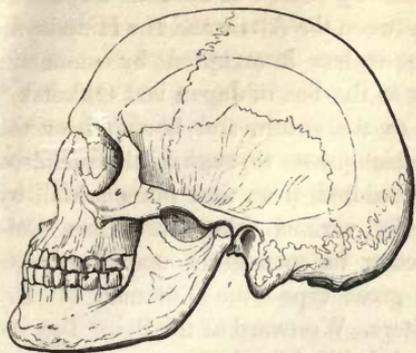
205



A native of Ombai Island.

In the skulls of the New Zealanders, preserved in the collection of the Royal College of Surgeons,

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Skull of New Zealander.

of one of which, the annexed figure (206) is a representation, the following particulars were observed:—They are heavy, and of large size, compressed laterally, with a tendency to a mesial elevation of the cranial arch, but far less decidedly than in the Tasmanian or Alfourou. The malar bones are large; the alveolar processes oblique; the nasal bones moderate, and tolerably well elevated; the lower jaw is broad and strong, its ascend-

ing branch is oblique, the angle somewhat rounded, and the base of the ramus slightly arched (though less than in a skull of a Fejee Islander), so that the chin, when the ramus rests on a plane, does not touch the surface of it: the basilar process of the occipital bone is directed less obliquely upward than in most European skulls, and, in this respect, agrees with that of a native of the Fejee Isles. In all these New Zealand skulls, the lateral compression of the frontal portion, the projection of the parietal bones at their centre, and the ridge-like form (more or less decided) of the mesial line of the cranial arch, the boldness of the external orbitary angles, the amplitude of the cheek-bones, the obliquity of the alveolar processes, and the arched form of the base of the ramus of the lower jaw, are peculiar features. The posterior fall of the skull, sweeping down obliquely from the vertex to the occiput, is also remarkable and constant.

The skull of a native of Tahiti, figured by Blumenbach in his *Decades* (tab. xxv.), closely agrees with those of the natives of New Zealand.

MONGOLE STOCK.

MONGOLE BRANCH.—From the Gulf of Kara, or the Karskoye Sea (washing the eastern shores of Nova Zembla), the Uralian chain of mountains runs southward to the Caspian, giving branches to the great Altaic chain, which sweeps across the centre of Asia from Turkestan, bearing northward to the Sea of Okhotsk. From the Altaic Mountains, in Turkestan, runs a branch to Caubul, there to join the Himalaya range, which passes through Caubul, Cashmere, and Nepal, and spreads over Thibet, send-

ing ramifications through China, the Birman Empire, and the Malay Peninsula. Other branches run through Corea; and a continuation follows the Coast of Manchouria, and joins the Stanovoy branch of the Altaic chain, at the south-east extremity of Siberia. Between the Altaic and the Himalayan chains stretches a vast desert, more or less interrupted by mountain ramifications, extending from Bucharia to the Sea of Japan and Okhotsk,* leaving China, Thibet, and Hindostan to the south, and bounded, on the west, by the range termed Belur Tag, which passes through Little Bucharia. The whole of this vast tract has been inhabited, from time immemorial, by fierce nomadic hordes, distinguished by various titles—as Huns, Calmucs, Mongoles, Mantchous, &c.; acting independently under separate leaders, but all appertaining to one great type—the Turanian of Dr. Prichard, and the Mongole of most writers. Westward of the Belur Tag are the deserts of Turkestan and Bucharia, inhabited by the Tartars, or Tatars, regarded, by most naturalists, as appertaining to a type distinct from that of the Mongole. Lawrence expressly states, that they belong to the Caucasian, or Iranian division of the human race: he, consequently, regards the description of the Tartari, by Matt. Paris, as applicable, not to the true Tartars, but to the hordes of Mongole invaders, who had penetrated, with their arms, into Europe: and Blumenbach observes, respecting the same description, “the writer (Matt. Paris) obviously speaks, not of the genuine Tartars, but of a people widely different from them; namely, the Mongoles, or Calmucs, whose only affinity to them consisted in the name by which then, and even now, the two races are improperly confounded. All the characters, therefore, which naturalists have assigned to the Tartars, belong to the wholly different Mongolian race. We know, on the contrary, that the Tartars are a handsome people, conspicuous for the beauty and symmetry of the countenance, as is evinced by the skull, which presents a complete contrast to the Mongolian characters,” &c. “The Tatars, or Tartars,” says Gibbon, “were a primitive tribe, the rivals, and, at length, the subjects of the Moguls. In the victorious armies of Zingis Khan and his successors, the Tartars formed the vanguard, and the name which first reached the ears of foreigners was applied to the whole nation. (Teret, in the *Hist. de l’Acad.* tom. xviii. p. 60.) In speaking of all, or any of the northern shepherds of Europe or Asia, I indifferently use the appellation of Scythians and Tartars.”† These tribes, however, became blended with the Huns,

* The great rivers which take their rise in the Altaic chain; viz.—the Irtish, the Enissey, the Lena, &c., travel northward, traversing Siberia to the Arctic Ocean. From the Himalaya range, the Indus, the Ganges, the Ira-wadi, and the Kiulon-kien, run southward. The Kian-ku, and the Ho-ang, or Yellow River, run eastward; as does also the Amoor, or Saghalien River, which has its origin partly in the Siolk mountains, but principally in the Stanovoy mountains, and traverses Manchouria. The Great Desert has no large rivers.

† See note, vol. iv. p. 231. 8vo. 1827. Gibbon uses the terms Tartars, Scythians, Huns, &c. indiscriminately; and often so as to lead to some confusion.

under Attila (in the fifth century), a true Mongole tribe, whose original country was an extensive barren tract, north of the great wall of China; and who, antecedently to the time of Valens, when they threatened the Roman Empire, had been formidable to that of China. (See M. de Guignes, for the original history of the ancient Hiong-Nou, or Huns.)

In the thirteenth century, Zingis Khan, whose ancestors had been tributary to the Chinese Emperors, with 700,000 Mongoles and Tartars, spread the terror of his name through China, Persia, Hindostan, and Europe. The destruction of independent Tartary was his last achievement on record. By Tamerlane (in the fourteenth century),* Hindostan was subdued; and the conquest of Persia was accomplished by Holagou Khan, the grandson of Zingis, and the brother and general of the two successive emperors, Mangou and Cublai. In all ages the Mongole tribes have been renowned for their valour, and dreaded for their ferocity: skilful as horsemen, and dexterous in the management of the lance and the bow; rapid in advance, sudden in retreat—at once daring and patient—they spread terror and desolation around them; and even the Gothic nations succumbed, for a season, beneath their resistless impetuosity. The terror they inspired led to the belief that they were the offspring of witches and infernal spirits; and their shrill voice, uncouth figure, and strange gestures, countenanced the superstition. They were compared to the misshapen figures, called *Termini*, which were often placed on the bridges of antiquity. Distinguished from the rest of the human species by their broad shoulders, flat noses, and small black eyes deeply buried in their heads, their countenance was deemed hideous; and, as they were almost destitute of beard, “they never enjoyed either the manly graces of youth, or the venerable aspect of age.” The portrait which Jornandes, a Gothic historian, draws of Attila, is applicable to a Calmuc of the present day:—a large head, a swarthy complexion, small deep-seated eyes, a flat nose, a few hairs in the place of a beard, broad shoulders, a short square body of nervous strength, though of a disproportioned form. Essentially similar is the account given by Pallas, of the Calmucs: he observes, that they are generally of moderate stature; few being tall, and many below the medium standard: instances of deformity are very rare among them; but most exhibit an outward bending of their arms and legs, which results from the practice of causing them, when children, to rest in their cradles on a kind of saddle, and also from their habit of riding on horseback continually, almost as early as they are able to walk. Their neck is generally short; their limbs are thin and lean: even the principal and more opulent men among them are seldom corpulent, a circumstance in which they differ from many of the Kirguise

* Tamerlane was not of the house of Zingis, except, perhaps, remotely by the female side.

and other Tartar nomades. The characteristic features of the Calmucs consist in the oblique position of the eyes, the inner angle of which, descending toward the nose, is slightly open and fleshy; in the eyebrows being black, thin, and forming a low arch; in a peculiar formation of the nose, which is generally flattened and crushed down toward the forehead; in the prominence of the cheek-bones, and in the roundness of the head and countenance. The ball of the eye is likewise very brown; the lips large and fleshy; the chin short; the teeth very white, continuing fine and sound, even in old age; the ears are of enormous size, and loose from the head. These characteristics are all, more or less, apparent in every individual. It is stated, by the same authority, as a remarkable circumstance, that a mixture of the Russian and Tartar, with the Calmuc and Mongole, produces very beautiful children; whilst those of Calmuc and Mongole origin are of misshapen figure, being, until the age of six years, bloated and ill-complexioned: as they grow, however, their features assume a more regular form.

The annexed portrait of Feodor Iwanowitsch, a Calmuc, educated at

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Feodor Iwanowitsch.—A Calmuc.

Carlsruhe, and afterward an engraver of celebrity at Rome, well exemplifies the Mongolian cast of countenance, as conveyed by the foregoing descriptions.

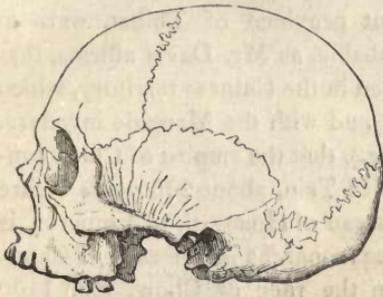
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Skull of Mongole.

The peculiarities of the skull of the Mongole race (fig. 208) consist in the globular form of the cranium, the flatness and width of the forehead, the breadth and depressed form of the face—the glabella and ossa nasi being placed nearly on the same plane with the malar bones, which have a great lateral projection, and incline outward—and the boldness of the zygomatic arches. The orbits are large, but the superciliary ridges are very slightly marked; the alveolar edge of the jaws is obtusely arched in front, and the chin is rather prominent.

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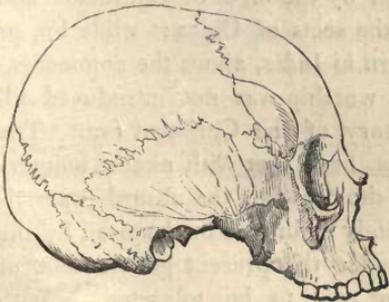


Skull of Chinese.

Fig. 209, represents the skull of a Chinese, in the Museum of the Royal College of Surgeons. The general contour is globular; the orbits are ample, and their inner and lower angles approach each other, encroaching on the sides of the nose, while the superior inner angle is gently rounded; the lachrymal canal is very large, and open; the cheek-bones project, being greatly developed, and inclined outward at the lower margin; the forehead is narrow, and somewhat elevated; so that a line, following the direction of each cheek-bone, just touches the sides of the forehead, and, meeting above, describes the form of a pyramid; a transverse line drawn across the face, from angle to angle, of the cheek-bones being its base, Δ . The zygoma sweeps boldly outward, with a round arch. The breadth of the skull, between the temporal bones, is great; and also between the mastoid processes. In an Esquimaux skull (imperfect), in the Museum of the Royal College,

of Surgeons (fig. 210), the same essential features are presented.

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Skull of Esquimaux.

In the *Decades* of Blumenbach (tab. xv.), is the figure of the skull of an ancient inhabitant of South Siberia, taken from one of the burial places found near the old mines, in the mountain districts, and ascribed, by the natives, to Ischudæ, or barbarians—a people evidently of the Mongole family, but of whom no historic memorials exist; their remains and works alone surviving the lapse of ages. The skulls and bones are said to have lost all their animal substance,—a proof of the high antiquity of the people whose existence they attest.

It would appear, that the natives of Hungary, are, in some degree, to be referred to a Mongole origin, blended with Scythian and Slavonian families. Hungary has been successively occupied by three Scythian, or Mongole and Scythian colonies; viz., first, by the Huns of Attila; secondly, by the Abares, in the sixth century; and, thirdly, A.D. 889, by the Turks, or Magiars, the immediate ancestors of the modern Hungarians, whose connexion with the two former is remote, and, perhaps, even doubtful.

With respect to China, its ancient records are enveloped in great obscurity: there is, however, little reason to doubt that the earliest tribes occupying that region, and the adjacent province of Thibet, were of Mongole lineage. Nevertheless, it is probable, as Mr. Davis affirms, that a colony from India, at an early era, settled in the Chinese territory, which became blended with the primitive race, and with the Mongole invaders. Mr. Davis observes (see *Trans. Asiat. Soc.*), that the empire of China cannot be dated earlier than the dynasty called Tsin, about 200 years before Christ; and the term Wong, or Prince, instead of Hoang-ti, or Emperor, is applied, by their own historians, to all the monarchs of the race of Chow, which immediately preceded it. From the race of Chow, B.C. 1100 to 240, may be dated the authentic history of the Chinese, which commences with the *Chun-tsew* of Confucius, or the annals of his own times, in which he relates the wars of the petty states against each other. The dynasty of Chow, from about the middle of which the records may be regarded as authentic, was distinguished by the birth of Confucius and of Laon-keun, the founders of two of the sects of China; while Fo, or Buddha, the author of the third, was born in India, about the commencement of the same period, although his worship was not introduced till long afterward; viz., in the first century of the Christian era. The memory and the doctrines of Confucius have met with almost uninterrupted veneration, down to the present time; while the absurd superstitions of the other two have been alternately embraced or despised by the different sovereigns of the country: under the present government of Mantchou origin, they can scarcely be said to be tolerated. With the exception of the worship of Buddha, the Chinese appear to have received nothing from their western neighbours, the Hindoos. Before

the invasion of Zingis Khan, China was divided into two empires, or dynasties—the north, or Cathay, and the southern, or Mongi; and these, from 1234 to 1279, were divided between the Great Khan and the Chinese: the northern empire, which had been dismembered by Zingis, was finally subdued, seven years after his death. The perfect reduction of China was reserved for the arms of Cublai, and the whole of the country, from the great wall* (built in the third century, A.C.) to Tonquin, submitted to his dominion.† The circumjacent kingdoms of

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Chinese.

* In the third century, A.C., an immense wall, 1,500 miles long, was erected to defend the frontier northern regions of China from the inroads of the Huns, who, nevertheless, overcame this obstacle, and obtained from Kaote, the Chinese monarch, an annual tribute of silk and money, besides a select band of the fairest virgins; and this alliance between the haughty Tanjous, or chiefs of the Huns, and the Chinese, was thus secured by their marriage with the daughters of the imperial family and other nobles.

† Gibbon says that Cublai declined from the pure and simple religion of his great ancestor, and sacrificed to the idol Fo; and his blind attachment to the lamas of Thibet, and the bonzes of China, provoked the censure of the disciples of Confucius. The attachment of the khans, and the hatred of the mandarins, to the bonzes and lamas, seems to represent them as the priests of the same god, of the Indian Fo, whose worship prevails among the sects of Hindostan, Siam, Thibet, China, and Japan.

Corea, Tonquin, Cochin-China, Pegu, Bengal, and Thibet, were also reduced to obedience, if not absolutely conquered: 140 years after the death of Zingis, his dynasty was expelled. In the seventeenth century, China again yielded to the arms of an invader, Xung-ki, a Mantchou king, whose successors still hold the sovereignty.

The Mantchou Tatars, as we are informed by Barrow, are scarcely distinguishable from the Chinese: the latter are rather taller, and of a more delicate and slender frame than the former, who are, in general, short, thick, and robust. The small eye, elliptical at the end next the nose, is a predominating feature in the cast of both the Chinese and Tatar countenance, and they have the same high cheek-bones and pointed chins. Their complexion is a tint between a fair and dark, expressed by the word, brunet, or brunette; and the shades of this tint are deeper, according to exposure to the influence of the climate. Hence, the women of the lower class, who labour in the fields, or who dwell in vessels, are, almost invariably, coarse, ill-featured, and of a deep or brown complexion, like that of the Hottentots. The portrait (fig. 211) is characteristic of the Chinese stamp of countenance.

The natives of Thibet, according to Turner, have black hair, and small black eyes, with long pointed corners, as if extended by artificial means; the eyelashes are so thin as to be scarcely perceptible; and the eyebrows are but slightly shaded: below the eyes, the face, which is rather flat, is broadly spread, but it narrows from the cheek-bones to the chin: their skins are remarkably smooth; and, even at a very advanced age, the rudiments of a beard are scarcely perceptible: their complexion is not so dark, by many shades, as that of the European Portuguese. (See Turner's *Account of an Embassy to the Court of the Teshoo Lama*.)

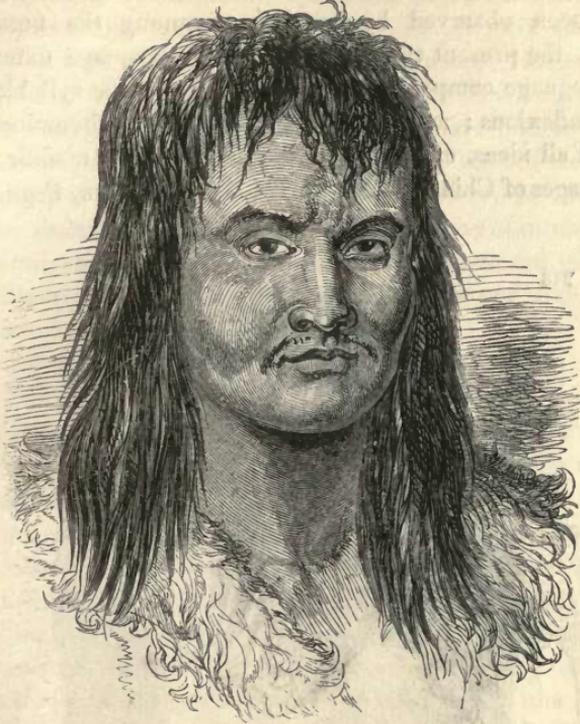
Of the Persian conquest by Holagou-Khan, the grandson of Zingis, and afterward by Tamerlane, or of the successful invasion of Hindostan by Tamerlane, who trod in the footsteps of Alexander, but paused not where the Macedonian stopped, and made his triumphal entrance into Delhi, glutting his soldiers with the pillage of the city and the blood of the Gentoos, this is not the place to treat: these events are here merely noticed to shew the extent of the Mongole conquests.

HYPERBOREAN BRANCH.—To the Mongole type many nations, inhabiting the wilds of Siberia, above the Altaic chain, to the borders of the Northern Ocean, are also referable. The natives of Corea and Kamtschatka, and the adjacent Aleutian Islands; the Tongouses, or Tongutski; the Samoiedes and Ostiacs, may also be included, together with the Greenlanders and Esquimaux tribes of North America. The characteristic features of the Samoiedes are well represented by the annexed figure (212).

The hair is long, coarse, and black; the face flat and broad; the

cheek-bones projecting ; the eyes long, narrow, and oblique ; the nose is depressed ; the mouth large ; the beard (of the male) scanty ; the complexion dusky brown. The Samoiedes are short in stature, but broad set ; and the lower limbs, though strong, seem disproportionately abbreviated.

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Samoiede.

Among the tribes of the Mongole section of mankind, the Esquimaux have been already mentioned. Although inhabiting the northern parts of America, from Behring's Straits to the extremity of Greenland, a tract of country remote from the abodes of the nomades of central Asia, the characters of the race, of which they form a branch, are sufficiently palpable : high cheek-bones, broad foreheads, flat faces, small narrow eyes, with the corners elongated, and closed so as scarcely to shew the white, wide mouths, flattened noses, dusky yellow, or brown complexion, and straight black hair, are observed, throughout them all. The men are of moderate stature, or low, but broad-set, and the hands and feet are small. When, however, it is said, that the Esquimaux, the Ostiaks, or the Samoiedes, are of Mongole blood, it is not to be inferred that they have sprung immediately from the Mongoles, or any one of the central Asiatic tribes, as they now exist ; but that they, with the central Asiatic nomades,

are of the same type, and have either branched off from a given stock, at some remote period antecedent to history, or are the descendants of distinct stocks, having the same physical peculiarities, and being referable to the same head, under whatever general appellation, for distinction's sake, it may be placed. The annexed figure (213) represents the Esquimaux physiognomy.

It has been observed by many, that, among the nations in Asia belonging to the present type, a monosyllabic language extensively prevails — a language composed of radical words of one syllable, admitting of no true inflexions; and, therefore, awkward and circumlocutory in the expression of all ideas, excepting those of the simplest modification. Such are the languages of China, Cochin-China, Tonquin, Ava, Pegu, Siam,* and

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Esquimaux.

* According to the Rev. Mr. Gutzlaff, the Siamese language, though originally monosyllabic, is not entirely so. "The Siamese have gradually changed from the monosyllabic system, by the introduction of words from the Páli language (which was introduced as the sacred language by Samut T'hakudum), and even blending and forming their own words according to this model. The Siamese language is euphonious, expressive of the subjects spoken of: it unites, in itself, the simplicity of a monosyllabic

Thibet. It is, perhaps, too presumptuous to say, with some, that in these languages the imperfection of the first attempt at speech is to be recognised; an imperfection continued for thousands of years, without improvement, and remaining, as it was formed, in the "cradle of our species;" for what do we know of the state of language in the cradle of our species? But, it may be affirmed, that, however it arose, and from whatever cause it continues, it opposes a great barrier to the progress of true civilization, and the advancement of science and literature; though it cannot be conceded, that the people who speak such a language "must ever remain children in understanding." The monosyllabic condition of language is not, however, by any means a universal concomitant of the Mongole or Turanian type of physical structure: on the contrary, the Mongoles, the Calmucs, the Burats, the Samoiedes, and even the Mantchous, have a polysyllabic language; as have, also, the Esquimaux and Greenlanders: but, as far as known, it is to nations of the Mongole type that languages of a monosyllabic structure are limited.

PROGNATHOUS STOCK.

AFRO-NEGRO BRANCH.—This branch includes the races usually comprehended under the term Negro, or Ethiopian.

The indigenes of Egypt, Ethiopia, Abyssinia, and Atlantica may be regarded as constituting a sort of link between the typical forms of the Caucasian stock, and the races to which the term Negro, or Ethiopian, is more or less correctly, but generally, applied. Their approximation toward the true Negro, varying, however, in degree, may be detected in many of their physical characters; for example, in the form of the eye, the elevation of the cheek-bones, the thickness of the lips, and the texture of the hair, which, though not woolly, is more or less crisp, or frizzled: and it would seem as if the peculiar features of the Ethiopic and Atlantic branches of the Japetic stock (they might be denominated Afro-Caucasian) were the first steps toward those stronger traits which characterize the Negro, and which, in some of this race, are carried out to their maximum. In the first receding step there is no loss of grace, of beauty, or of intellectual expression; yet we feel that a receding step has taken place, and, also, that this step is toward the Negro. This fact was perceived by Ledyard, who says, "I suspect the Copts to have been the origin* of the Negro race; the nose and lips correspond with those

with the advantages of a polysyllabic language. The Cambojan has many rough sounds; the Peguan is remarkable for harshness; the Laos, for clumsiness; and the Burman for an abundance of nasal sounds; while the Siamese maintains, among them all, the same character as the Italian among the Roman dialects. Compared to the Chinese, in regard to sounds, it is richer, because it has more initials, diphthongs, and finals, to form them."—Gutzlaff on Siamese Language; *Trans. Royal Asiatic Soc.* vol. iii.

* We do not agree with Ledyard, as to the Coptic origin of the Negroes: it is his testimony, as to the inclination of the Coptic features towards those of the Negro merely, that we wish to notice.

of the Negro: the hair, whenever I can see it among the people here, is curled; not like that of the Negroes, but like the Mulattoes."

Among the African races usually comprehended under the term Negro, or Ethiopian (which latter term, in the sense in which it is used by most writers, is highly objectionable), are to be found numerous grades and varieties; and many, except in colour, can no more be referred to the Negro stock, than can the Copt, the Abyssin, the Galla, or the Berber.* The characters of the genuine Negro race of Mozambique, and especially of Guinea, are as follow:—a black complexion, with black and woolly hair; thick protruding lips; prominent narrow eyes; a retreating chin; the incisor teeth having an oblique direction; a low, flat nose, depressed and spreading at the nostrils; a meagre calf, seated high on bowed shanks; a projecting heel; high shoulders; and the skull compressed laterally, and elongated; the forehead being low, depressed, narrow, and retreating. The annexed figure (214) is the portrait of a genuine Negro, in which the characteristic physiognomy is admirably delineated. Our knowledge of the indigenous races of Africa is yet in its infancy: but, we have reason

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Negro.

* The Berber tribes, which live 700 miles south of Algiers, in the remote parts of Atlantica, and towards the Great Desert, differ much, both in colour and countenance, from the northern Berbers; they are black, and approach the Negro both in hair and features: such are the Aith-Eregaiah, and the Aith-Ouergelah, according to the testimony of Mr. Hodgson.

to believe, that the term Negro, as thus characterized, will be found to have only a very restricted application. Winterbottom, in his account of the native Africans of Sierra Leone, observes, that "the sloping contracted forehead, small eyes, depressed nose, thick lips, and projecting jaws, with which the African is usually caricatured, are by no means constant traits; on the contrary, every gradation of countenance may be met with, from the disgusting picture too commonly drawn of them, to the finest set of European features." We may, indeed, ascend a progressively rising scale, from the Negro of Guinea, to the Mandingo of Gambia, or the Foulah; from the lowest style of the human countenance, to that of the European model. As a general rule, it would appear that the tribes along the coast are decidedly inferior, physically considered, to those which tenant the interior countries of Senegambia and Soudan: these only are mentioned, because the whole of the region from Biafra, and the Gaboon coast, to Ajan and Magadoxo on the east, occupying a space on both sides of the equator, from Nigritia to the tropic of Capricorn, with the exception of the countries along the coast,* is a terra incognita. It is, indeed, only within the last few years, that the central regions of Nigritia have been penetrated by daring and devoted Europeans; and the discoveries of those who have reached, or attempted to reach, the inland lake, Tschad, or the city of Timbuktoo, have opened to our view nations till now unheard of, advanced in arts, commerce, and government, to a degree we were little prepared to expect; having towns of great extent, governed by laws, practising agriculture, and professing the doctrines and creed of Islam, received from men whose enthusiasm carried them beyond the mark which bounded the ambition of the Roman, or the commercial enterprise of the Phœnician.

To the south of Soudan, the semi-civilization which there prevails (the result of the introduction of Islamism), abruptly ceases; a barrier-chain of mountains obstructs its progress. These mountains, extending from the south of the Abyssinian Alps, below the tenth degree, north-latitude, to join the highlands of Senegambia, form the northern boundary of an elevated table land, occasionally penetrated by adventurous natives from Soudan, with beads and other articles of traffic, for skins and slaves; but unmapped by the European traveller. Major Denham, who visited the Valley of Mandaar, to the south of the lake Tschad, approached the foot of this mountain range, the bold sides of which overhang the level region. Its recesses contain the abodes of numerous and barbarous tribes, whose dwellings were seen in clusters on the tops and sides of the hills which overlook Mandara, and whose fires, which were "nightly visible in the different nests of these unfortunate beings, threw a glare upon the bold peaks and blunt promontories

* Namely, Congo on the west, and the Zanguebar and Mozambique country, and the region around the Bay of Sofallo, on the east.

of granite rock by which they were surrounded, and produced a picturesque and awful appearance." The inhabitants of this wild region paint and stain their bodies of different colours, go almost naked, and live in common, without regard to any relationship. Lakes of large extent are found in the interior; and the valleys produce figs, mangoes, and other fruits. On penetrating into this region a short distance, with some people of Mandara, we saw, says Major Denham, "the inhabitants run up the mountains, quite naked, with ape-like agility. On another occasion, a company of savages were sent from a Kerdy, or Pagan village, termed Musgow, as a peace-offering, to deprecate the Sultan, who was on the eve of making a kidnapping expedition into their country. On entering his palace, they threw themselves upon the ground, pouring sand upon their heads, and uttering the most piteous cries. On their heads, which were covered with long woolly, or, rather, bristly hair, coming quite over their eyes, they wore a cap of the skin of a Goat, or some animal like a Fox; round their arms, and in their ears, were rings of what appeared to be bone; and around their necks were from one to six strings of the teeth of the enemies they had slain in battle: teeth and pieces of bone were also pendant from the clotted locks of their hair; their bodies were marked, in different places, with red patches, and their teeth were stained of the same colour. Their whole appearance was strikingly wild, and truly savage. Endeavours to set on foot intercourse with them were in vain: they would hold no communication; but, having obtained leave, carried off the carcass of a horse to the mountains; and the fires that blazed during the night, and the savage yells, which reached the valley, proved that they were celebrating their brutal feast."

The mountain countries of Bertat and Fertit, to the west of Abyssinia, are inhabited by a race of savage Negroes, divided into different tribes, speaking different languages, or dialects; and the mountain regions of Kordofan are tenanted by similar tribes, but rather more advanced in some of the ruder arts, the result of their knowledge of the use of iron, and of a mode of obtaining it from the red oxide, with which the hills abound. On the hills and in the valleys of the Fazoclo chain, the defiles of which are traversed by the Bharel-Abiad, are the Shangalla tribes, a rude and savage race, oppressed and hunted down by the Abyssinians, and exhibiting a degraded picture of the unimproved Negro. Elephants, Hippopotami, Rhinoceroses, Ostriches, Crocodiles, Locusts, Snakes, and Lizards, and various roots of the earth, constitute their food. They are woolly-headed, jet black, robust, with narrow foreheads, high cheek-bones, flat noses, small eyes, and wide mouths. Bruce regards these tribes as the Rhizophagi, Elephantophagi, Acridophagi, Struthiophagi, and Agriophagi of Ptolemy. The Dobenah, according to the same traveller, are the most powerful of the Shangalla; they live near to the Tacazze, and feed upon the Elephant and the Rhino-

ceros ; in other districts their food is more promiscuous, consisting of the flesh of Buffaloes, Deer, Boars, Lions, and Serpents. In the valley of Wal-dubba, he notices a tribe who live upon Crocodiles, the Hippopotamus, and on fish, and, during the summer, on Locusts, which they boil and keep dry in baskets. Ostriches, as well as Lizards, which abound upon the Mareb, are the food of the eastern Shangalla. In the summer, the Shangalla live under the shade of trees, the branches of which they bend downward, and roof them with skins, so that, until the setting in of the tropical rains, almost every tree is a house. In the winter, they tenant the caves of the mountains, secured from the inclemency of the season. Such is a sketch of some of the Negro nations of the interior of the African continent : to pursue the subject in detail, is here impossible ; a condensed review can alone be attempted.

Senegambia.—Senegambia may be divided into a bold mountain region, with elevated table lands, occupying its central and southern portion, whence rise the Senegal, the Gambia, and their tributary branches, and into a flat western coast and northern district. From the promontory of Sierra Leone, which stretches out to the southern portion of the coast, the great mountain chain runs northward, giving off numerous ranges, intersected by ravines, through which the rivers rush, often over tremendous falls, in their passage to the level sea-coast. The most elevated parts of these ranges are unknown ; but, to the south, they are supposed to extend eastward, to the Kong range, and so communicate with Jibbel Kumri (the mountains of the moon). The natives of the Senegambia country consist of various tribes, or, indeed, nations, of which the following may be enumerated :—

The Foulahs, a widely-spread race, of which the mountain terrace of Timbu, or Teembo, may be regarded as the chief abode. The town, so called, surrounded by rocky deserts and mountain pastures, contains 9,000 or 10,000 inhabitants : they are an industrious people, who cultivate the ground, make leather, fabricate cloth, forge iron and silver, and have mosques and schools : they are also brave and warlike, have formidable armies, and have founded extensive kingdoms.* According to Park, the Foulahs (or Fúlahs) have well formed features, and soft or silky hair, without either the thick lips or the crisp hair of the Negro : he also says, that they are not black, but of a tawny colour, which is lighter in some states than in others ; and M. Golberry describes them as a fine, robust race ; courageous, strong-minded, and prudent : and states, that “ they understand commerce well ; travel in the capacity of merchants, even to the extent of Guinea ; and are formidable to their neighbours. The colour of their skin is a kind of reddish black : their countenances are regular, and their

* A kindred people, viz., the Felatahs of Soudan, whose capital is Soccatoo, and who are of the Foulah lineage, will be hereafter adverted to.

hair is longer, and not so woolly as that of the common Negroes: their language is altogether different from that of the nations by whom they are surrounded; it is more elegant and sonorous." They are zealous Mahometans. M. Durand gives a similar account, and, with Park, describes their hair as silky (*soyeux*) and "les traits petits et agréables."

The Mandingos. North of the Foulahs, the Mandingo tribes occupy a vast extent of alpine territory, the country between the high waters of the Niger and Senegal being their original abode. For industry, intelligence, and energy of character, the Mandingos have been universally celebrated by all travellers who have visited their country. They cultivate the ground, keep flocks and herds, and engage extensively and successfully in commerce. According to M. Golberry, their features are more akin to those of the blacks of India than those of Africa, being regular, and expressive of a generous and open disposition. Major Laing, whose description agrees with that of M. Golberry, states that their appearance is engaging; their features regular and open; their persons well formed and comely, averaging a height rather above the common. They are strict Mahometans; have public schools, in which the Marabouts teach the reading of the Koran: their towns are governed by an hereditary alcaid, and a council of elders. They have various manufactures:—they weave cotton stuffs; fabricate leather of beautiful texture; use indigo and other pigments as dyes; and have smelting furnaces for iron. The women are cheerful and pleasing; and instances of conjugal infidelity are very rare among them. The conquests of the Mandingos are very considerable: they have colonized the banks of the Gambia, from its sources to the sea, and established the kingdoms of Barra, Kollar, Badibon, Upper and Lower Yani, and Bambouk. Several nations, still in a state of Paganism, speak the Mandingo language, and are, probably, branches of the same family. Of these we may notice the Koorankos, who occupy the country between the Bullom and Immani countries on the west, and the Niger and the Kissi territory on the east, thence stretching toward the Kong Mountains; and the Bambarans, whose country extends along the Joliba, having Segou for its capital. The slaves, formerly brought to the French factories of Senegal and Gambia, were mostly from Bambarra. The Foulahs and the Mandingos are the two most powerful and widely spread races of Senegambia. Among the tribes of less note, are—

The Jallonkas. A tribe connected, as their language proves, with the Mandingos, and inhabiting the high mountains in the west of Senegambia, above Teemboo.

The Sokko, or Asokko. Of these little is known, but their language is said to resemble that of the Jallonkas.

The Rissi. Inhabiting the mountains about the sources of the Niger.

The Sulimas. Inhabiting the mountains to the south of Foutah-jallo.

Major Laing describes them as a warlike race of Pagan Negroes : the men are of short stature, but very muscular ; the women are often beautiful. They trade with the Mandingos.

The Sangaras. A race allied to the Sulimas, and inhabiting the mountains along the course of the Niger, where it flows from south to north. They are bold and active ; and are celebrated for the manufacture of cloth.

The natives of the low lands of the Senegambia, are—

The Joloffs, or Whalofs. This race, divided into numerous tribes, each having an independent state, occupy the flat country above the Mandingos, between the rivers Gambia and Senegal. The Joloffs are true Negroes, of a transparent jet black, with woolly hair, round noses, and thick lips ; but they are handsome Negroes, and, as M. Golberry states, the finest of their race. The men are tall, and well made ; the women beautiful. In disposition they are kind and hospitable, inclined to social habits, and to the customs of civilization.

The Serreres. Allied, as their language appears to intimate, to the Joloffs : they are a pastoral people, and occupy the Cape Verd territories.

The Serrawoolli. The country of Galam, on the Senegal, is occupied by tribes of this race, which extend to the north of Bambarra. Park describes them as Negroes of a dark brown, or bright black complexion: Their language is guttural.

The Feloups, or Felúppes. The flat forest lands on the southern bank of the Gambia, divided by that river from the Joloff country, are inhabited by the Feloups, a numerous and savage tribe of Negroes, of short stature, with woolly hair, a black complexion, and rough skins : they go nearly naked, scarify their faces and bodies, and use poisoned arrows.

The Papels. The country south of the Feloups is tenanted by this race of savage Negroes : their aspect is ferocious ; their habits are degraded.

The Balantes. Southward of the Papels, the coast and the Isle of Bassi are inhabited by this race, who are even more ugly than the Papels.

The Bissagos. The Bissagos Archipelago is inhabited by a tall, robust, and ferocious race of Negroes, who feed on fish and palm-oil. Each island has an independent chief.

The Biefres, or Iolas. These Negroes are said to be a fine race : they tenant the bank of the Geba.

The Bassores, the Naloubes, the Zapes, the Foulis, the Cocolis, and the Nalez. These tribes occupy different districts along the coast, to the territories adjacent to Sierra Leone. Harsh features, flat noses, and a dirty black colour, are their general characteristics. The country of the Bulloms, the Timmanis, the Bajoes, and the Soosoos then succeeds. These races are distinguished by fine features and forms ; they are endowed with excel-

lent capabilities, and are of pleasing manners: they speak different languages; that of the Bullom race extending as far along the coast as Shebar.

Guinea. From the Sherboo Isle to Cape Palmas extends a low coast, termed the Grain, or Pepper, Coast. The interior is occupied by the Quojas tribes; on the coast are the Vy-berkomas; the Quoja-berkomas, the Galas, the Hondo, the Curras, and the Folgias. Cape Palmas is the territory of the Kroos. These races are all of the true Negro stock.

Between Cape Palmas and the Cape of Three Points extends the Ivory Coast, occupied by a rude Negro race, termed Quaquas: the inland territories are inhabited by the Buntakoos, a powerful and numerous people. From the Cape of Three Points to the Rio Volta extends the Gold Coast. The chief tribes of the coast and interior region are, the Ashantees, the Fantees, the Aminas, the Warsaws, the Akims, Assims, and Aquapims; still more interiorly are the Intas. According to Bowditch, the Intas are the original stock, whence the Fantees, the Ashantees, and the rest have branched out. Their languages are dialects of the Inta; and the tradition of the various tribes refers to Inta as the source from which they emigrated. It would seem that neither the Fantees nor the Ashantees have a thoroughly Negro physiognomy—more particularly the Ashantees. According to Bowditch, “the men of Ashantee are very well made, but not so muscular as the Fantees; their countenances are frequently aquiline: the women are generally handsomer than those of Fantee; but it is only among the higher orders that beauty is to be found; and among them, free from all labour and hardship, I have not only seen the finest figures, but, in many instances, regular Grecian features, with brilliant eyes, set rather obliquely in the head,” the physiognomy being rather Indian than African.

The Acras constitute another nation inhabiting the Gold Coast: they are distinct from the branches of the Inta race, speak a language peculiar to themselves, and are genuine Negroes. To the Gold Coast succeeds the Slave Coast, extending to the Benin river, peopled by the Whidahs, the Papaas, the Ardrahs, the Mahas, and the Dahameh, or Foy, tribes; respecting which, little is accurately known: they are said to speak dialects of one common language, and to resemble each other in habits, manners, and person. They have the Negro stamp of countenance, are tall and robust, but of black hue, less pure and glossy than that of the Negroes of the districts previously enumerated.

Of the natives of Benin Biafra, the Island of Fernando Po, and the Gaboon Coast, little seems to be known. A race termed Eboes, or Ibos, tenant the inland country on the banks of the Quorra; and a race called Mokos, the district of old Calabar; behind which, according to Barbot, are the Hackous Negroes; of whom numbers were, in his day, brought down to Calabar, to be sold as slaves, for transportation to the West Indies.

Soudan. The vast level region occupying central Africa, south of the Desert, and bounded, on its south, by the Mountains of the Moon, contains several semi-civilized independent states, and various petty kingdoms, more or less dependant upon others, which, by policy or the force of arms, have gained a fluctuating predominance over them. However these states or kingdoms may be divided, it would seem that three principal races, having each a distinct language which has ramified into many dialects, occupy this extensive country. These three races lead to the division of Soudan into the kingdom of Timbuctoo, the kingdom of Houssa, or Hausa, and the kingdom of Bornou, to which latter the states of Bergú, or Dar Szalich, Begharmi, and Borgho, are tributary. Bergú is seated to the east of Bornou, Begharmi to the south-east of the lake Tschad, and Borgho to the south-west or the south of Houssa, having a country termed Gourná on its northern boundary, and Yarriba, or Eyeo, to the south, extending to Dahomeh. According to Clapperton, the Kong chain of mountains rises in the Borgho country, north of Ashantee, whence it stretches in a south-east direction, through Borgho, Yarriba, and Laboo, into Benin, having an altitude of about 2,500 feet. Borgho is divided into the petty states of Niki,* Khiama, Wawa, and Boussa, the latter being seated on the Niger. The language of this territory and that of Yarriba are cognate dialects. Our knowledge of the present condition of Soudan is due to the researches of various modern travellers, among whom Clapperton and Denham, Burckhardt, Lander, and Hornemann, may be consulted with advantage.

Of the physical characteristics of the Negroes of Soudan, we have only general accounts: they are said to be robust and muscular, with coarse features, and a jet black complexion, but to differ in minor peculiarities. The Houssa race are superior to the people of Bornou, Wargera, and the Bergú, or Mobba, district, and excel them in intelligence. Some of the females, as Jackson reports, are even beautiful; and he ascribes to them large expressive eyes, and a prominent nose: he adds, that "a young girl of Houssa, of exquisite beauty, was sold at Morocco, when he was there, for 400 ducats, the usual price of a female Negro being 100." M. Rozet observes, that Negresses brought from the interior of Soudan are to be seen, in the Algerine country, of a jet black colour, but with aquiline noses, lips slightly tumid, large eyes, and an open forehead; and that men from the same country have often a similar style of countenance. Dr. Seetzen ("Nachrichten, v. d. Negerlande," in F. Von Zach's *Monathl. Corr.* 1810, p. 141) describes two natives of Bergú, or Mobba, Abdallah and Hassan (from whom he derived much

* According to Lander, the king of Niki is styled, by way of pre-eminence, the Sultan of Borgho, and his empire includes the following states; namely, Niki, Bury Khiama, Sandero, Kingka, Korokoo, Loogoo, and Funda. Boussa and Wawa, he adds, form a separate state, where a different language is spoken, and different manners prevail.

information respecting their country), who left their native place on a pilgrimage to Mecca and Medina, without a para of money, as being men of sense and candour, and by no means inferior to Europeans. Abdallah had a broad, flat nose, and an uneven complexion, perhaps from small-pox, one of the scourges of the Negro race: Hassan was black, but less so than some Negroes, his nose was less broad, and his lips were less turned out. He was of middle stature; of spare habit, and his beard was short and scanty.

Throughout Soudan are scattered hordes of Felatahs, a race different, in many respects, from genuine Negroes: they live in the forests and desert places, in small tribes, feeding flocks, and dwelling in temporary huts. Most have embraced the Moslem faith; but some are still Pagans. According to Professor Vater, from a comparison of the vocabulary of African languages, arranged by Dr. Seetzen, they are a branch of the great Foulah race. Soccatoo, when visited by Clapperton, was the residence of the Felatah Sultan, Mohammed Bello, whose power was very considerable. It is to this lamented traveller, who collected, in his last unfortunate journey, much information respecting the Felatahs, that we owe the best information. From their own account, it would appear that they originally emigrated from Malli, under which term they include the Foulah states in Senegambia, Foota-Torro, Foota-Bonda, and Fouta-Diallo. They dispersed themselves in hordes, wandering with their cattle over the Soudan country, and many embraced Islamism, and became devotees, performing pilgrimages to Mecca. In the course of time, a Felatah Sheik, named Othman, or Danfodio, who had acquired the learning of the Arabs in the north of Africa, succeeded in persuading his countrymen that he was a prophet. At the head of his followers, he issued out from the woods of Tadena, and built a town in the Guber country; but, being expelled by the natives of the province, he returned to the Tadena, or Ader district, and founded Soccatoo: here the tribes of his race flocked to his standard, and his victorious progress may be compared to that of Mahomet. He appointed chiefs; gave them white flags; raised the war-cry, Allah Akbar, and bade them conquer in the name of God and his prophet, who had given the lands of the Caffres to be theirs. Thus, inspired by religious enthusiasm, they overran Guber, Houssa, and the adjacent states, conquered a great part of Bornou and Yarriba, and rose at once to power and distinction, becoming the terror of the nations of Soudan. Danfodio governed with great skill and policy; but, in the latter part of his life, became religiously insane. After his death, in 1816, some of the states revolted; but the present chief, Mohammed Bello, has succeeded in reducing a great part of the country under his dominion. Lander gives us a similar account of the progress of the Felatahs; but observes, that the tribes dispersed over Borgho, who speak the same

language as the Foulahs of Senegambia, maintain no intercourse with their nation established in Houssa, and have no traditions of their origin: the Felatahs, therefore, with their kindred, the Foulahs, are to be ascribed, not to the Negro stock, but to that class of the indigenes of Africa intermediate between the Negro and the Japetic. The characters of the Foulahs have been already noticed.

South of the line, to the Tropic of Capricorn, our knowledge of the natives of Africa is limited to the nations along the east and western coasts, glimpses only of the space between having been occasionally obtained by Europeans. From the concurrent testimony of various authorities, it appears that the languages spoken by the tribes occupying these opposite coasts are referable to one origin; and, farther, that they are intrinsically identical with the dialects of the natives of the territory near Delagoa Bay, and of the several Caffre tribes tenanted the country south of the tropic,—a circumstance of interest, as leading to the conclusion that the multitudinous nations and tribes, spread over the continent of subequatorial Africa, the Hottentots excepted, are branches of the same stock, and that the differences in colour and physiognomy, which may obtain among them, are to be attributed to extrinsic causes: not, indeed, well understood, but parallel to those which have stamped the natives of the kingdoms and provinces of Europe, derived from a common source, with their respective national characteristics of form and features. The natives of Congo, on the west, and Mozambique, on the east, have been usually regarded as Negroes; while the Caffre tribes are not generally considered to come under that denomination: it would appear, however, that, as we advance northward, in the Caffre country, a gradual approach is observable, both in features and complexion of the tribes, to the black or Negro races of Congo* and Mozambique; while, on the other hand, tribes inhabiting certain districts of these countries approximate, both in stature and complexion, to the Caffres. Among the natives of Congo, for example, whence the Portuguese have long drained their colonial slaves, tribes occur, approaching the European in features, and of a brown olive, or sandy-red complexion; and the Movisas, the Monomugi, and Maravis, tenanted the interior districts of the Mozambique region, are not decidedly black, but of a dusky or brown complexion, and of a tall and athletic form. The natives, however, of the districts adjacent to the coast, and along the Zambesi river and its branches, as the Sowauli of Zanguebar, and the neighbouring isles, the Makuanas of Mozambique Proper and the

* In the empire of Congo are comprehended the provinces of Loango, Angola, Bemba, Matamba, and Benguela, &c.; on the east, this extensive region, forming, by a mountain range, a line of separation between it and the elevated table land of central Africa. The river Zaire, or Congo, rises and flows, for some distance, among mountains rich in ore, between which and the flat country along the coast is a district of diversified surface, fertile, and highly populous, including the province of Bemba. The low country is pestilential in the extreme. The unfortunate result of Captain Tuckey's expedition up the Congo river is well known.

Comoro Isles, the natives of Sofala, the Bororos, and the Monomotapa, or Mocaranga nations, are black, with thick woolly hair, and resemble the natives of Guinea. They ornament the body with marks produced by tattooing and superficial incisions. The annexed figure (215) is the por-

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Mozambique.

trait of a Mozambique, from Dr. Prichard's learned work on the *History of Man*, and conveys a good idea of the national physiognomy.

The ultratropical extremity of South Africa, that is, from the Desert of Concritan, on the west, and the river of Inhambane, on the east, to the line of shore between the Cape of Good Hope and Algoa Bay, including the whole of the interior of the country, is inhabited by two races, to which the respective terms, Caffres and Hottentots, have been applied.

The Caffres* are divided into many distinct and independent nations, differing in the degree of civilization to which they have respectively advanced; differing also, to a certain extent, from each other in physiognomy, and speaking various dialects. The range of country

* The word Caffre, or Kafir, an Arabic term for infidel, has been applied, by the Arab settlers in various parts of Africa, to the heathen natives: the Dutch adopted the term, and conferred it upon the hordes of savages (not Hottentots), by which the Cape colony is surrounded, and custom has legitimized its use as their national appellation.

they occupy is very considerable; but their tendency is to press southward, so as to encroach upon the districts occupied by the Hottentots, portions of whose territories have been usurped by them, as tradition informs us, and as the Hottentot names of places and rivers, in districts now tenanted by the Caffres, prove.

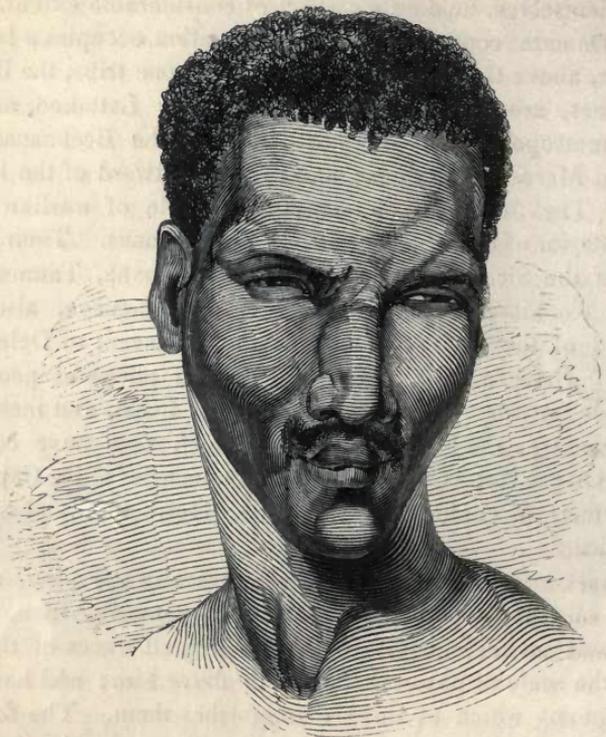
The distribution of the Caffre nations, at the present time, is, in a general sense, as follows:—on the west, above Angra Pequena, the Damaras have established themselves, holding a district of considerable extent. To the east of the Damara country, the Bechuana nation occupies a large tract in the interior, above the Orange River, of which one tribe, the Batchapis, or Matchappees, are well known to Europeans; Lattakoo, or Litakú, being their metropolis. To the north-east of the Bechuana are the Tammaha and Marootzee nations; and to the westward of the latter, the Wankitzee. The Mantatees, a wandering horde of warlike savages, occupy the interior of the country above the Bechuana. Their language is a dialect of the Sichuana, spoken by the Bechuana, Tammaha, Marootzee, and Wankitzee nations; which is the language, also, of the Damaras, and of the natives of the country adjacent to Delagoa Bay. Southward of Delagoa Bay, the Amazoolahs, a powerful people, have usurped a wide territory, extending to the Natal Coast, and including the Hamboona country, the Caffre natives of which they have completely subjugated. On the Natal Coast, above the boundaries of the Cape colony, the region formerly occupied by the Gonaqua Hottentots is possessed by the Amakosahs.

To the superiority of the Caffre tribes, generally speaking, above the Negro races of Guinea and other parts of equatorial Africa, travellers have born abundant testimony. Without losing all traces of the Negro, they rise in the scale of physical characters above him; and have that in their physiognomy which at once distinguishes them. The forehead is high and ample; the lips are thick; the nose elevated; the cheek-bones prominent; the eyes long and deeply set; and the chin well moulded: the hair is short, black, and woolly, growing in frizzled knots; and such is the character of the beard: the complexion is mostly of a clear brown; the stature is tall; the figure athletic. Fig. 216, is an example of the Caffre physiognomy.

Though revengeful and cruel, like all rude nations, the Caffres are not utterly uncivilized: they dwell in hamlets, or towns, of circular houses; are governed by kings, who succeed each other by hereditary right; hold assemblies for the discussion of important topics; possess herds of cattle; practise agriculture; and cultivate enclosed gardens. They are acquainted with the working of iron and copper, and the art of tanning leather. They believe in the existence of supreme powers, and in a future state of being; are influenced by various superstitions; sacrifice to imaginary

spirits ; and put faith in the assurances of sorcerers, or persons pretending to supernatural endowments. The rite of circumcision is universally practised, attended by certain ceremonies ; but of its origin, or the motives which conduce to it, they profess to know nothing. It is an established custom, which has passed from generation to generation.

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Caffre

HOTTENTOT BRANCH.—From the Caffres we pass to the Hottentot race, or, as they term themselves, Quaiquæ, who occupy the southern extremity of Africa, encompassed on the north and east by the Caffres, who, as already said, have encroached upon and circumscribed their original territory. The Hottentots* were once a free people, of pastoral and agricultural habits, under a patriarchal government, and divided into numerous and extensive tribes, of which few now remain ; partly owing to the changes to which European colonization has subjected their country, and partly from the pressure of the Caffre tribes from the north. The relics of several Hottentot tribes exist within the limits of the colony, in a state of servitude : beyond these limits, a few independent

* The derivation of this word is not known.

nations occupy their respective territories. Of these, the principal are, the Namaquas on the west, on both sides of the Gariep, or Orange River; the Koras, or Koranas, in the interior, along the higher course of the Gariep and its tributary branches; and a broken tribe of the once powerful Gonaquas, which still lingers on the borders of the colony, near the Great Fish River, in contact with the Amakosah Caffres. To these may be added the Bushmen, Bosjemen, or Saabs, a wandering and degraded offshoot of the Hottentot stock, scattered over the Karroos, and particularly the vast barren desert, north of the Orange River, where they obtain a scanty subsistence on roots, insects, and reptiles.

In physical characters and language the Hottentot race differs, not only from that of the Caffres, but from every other known people of the African continent; and if, as Professors Vater and Lichtenstein suppose, Southern Africa owes its population to the influx of nation after nation from the north, one being pressed onward by another following after it in regular rotation, the conclusion will be, that the Hottentot race must be regarded as a relic of one of the most ancient of the human denizens of, at least, subequatorial Africa.

Dr. Prichard considers the Hottentot and Bushman race as forming a distinct class of the human species, distinguished from the Negro race, with which they have been confounded, not only by their physiognomy, but by the conformation of the cranium. The Hottentots, according to Barrow, are well proportioned, erect, and of delicate rather than muscular contour: their joints and extremities are small; their face is ugly, but varies in different families, some having the nose remarkably flat, others considerably raised; their eyes are of a deep chestnut colour, long and narrow, distant from each other, the inner angle being rounded, as in the Chinese, to whom the Hottentot bears a striking resemblance; the cheek-bones are high and prominent, and, with the narrow pointed chin, form nearly a triangle; their teeth are very white. The women, when young, are graceful and well made; the nipple is unusually large, and the areola much elevated; but, immediately after the birth of the first child, the breast becomes flaccid and pendent; and in old age, greatly distended; the abdomen also acquires protuberance, and the posteriors are covered with a huge mass of pure fat. Burchell's description is to the same effect; he gives the following as their characters: "Hands and feet little; eyes so oblique, that lines drawn through the corners would not coincide as being on the same plane, but would intersect sometimes as low down as the middle of the nose; space between the two cheek bones, flat; scarcely any perceptible ridge of the nose; end of the nose wide and depressed; nostrils squeezed out of shape; chin long and forward; narrowness of the lower part of the face, a character of the race." The hair is of a singular texture; it is not

universally and equally spread over the scalp, but grows in small frizzled knots, or tufts, at a certain distance from each other, and, when suffered to grow, hangs in hard twisted tassels, the hairs forming each being so felted together as to defy the aid of the comb to separate them. The colour of the skin is tawny buff, or sickly yellowish brown. Sparrman compared it to that of a person affected with jaundice. The Hottentot physiognomy is represented in fig. 217.

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Hottentot female.

The Bushmen, or Saabs, now generally recognised as a division of the Hottentot race, exhibit all those characters which arise from extreme wretchedness, and insufficient or innutritious diet, combined with a life of incessant apprehension, being persecuted alike by the Coranas, the Caffres, and the Boors; they are diminutive in person, and generally ill-favoured in countenance, though not universally so; instances occurring, especially among the females, of pleasing features. "A wild, shy, suspicious eye, and a crafty expression," says Lichtenstein, "form (in the Bushman) a striking contrast to the frank, open physiognomy of the Hottentot. The universally distinguishing features of the Hottentot, the broad flat nose, and large prominent cheek bones, are, from the leanness of the Bushmen,

doubly remarkable. Their figure, though small, is not ill-proportioned ; and they would not be ugly if they had more flesh : yet the men may be called handsome, in comparison with the women. The loose hanging breasts, and the disproportionate thickness of the hinder parts, united with their ugly features, make them, to Europeans, disgusting. The Hottentot women, though resembling the Bushmen, are, from their greater height, and better-proportioned limbs, in comparison with them, handsome." Their colour is dirty yellow, and their hair resembles that of the Hottentots. Hunted down like wild beasts, the Bushman tribes seek refuge in the desert, dwelling in low huts, or excavations in the ground, or in natural fissures or cavities among the rocks : concealed in these retreats, they endeavour to escape observation, and watch the moment, in which to discharge their poisoned arrows against the unwary intruder, whom they have been taught to regard as necessarily their enemy. The acuteness of their sight almost exceeds belief ; and they are subtle and active in the pursuit of game. Their usual dress consists of the kaross, or sheep-skin mantle ; but they are fond of ornaments, such as beads and metal rings.

The females, both of the Hottentot and Bushman tribes, are alike conspicuous for the fatty protuberance which covers the haunches and sacrum, reminding us of certain breeds of sheep found in Asia and Africa. This appendage, the development of which is not easy to account for, and which does not take place until after the first pregnancy, is elastic and tremulous, and vibrates at every step. Cuvier, who examined its structure in the Bushman female, known under the name of the Hottentot Venus, who died at Paris in 1815, observes, that it consists of fat, traversed in various directions by strong cellular threads, and is easily removed from the glutæi muscles. An examination of the same individual enabled M. Cuvier to investigate the nature of that structural enlargement so often alluded to by anatomists, and described by Le Vaillant, Sennerat, Barrow, and others, as an unvarying peculiarity in the Hottentot female ; but which, in reality, is not universal, at least, in a conspicuous degree, being only considerable in some of the Bushman females ; a statement, however, contrary to the assertion of Barrow.

The projection of the jaws, and the obliquity of the incisor teeth, are by no means constant characters in the Hottentot or Bushman skull ; and in Blumenbach's specimen, the skull differed not in these peculiarities from the European.

The similarity of the Hottentot physiognomy to that of the Mongole, noticed by Cuvier, has been remarked by other writers. Barrow, indeed, perceived the resemblance which the Hottentots bear to the Chinese and other nations with broad and flat-faced skulls, in which the prominence of the malar bones and boldness of the zygomatic arches are considerable. The size of the foramen magnum, compared with the same

in European and other heads; the size and breadth of the nasal processes of the superior maxillary bones, and, consequently, the breadth of the alæ nasi; the obliquity of the eyes; the broad and square contour of the head; the high cheek-bones, and the pointed chin, giving a triangular form to the lower part of the face, have been also noticed as characters common both to the Mongole and Hottentot; and Dr. Prichard has drawn up a list of these and other minor points of resemblance, concluding with the observation, that the similarity between the skulls of the two races is accompanied by a similarity of the moral condition, and of the external circumstances under which, from time immemorial, they have existed. "Both are nomadic races, wandering with their herds through deserts, remarkable for the wide expansion of their surface, their scanty herbage, the dryness of the atmosphere, and almost perpetual drought. Both races feed upon the milk and flesh of their horses, as well as of their oxen.

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Skull of Negro.

No countries can be more similar than are the vast steppes of Central Asia and the Karroos of Southern Africa."

The subjoined are figures of the skulls of individuals of various tribes, or people, of the African continent.

Fig. 218. Skull of a Negro. In this characteristic example of the Negro skull, in the Royal College of Surgeons, the following particulars are worthy of notice:—The contour of the cranium is compressed laterally; the forehead is narrow and retreating, but tolerably arched; the superciliary margin, with the glabella, projects boldly; and the nasal bones, which are broad and flat, seem sunk below the ridge of the frontal bone; the interorbital space, owing to the breadth of the nasal bones, and of the ascending branch of the maxillary, which advances forward, almost to the level of the bridge of the nose, is very great,—the difference, in this point, between the Negro and the Orang, or other Simiæ, being considerable; the orifice of the nares is large and broad, and almost quadrate; the malar bones are greatly developed and advanced, having a deep sulcus before them (in which is the suborbital foramen of the superior maxillary bone), and their anterior angle is deep, prominent, and abrupt; the zygoma is thick, and arched forward; the external orbital processes are strong and prominent; the alveolar processes are long, and very oblique, projecting as in the Orang; the lower jaw rests flat on a plane surface; the great foramen of the occipital bone is small, and forms a narrow oval; the anterior projection of the upper jaw throws the occipital condyles to a greater distance beyond a trans-

verse mesian line, on the basis of the cranium, than in European skulls. The skull is remarkably thick, solid, and rugose: the coronal suture only just impinges on the sphenoid bone.

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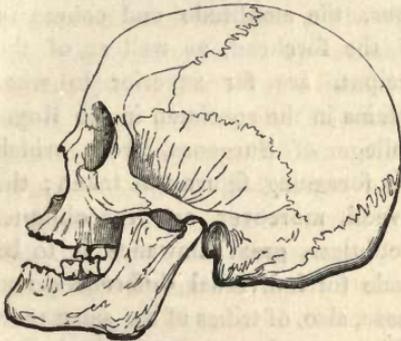


Skull of Ashantee.

Fig. 219. Skull of a warrior of Ashantee. This skull is well formed; but the transverse diameter is less than in a well-developed European skull; the frontal bone is narrower, and more retreating, and the arch of the calvarium is lower; the ridge, indicating the attachment of the temporal muscle, is very distinct; the frontal sinuses, and a ridge

continued from them over the orbits, are strongly marked; the nasal bones, though not rising as in the European, are less depressed, and narrower than in the preceding, and the interorbital space is less considerable; the malar bones are not remarkable for amplitude, but the zygoma is strong, and arched forward; the alveolar processes are shorter than in the preceding, and less obliquely prominent; the sphenoid bone fails to reach the parietal bones, so that the coronal suture, instead of impinging upon the former, joins the margin of the temporal bone.

220



Skull of African—Gold Coast.

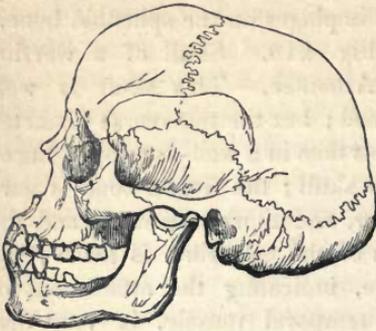
Fig. 220. Skull of an African from the Gold Coast. General contour elongate, with slight longitudinal coronal eminence; the parietal bones

bulge out, giving considerable transverse volume to the posterior part of the cranium; the forehead is narrow, but rises well; the nasal bones are broad, and quite flat; the interorbital space is considerable, though exceeded, in this respect, by other African skulls; the malar bones are large and prominent; the alveoli of the maxillary bone project obliquely forward; the ascending ramus of the lower jaw is broad, and the posterior angle acute and prominent, with an anterior notch adding to its boldness: the sphenoid bone is united to the parietal as usual.

Fig. 221. Skull of a Mozambique Negro. This skull is singularly elongated, and, at the same time, flattened laterally, with a projecting occiput, and a longitudinal vertical eminence, bounded by a flat slope on each side: the forehead is narrow and low, and the elevation of the arch of the cranium is inconsiderable; the nasal bones are broad, and rather flat; the nasal orifice is wide; the malar bones are large; and the alveolar processes

of the maxillary, projecting. In this skull, as in that of the Ashantee, the coronal suture joins the temporal bone, the sphenoid failing to send up its wing so high and backward as to meet the parietal.

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Skull of Mozambique.

menti, but the posterior part of the ramus is narrow, and the angle boldly prominent.

In the skull of a Caffre, given by Dr. Prichard (see *Researches, &c.*, vol. i. p. 597, fig. 5), copied from

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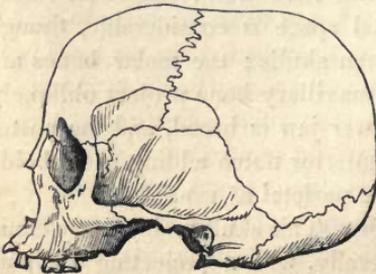


Skull of Caffre.

a figure in the *Wernerian Transactions*, the amplitude and convexity of the forehead, as well as of the occiput, are far superior to what obtains in the specimen in the Royal College of Surgeons, from which the foregoing figure was taken; the alveoli, moreover, are less oblique. Doubtless, great allowance is to be made for individual differences, and those, also, of tribes of the same race.

Fig. 223. Skull of a Bushman. The general contour of this skull is somewhat elongate, with a low forehead; but the parietal bones bulge considerably at their centre, giving breadth to the posterior part of the cranial cavity; behind the coronal suture they are depressed, a sort of furrow, or transverse channel, being thus produced: the nasal bones are short, and quite flat; the nasal orifice is broad. There is no coronal elevation; the face is flat and broad, with projecting alveolar processes, and the

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Skull of Bushman.

interorbital space, owing to the development of the ascending, or nasal branches of the superior maxillary, is considerable; the cheek-bones are high and prominent; the lower jaw, with an acute posterior angle, is

somewhat arched at the base, and the chin is narrow and prominent. (In this specimen, the sagittal suture is obliterated.) Comparing this with the skull of the Negro (see page 296) first described, many traits of distinction are perceptible. It is not only less solid and heavy, but the general contour of the whole is different: the maxillary bone does not present that sudden sinking, anterior to the malar bone, so remarkable in the Negro skull; and hence the space between the two malar bones is flat, the nose being altogether depressed; the jaws, though the alveolar processes are oblique, have less of the Orang-like protrusion than in the true Negro; and the ascending ramus of the lower jaw is more perpendicular.

In concluding this sketch of the principal indigenous nations of Africa, of which we have the most authentic information, the fact must be again reverted to, that not only some are excluded from the pale of the Negro type, approximating to that of the Japetic, and even Mongole, but that a great diversity of characters exists among such as are usually referred to the Negro stock, various grades and phases of approximation to the genuine Negro form being perpetually exhibited among them; but the grades of approximation in the physiognomy are not accompanied by a constant and uniform correspondence of other characters. Some races, for example, as the Jolloffs, have a black skin and woolly hair, combined with fine forms and almost European features; some, a black, or dark brown complexion, with regular features, and crisp, but not woolly hair; others, a Negro colour and physiognomy, with long, or crisp hair; and others, again, have the general characters of the Negro, with a brown or dusky skin. The Caffres, with their ample forehead, elevated nose, high cheek-bones, light brown hue, knotted hair, and noble figure, present us with a notable instance of departure from the Negro type; the Hottentots with another, equally, or more decided, insomuch that they have a claim to be regarded as constituting a class, *per se*. Hence, then, there appears to be not one, but many African types of form and features, unless we are to regard them, or most of them, as variations of one common type, having its characters not permanent, but fluctuating. Is there, it may be asked, a tendency in the Negro race to lose its peculiar feature — its supposed badges of inferiority in the scale of the human race — a tendency toward amelioration? Many circumstances render this not improbable. The difference between certain of the Caffre tribes, as the Amakosahs, and the Negro natives of Congo and Mozambique, whose respective languages prove a common origin, seems to warrant the opinion — an opinion advocated by Dr. Prichard, who, in reference to the Caffre tribes, which have been thought, by many observers, to resemble the Arabs rather than the natives of intertropical Africa, states, — “they are a genuine African

race; and, as it appears highly probable, only a branch of one widely-extended race, to which all the Negro nations of the empire of Congo belong, as well as many tribes, both on the western and eastern side of Southern Africa. The skull of the Kosah Caffre, though still retaining something of the African character, deviates very considerably from that type, and approaches the form of the European skull, or that of the Indo-Atlantic nations. To the form described by Dr. Knox, as characteristic of the Caffre, the eastern Negroes of Africa appear generally to approximate; the skulls of the Mozambique blacks, or Makúani, filling up the gradations that may be imagined between the depressed forehead and strongly-marked African countenances of the Ibos, and the well-developed heads and bold and animated physiognomy of the Amakosah and Amazulah. The complexion of these tribes presents every variety, from the dark black of the Loango, or Angola Negro, to the olive-brown, or copper colour, of the Bechúana, who inhabit the high plains beyond the tropic. The nature of the hair is one of the most general, as it is one of the most characteristic peculiarities of these nations. Yet even this displays deviations; and in some tribes, among whom there is no probable ground for conjecturing diversity, or intermixture of race, the hair is positively stated to be not woolly, but merely curled, or in flowing ringlets of considerable length. Many other instances may be collected on a survey of the African races, in which variations of a similar description are proved to have taken place. The more accurate our researches are among the indigenous population of this region of the world, the less reason do we find for the opinion, that the characteristic qualities of the human races are permanent and undeviating.* Among the various considerations which confirm this view of the subject, we must not neglect to take into account the conclusions to which we are led by a comparison of the languages of Africa. If, as it would appear highly probable, the various idioms of Africa constitute one family of languages, in which the language of the Caffres and that of the Egyptians are included, this will go far toward the proof of a common origin." The question is one of great difficulty: our facts, after all, are too scanty, our acquaintance with the races of Africa too limited, and our knowledge of the revolutions, migrations, and intermixtures to which, in remote ages, the nations and tribes of this immense Continent have been subjected, too trivial to enable us to come to anything like a positive conclusion. Granting, however, this presumed tendency, in the Negro race, to lose its most striking characteristics, it does not appear, on the contrary, that any well-authenticated instances

* In all the peculiarities of organization which belong to the African nations, the Caffres resemble the Negroes: their skulls have, though not in an equal degree, the same characteristics of shape. The extent of development of the upper jaw is, in the Caffre, nearly as great as in the Negro, according to the testimony of Dr. Knox, who concludes that the Caffres are Negroes of the mountains, or Negroes changed by inhabiting an extra-tropical climate.

can be adduced of nations, or tribes, of other races assuming the Negro type. A darker hue, indeed, has, doubtless, in some cases, taken place, but no alteration of physiognomy. Thus, the Tuaricks of the Sahara are black, or nearly so, while the Berber tribes of the highlands of the Atlantica, of which the former are a branch, are brown, or dusky,—“subfusci coloris.” The Arab tribes, moreover, of the same desert, and those, likewise, who have settled in Nubia and Abyssinia, are black, or of a much darker colour than their Asiatic brethren; even where there has been no admixture between them and the black races around them. Waddington describes the Sheygya Arabs of Nubia as being of a clear, glossy, jet black. “They are distinguished,” he adds, “in every respect, from the Negroes, by the brightness of their colour; by their hair, and the regularity of their features; by the mild and dewy lustre of their eyes, and by the softness of their touch, in which last respect they yield not to the Europeans.” M. Rozet describes the Arabs of pure blood, inhabiting the Sahara, as large and well-made men, with black hair, open foreheads, lively eyes, a well-formed mouth and nose, an oval countenance, and long features:—“their skin,” he says, “is brown, sometimes olive; but I have seen many as black as Negroes, yet preserving all the other characteristics of the Arab race.”

A degeneration, then, of the form and features of other races into those of the Negro, among people who have long settled in Africa, but continued unmixed, cannot be found to have occurred.

The intellectual inferiority of the African nations generally, but especially of the Negroes, and the approximation of the latter, both mentally and physically, to the Simiæ, have been entertained as facts too strong for contradiction, by the most celebrated writers, and gladly received by those who, in such a theory, found some vague excuse for the acts of cruelty and oppression involved in the lucrative traffic of the black portion of the human race. White, Bory St. Vincent, Soemmerring, Camper, Cuvier, and Lawrence, have lent their authority to the statement, and supported the opinion by arguments of apparent solidity. They have measured the skulls of Negroes, ascertained the degree of the facial angle, and hastened to the conclusion, that the Negro brain is of less volume than that of the European, forgetting that the peculiar configuration and extent of the facial bones might render their modes of test fallacious. On the other hand, Professor Tiedemann, who has published a valuable paper in the *Philosoph. Transact.* (part ii. 1836), “On the Brain of the Negro, compared with that of the European and the Orang-outan,” contends, that the opinion respecting the cerebral degradation of the Negro race is utterly untenable. The result of his researches is given in copious tables, shewing the comparative capacity of the skulls of numerous individuals* of the African races, com-

* Forty-one skulls of various African tribes, not Egyptian.—Seventy-seven of Europeans, male, and

pared, not only with those of Europeans of every kingdom, but, also, with skulls of the Asiatic Caucasian tribes, and of the Mongolian, American, and Malayan races. From these comparisons, it is proved that the capacity of the *cavum cranii* of the Negro, in general, is not smaller than that of the European and other human races. The substance of Hamilton's investigations, he states to be the same; and, therefore, he contends that the opinion of many naturalists, such as Camper, Soemmerring, Cuvier, Lawrence, and Virey, that the Negro has a smaller skull and brain than the European, is ill founded. The mistaken notion of these naturalists, he adds, arose from the application of Camper's facial line and facial angle on a few skulls of Negroes living on the coasts, who, according to credible travellers, are the lowest and most demoralized of all the Negro tribes; the miserable remains of an enslaved people, bodily and spiritually lowered and degraded by ill treatment. Camper's facial line and facial angle are confessedly unsatisfactory as a test for determining the capacity of the skull, the size of the brain, and the according degree of intellectual vigour. His conclusions, drawn from an anatomical examination of the brain, are thus detailed:—

“ 1. The brain of a Negro is, upon the whole, quite as large as that of the European and other human races: the weight of the brain, its dimensions, and the capacity of the *cavum cranii*, prove this fact. Many anatomists have, also, incorrectly stated, that Europeans have a larger brain than Negroes.

“ 2. The nerves of the Negro, relatively to the size of the brain, are not thicker than those of Europeans, as Soemmerring and his followers have said.

“ 3. The outward form of the spinal chord, the medulla oblongata, the cerebellum, and cerebrum of the Negro, shew no important difference from that of the European.

“ 4. The Negro brain does not resemble that of the Orang-outan more than the European brain, except in the more symmetrical distribution of the gyri and sulci. It is not even certain whether this is always the case. We cannot, therefore, coincide with the opinion of many naturalists, who assert that the Negro has more resemblance to Apes than Europeans, in reference to the brain and nervous system.”

The advocates on either side, most probably, go to extremes. Suffice it, however, to say, that Professor Tiedemann has accumulated abundance of proofs exonerating the Negroes from the hackneyed charge of such

twelve female; twenty of the Mongole races; twenty-seven of the American races; and forty-three of the Malayan and Oceanic races;—besides, four of Egyptians, have their respective capacities registered in these tables. The capacity of the Hindoos is small:—in one instance, a Brahmin, it amounts to only 27 oz. 6 drs. 30 grs.; in others, to 31, 32, and 33 oz.—while in the Negro skull (male) of the least capacity, it is 31 oz. 5 drs. 16 grs.;—in others, 36, 37, 38, 40, 42, 43 oz.—and in an Ibo of Congo, 54 oz. 2 drs. 33 grs.;—so that the Negro skulls, on the average, have a capacity equal to those of Europeans, of which the largest given (Cossack from the Don) is 57 oz. 3 drs. 56 grs.; the smallest (a German) 39 oz. 1 dr. 55 grs.

mental inferiority as would militate against a far higher degree of cultivation than at present exists among them.

ON THE PAPUAN AND ALFOUROU BRANCHES.

Leaving the continent of Africa, and touching at Madagascar, off its eastern coast, we there find a population consisting of various people;*—Hovas, an olive-coloured race, of Malay extraction, and Negroes of Mozambique lineage; together with a people referable to a race termed Papuan, or Papou, the genuine Madecasse, or Malagasy; and scattered relics of an Alfourou race, tenanting the interior districts. It is to these two latter races, tribes of which are widely disseminated through the islands of the Malayan Archipelago, the Philippines, New Guinea, and the Carolines, which exist in the Malay Peninsula, and divide Australia and Van Diemen's Land between them, that we have now to direct our attention. If the term, Prognathous,† of Dr. Prichard, be adopted as the descriptive epithet of skulls, the agreement of which, in general contour, necessitates a classification of certain branches of mankind under one common section, of which the genuine Negro is the type, to that section these races must be referred: and, certainly, with regard to the Papuan, there is much to induce physiologists to assign it to the Negro stock, its resemblance to which has obtained for it the name of the Oceanic Negro. In treating upon these two races, it will be more convenient to take each separately: and, first, the Papou.

PAPUAN BRANCH.—Under the term Papous, Papouas, or Papuans, is included a race of men closely approximating to the Negro, and widely distributed, from Madagascar, through the islands of the Malayan Seas; in many of which, as Waigou, Sallawaty, Gummin, Battenta, and the northern shores of New Guinea, they are intermixed with the Malay family. These are, in fact, Malayo-Papuans,‡ though termed Papous by Quoy and Guimard, and must be distinguished from the genuine Papuan tribes, inhabiting the interior parts of the north of New Guinea (in contact with the scattered Alfourous), New Britain, New Ireland, Bougainville's Island, Bouka, Solomon's Islands, New Caledonia, and the Fidje, or Fejee, Islands, together with Van Diemen's Land and Madagascar, which have been already mentioned.

The Papous, according to Lesson, are not the aborigines of the Indian

* Of the Quimos, or Kimos, a nation of white dwarfs, with long arms, said to live in the interior of Madagascar, and of the existence of which, both Commerson and the Count de Modave, governor of the French settlement at Fort Dauphin, declared their belief, we can obtain no information. It appears, that the governor purchased a female slave from the interior, of a pale colour, about three feet high, and with arms reaching to the knees. On this the whole case rests. Sonnerat, who saw the individual, regarded it as an individual formation. Le Gentil, who was at Madagascar with Commerson, discredited the existence of such a race. Blumenbach considers it an instance of individual malformation, analogous to Cretenism.

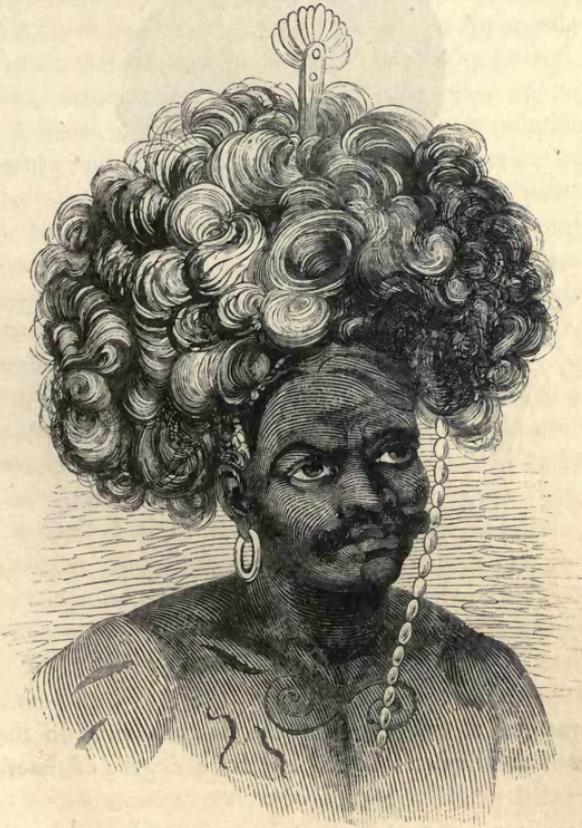
† Having prominent jaws.

‡ *Homo Papuensis, hybridus ex Neptuniano et Melanino.*—Fischer.

Archipelago; but are to be regarded as a wave of population, which, spreading over the northern coast of New Guinea, then over New Britain, New Ireland, the Bouka Isles, the Admiralty Isles, those of Solomon, of Santa Cruz, the New Hebrides, and New Caledonia, and thence over Van Diemen's Land, failed to reach the remoter islands of the Pacific, which had already received a tide of population from another source. The true Madecasses, or, as Lesson terms them, Cafro-Madécasses, are allied to this race, as their physical characters, traditions, habits, and language, according to the same author, sufficiently prove. Their figure is handsome, the form displaying great vigour, conjoined with activity; and many of the men are of fine stature. "Their hair," he observes, "is moderately woolly, and tied over the occiput in great ringlets; their skin is dark brown, mixed with yellow; their noses are slightly flattened; their mouths large; and the whole of their countenances and regular features would represent the portrait of a Papou of Dorery, of Beraae, of New Britain, New Ireland, or of Bouka. The hair of all these people is, in general, very crisp and stiff, and, at the same time, very thick. Some tribes of New Guinea, Waigou, and of Bouka, give it the frizzled out, and singular form which is the characteristic of the Papous: but others, as those of Bony, in New Guinea, of New Britain, and New Ireland, let it fall upon their shoulders in long and floating ringlets. The Papous go quite naked, and ornament their shoulders and breasts with incisions, ranged in curved or straight lines. This custom, which distinguishes many tribes in the interior of Africa, is practised by all the natives of Madagascar, as well as by the black races in the western parts of the Pacific, in Van Diemen's Land, and in New Holland. The Papous are in the habit of covering their heads with the dust of ochre, mixed with grease, which reddens their hair and their whole countenance: they wear abundance of feathers on their heads; and ornaments of shells, as well in their girdles as on their arms. A custom, exclusively peculiar to this race, is the wearing of bracelets, dazzlingly white, artfully made and polished, which they, probably, fashion from the large extremity of the great conchs found in the neighbouring seas." With regard to the Papous of New Guinea, the same traveller states, that the woolly-haired race, spread over its northern parts, distinguish themselves by the respective terms, Arfaki, or mountaineers, and Papuas, or people of the sea-shore: the latter live in scattered tribes and insulated villages, and in a continual state of dissension and hostility. Their villages, built upon piles, by the water's edge, consist of a few huts: authority is entrusted to the aged chiefs. The stature of these people is generally of the moderate height; but there are among them tall and robust men: their limbs are well proportioned, and their figure is often athletic: the colour of their skin is black, mixed with a small proportion of yellow, which imparts to it a clear tint of various gradations: their hair is black, very thick, and moderately

woolly ; they wear it frizzled out in a remarkable manner, or let it fall upon the neck in long twisted masses ; their countenance and features are regular ; but their noses are somewhat flattened, and have the nostrils enlarged in the transverse direction ; their chins are small and well formed ; their cheek-bones are prominent ; their foreheads are elevated ; their eyebrows are thick and long, and their beards are thin, and suffered to grow upon the upper lip and chin, as is the practice among many African nations. In the countenances of the Papous are strongly reflected the feelings which animate them, and which arise from mistrust, suspicion, and all the most hateful passions. The females are generally ugly ; yet Lesson observed, in New Guinea, some girls, who were well made, and whose regular and soft features were conspicuous. Born to servitude, the women, among the Papous, are subjected to the rudest labours, in which their stern and rigorous masters disdain to participate. The natives of Bouka, according to Lesson, as far as was observed, display the characters and habits of the Papous of New

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Papuan.

Guinea, and wear, like them, their long and woolly hair frizzled out. The natives of Port Praslin, in New Ireland, and those of the Isle of York, in the Channel of St. George, do not differ from the latter: a greater number of tall and robust men were, however, seen among them; and many individuals were distinguished by the light shade of their complexion, approaching the tawny and slightly-bronzed hue of the Oceanic nations.* The aged men among these various tribes were generally calm and impassible; yet rapid changes might be observed to pass over their countenances. The treacherous and cunning looks of some were as remarkable as the suspicion and mistrust indicated by others: simplicity and frankness were denoted in the faces of only a small number.

The preceding sketch (fig. 224) will illustrate the Papuan physiognomy, as it is exemplified in a native of New Guinea.

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Native of Van Diemen's Land.

The characters of the Papuan race, as they exist in the natives of Tasmania, or Van Diemen's Land, exhibit a degree of deterioration cor-

* It is not improbable that, in these instances, there may have been a mixture of Malay blood.

responding to that displayed by the Alfourou race of Australia,—a deterioration accompanied by extreme barbarism, and produced by various causes, among which an irregular supply of food, and that of an innutritious quality, is one. In the Tasmanian, the hair is decidedly woolly; the nose is broad, with nostrils spreading transversely; the mouth wide, the cheek-bones developed, the eyes long and narrow, the lower part of the face preponderating, and the colour dull black. The Papuans, as already stated, have been termed Oceanic Negroes; and the expression perfectly applies to the Tasmanian ramifications, as the foregoing delineation (fig. 225) will serve to prove.

ALFOUROU BRANCH. — To a race termed Alfourous, Arafuras, or Alfoors, are to be referred scattered tribes inhabiting the central parts of most of the islands of the Indian Archipelago, and also of Madagascar, where they are called Virzimbirs.* To the same race, also, probably belong the Battas (a cannibal tribe) of the interior of Sumatra, and the wild Dayacks of Borneo. In the Philippine Islands they have been termed Los Indios, by the Spaniards; in Mindanao, Negroes del Monte; and in the interior of New Guinea, Endamênes (“Alfourous-Endamênes” of Lesson). The natives of Australia are usually considered, and apparently with justice, as a branch of the Alfourou stock, and are termed, by Lesson, “Alfourous Australien.” At some former period, the Alfourou race was widely spread; and it may, perhaps, be regarded as the primitive population both of the Malay Peninsula and of the adjacent groups of islands; but their territories, for the most part, have been usurped by more powerful races—Papous and Malays, which have either extirpated them entirely, or driven the relics of the broken tribes to seek refuge in the mountains and woods of the interior; where, almost unknown, they still linger, immersed in barbarism. Lesson describes the Endamênes as living in the most miserable manner, and involved in continual warfare with their neighbours, from whose attacks, or snares, they are incessantly occupied in endeavouring to preserve themselves. He observes: “The custom prevalent among the Papous of the coasts, of putting their prisoners to death, and erecting their spoil as trophies, accounts for the difficulty we find in observing them, even in New Guinea; and two or three men, whom we saw in a state of slavery at Dorery, are the only individuals we have met with. The Papous described them to us, as of a ferocious character, cruel and gloomy, possessed of no arts, and passing their whole lives in seeking subsistence in the forests: but we cannot regard this hideous picture, which each people draws of its neighbouring tribes, as authentic. The Endamênes, whom we saw, had a repulsive physiognomy: flat noses; cheek-bones projecting; large eyes; prominent teeth; long and slender legs; very black and thick hair, rough and shining, without being long;

* Virzimbirs, or Ovals.

their beards were very hard and thick: an excessive stupidity was stamped upon their countenances, probably the effect of slavery. These savages, whose skin is of a very deep dirty brown, or black colour, go naked: they make incisions upon their arms and breasts, and wear in their noses pieces of wood, nearly six inches long: their character is taciturn, and their physiognomy fierce; their motion is uncertain and slow. The inhabitants of the coasts gave us some details of the Endamènes; but as they seemed to us to be dictated by hatred, and as their accounts differed, either because the sense of what they told us was badly understood, or because they related to us statements which they did not themselves credit, with the intention of inspiring us with fear, we think it useless to make a race of men known, by false or inexact descriptions, whose history is still enveloped in thick darkness."

The same writer supposes that, though confined to the interior in the northern districts of New Guinea, the Endamènes, or Alfourous, are the sole possessors of the southern portion of the island; and that, having crossed Torres Straits, at some remote era, they have spread themselves over the vast regions of Terra Australis: a theory which appears to be supported by the physical characters, as well as by the customs, of the Australians. The "Alfourous-Endamènes" are farther described as having the skin blackish, the hair coarse and straight, the face broad, the cheek-bones prominent, the beard thick and very black: their manners are savage and repulsive.

In stature, the Australians, or "Alfourous-Australien," are moderate; the limbs are generally slender, and elongated; the face is flattened; the cheek-bones are prominent; the nose is large and depressed, with widely-spread nostrils; the lips are thick; the mouth is of disproportionate width; the teeth are projecting; the eyes are half closed by the upper eyelids, which are lax and heavy; the ears are loose and large; the hair* is black, coarse, hard, and worn in rough knots, or masses, often bound round with a fillet, termed cambun, or bolombine; the beard is rough and matted; the colour of the skin is of a dirty black, and the expression of the physiognomy lowering and repulsive. Many tribes perforate the septum naris, and wear in the orifice a round stick; and the custom of extracting one of the upper incisor teeth is practised by the males, on arriving at manhood.† The annexed figure (226) is characteristic of the features of the Alfourou-Australien.

* The females use much grease in dressing the hair. The bolombine is sometimes made from the stringy bark of a tree, or from the tendons of the Kangaroo's tail, and daubed with pipe-clay.

† Mr. George Bennett, in his *Wanderings in New South Wales, &c.*, thus describes the natives of the Bugong Mountain in the Tumah country:—"Both males and females were in a state of nudity, wearing the Opossum skin cloaks only as a protection from the weather; and the septum naris had the usual perforation and ornament through it. Some of the females had tolerably pretty features, with dark hair, short, and having a natural curl; not, however, in any respect like the frizzled hair of the African Negro, or the spiral twist of that race so closely allied to them, the Papuan; but having that

With regard to the crania of the Papuan, Alfourou, and Oceanic people, Lesson has made some very interesting observations; but the crania of the Papuans described, are not those of the pure race of New Guinea, but of the Malayo-Papuans of Waigou and other islands; and it is of this mixed race that some skulls are figured in the atlas to the voyage of M. Freycinet.

“The skull of the hybrid Papuan,” says M. Lesson, “is remarkable for a considerable flattening at its posterior part, which forms a square surface, with the angles rounded. This conformation does not make the occipito-frontal diameter (that is, the diameter from the occiput to the forehead) much smaller, comparatively, than it is in the heads of Europeans, Alfourous, and the Negroes of Mozambique; the bi-parietal diameter (the admeasurement from side to side), on the contrary, is much larger, owing to the more considerable development of the convexity of the parietal bones; the coronal, though a little larger than that

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Australian.

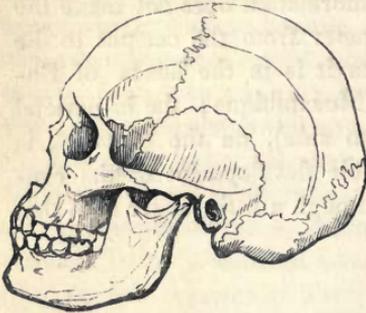
of a European, does not present differences so decided as to admit of description; the face is likewise larger, in consequence of the great transverse diameter of the orbital cavities, and of a slight flattening of the bridge of the nose; the nasal orifice is, in every respect, like that of a European; but the distance from them astoid apophysis of one side, to

curled appearance often seen in the hair of European races. Many of the females wore the front teeth of the Kangaroo, as ornaments attached to the hair, and esteemed them for that purpose. The native weapons are clubs, spears, the boomerang, and shields; which latter have rude ornaments, carved with the incisor tooth of a Kangaroo, upon them.”

that on the opposite side, is greater ; the vertical admeasurement is much the same as in the skulls of Europeans and Alfourous."

Taking the Tasmanians, or natives of Van Diemen's Land, as examples of the genuine Papou, the following description of a skull of one of this race, a male, from the western coast of that country (in the Royal College of Surgeons, London), may be compared with Lesson's

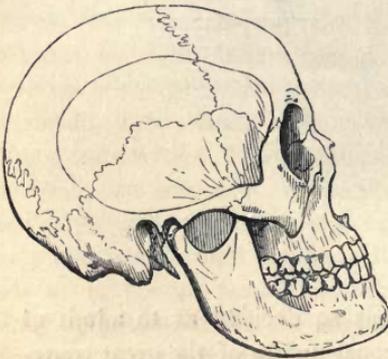
227



Skull of Tasmanian.

the frontal sinuses : the top of the head rises in a longitudinal ridge from the forehead to the occiput ; and from this ridge the skull slopes, like the roof of a house, to the middle of the parietal bones, which there project boldly : the cheek-bones are prominent : there is an abrupt notch, or sinking, at the union of the nasal bones to the frontal ; but the nasal

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Skull of Fejee Islander.

bones are short, and the nasal orifice is large and wide ; as is the orifice of the posterior nares also : the depth of the osseous palate is considerable ; the lower jaw is thick and deep ; the posterior angle of the ramus, instead of being acute, is moderately rounded ; and the base of the ramus is arched, so that, placed on a level surface, neither the posterior angle nor the point of the chin touch it ; the alveolar processes of the upper jaw are projecting. From the centre of the occipital condyle to the alveolar ridge, between the two middle incisors, the distance is four inches and a quarter ; the posterior development of the skull (measuring from the centre of the condyle), nearly four inches.

The foregoing sketch (fig. 228) is from the skull of a Fejee Islander, in the Royal College of Surgeons. The forehead is small, and laterally com-

details respecting that of the Malayo-Papuan, from which it recedes by several degrees toward the Negro, and is, consequently, still more than that of the hybrid Papuan removed from the European form :— The forehead is low, and compressed at the sides, the space for the temporal muscle being flat ; the coronal suture only just touches the sphenoid bone ; the orbits are quadrate, with a strongly-marked superciliary ridge, and large prominences, indicating

the frontal sinuses : the top of the head rises in a longitudinal ridge from the forehead to the occiput ; and from this ridge the skull slopes, like the roof of a house, to the middle of the parietal bones, which there project boldly : the cheek-bones are prominent : there is an abrupt notch, or sinking, at the union of the nasal bones to the frontal ; but the nasal

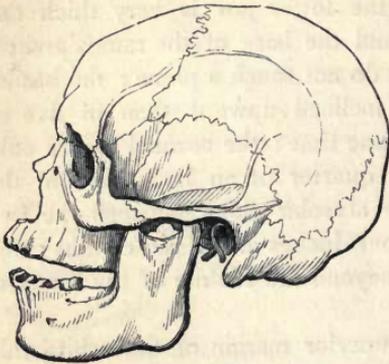
pressed, the space occupied by the temporal muscle being quite flat ; but the centre of each parietal bone is boldly and abruptly convex ; the top of the head, or coronal arch, is ridge-like, with a slope downward on each side ; the cheek-bones are large and deep ; the upper margin of the orbits is smooth ; and the frontal sinuses are but slightly indicated ; the orbits are large, and rather circular ; the nasal bones are short and depressed, and the nasal orifice is of remarkable width and extent, as is that of the posterior nares also ; the alveolar ridge of the superior maxillary bone projects moderately ; the lower jaw is very thick and deep ; the posterior angle is rounded, and the base of the ramus arched, so that the posterior angle and the chin do not touch a plane ; the basilar process of the occipital bone is less inclined upward than in five or six European skulls examined at the same time : the coronal suture only impinges on the sphenoid bone by a quarter of an inch. From the middle of the occipital condyle to the alveolar ridge between the two middle incisors, the measurement is four inches and three-eighths ; the posterior development of the cranium, beyond the middle of the condyle, three inches and three-eighths.

Except in the smoothness of the superior margin of the orbits, this skull presents the same general characters as the preceding : the coronal ridge, the slope on each side, the convexity of the parietal bones, the narrowness of the forehead and compression of its lateral portion, are the same in both.

In the form of the skull, the Alfourous-Endamènes, according to Lesson, approach nearer the Mozambique Negro than do the Malayo-Papuans. The differences, he states, consist in a flattening of the lateral portion of the cranial arch, giving a shelving contour, on both sides, at the summit of the arch ; in the occipito-frontal diameter being a little more elongated, and in the shape of the face being rather less oblique than that of the Mozambique, in such a manner that the facial angle is more open in the heads of the Alfourous : hence it results that the nasal bridge is more vertical. The nostrils, also, are not quite so large ; and the cheek-bones are less projecting among the Alfourous than the Mozambiques, but more so than in the Papuan and the European, owing to the depth of the infra-orbital fossæ : the jaws of the Alfourous, although less prominent than those of the Mozambique, project in a greater degree than those of the Papuan and the European. The heads of the Alfourous are intermediate, in their general form, between the skulls of the New Zealanders and those of the Mozambique Negroes : like the latter, the two jaws are so much elongated, that they may be compared to the face of an Orang. The lower jaw of the Alfourou exhibits the same development as does that of the Mozambique, but it is narrower than that of the Papuan : compared to the

lower jaw of the European, they all three differ from it, in the form of the basis, or lower edge of the bone, and in that of the chin; the anterior part of the body of the bone, instead of being inclined backward, as in the European and New Zealander, is cut perpendicularly, thereby contributing to the projection of the alveolar arches: the basis of the lower jaw is more rounded, and raised a little forward, in the Alfourou, the Mozambique, Papuan, and even New Zealander. The bend is

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Skull of Alfourou-Endamène.

always less apparent among the Papous. Placed upon a horizontal plane, the lower edges of the jaws do not touch in all places, as is the case in the European; the lateral angles of the chin are, consequently, more rounded than in the latter. For the description of the skull of the New Zealander, see page 269.

The annexed (229) is a figure of the skull of an Alfourou-Endamène, from the work of M. Duperry.

The compression of the zygomatic arches is remarkable in this skull, their plane being nearly level with that of the sides of the cranium.

The following (230) is a figure of the skull of an Australian (male), in the Royal College of Surgeons, where several other specimens also are preserved.

The general characters of the Australian skull consist in their narrowness, or lateral compression, and in the ridge-like form of the coronal arch; the sides of which, however, are less roof-like, or flattened, than those of the Tasmanian skulls examined in the same collection. The superciliary ridge projects greatly, giving a scowling expression to the orbits, and reminding us of some of the larger Apes: the nasal bones, which are exceedingly short and depressed,

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Skull of Australian.

sink abruptly, forming a notch at their union with the frontal bone, which projects over them; the forehead is low and retreating; and the external orbital process of the temporal bone is very bold and projecting, while the space occupied by the temporal muscle is strongly marked; the orbits are irregularly quadrate; the cheek-bones are prominent; the face is flat, and seems as if crushed below the frontal bone; the external nasal orifice,

sink abruptly, forming a notch at their union with the frontal bone, which projects over them; the forehead is low and retreating; and the external orbital process of the temporal bone is very bold and projecting, while the space occupied by the temporal muscle is strongly marked; the orbits are irregularly quadrate; the cheek-bones are prominent; the face is flat, and seems as if crushed below the frontal bone; the external nasal orifice,

and that of the posterior nares, are very ample; the coronal suture terminates as in the skull of the Fejee Islander; the lower jaw is more acute at its angle than in the skull just alluded to, but it is arched upward at the chin; the upper jaw, of which the alveolar margin projects most remarkably, wants one of the middle incisors, which has evidently been extracted, the alveolus being obliterated. A female skull, with the incisors perfect, presents the same characters.

OCCIDENTAL STOCK.

BESIDES the Esquimaux race, which has been already noticed as appertaining to the Mongole type of the human family, America presents us with an indigenous population, divided into nations and tribes, extending from the northern latitudes, adjacent to the arctic circle, to Terra del Fuego in the south, a range including every variety of soil, climate, elevation, and production. The remote history of the original population of this vast portion of the earth's surface is unknown. It was but a few centuries ago, that their existence, or that of their wide-spread realms, broke in as a light upon the nations of the Old World, who rushed forward to secure each a share of the New Hesperia. Busied in the work of spoliation, and eager only for gold and territory, the adventurers were utterly indifferent to the character and history of the indigenes, whom they seemed to regard as intruders upon their rights, and consigned to torture and death. The extirpation of tribes and nations was carried on without remorse,—avarice and fanaticism urging the good work;—and, for years, the musket, the spear, the bloodhound, the rack, and the fire, were unceasingly in operation. Possessed by European colonists, America now contains only the scattered remnants of her pristine tribes, and these are gradually melting away before the march of colonial enterprise. Diminished, however, as they are, the aborigines of this vast portion of the globe afford ample materials for the study of the naturalist and the philosopher: their origin, their affinities, their differences, their physical characters, and their languages, open a wide field for investigation. Here, then, in connexion with the present subject, the question arises, as to what stock, to what branch or branches, of the human family, the natives of America and its islands are to be referred; and, further, whether the people, whose remains occur in tumuli, in caves, and artificial burial-places, were the progenitors of the tribes now occupying the same localities.*

* We may, by way of note, glance at a people whose remains, mingled with works of skill, occur in tumuli of great extent along the Mississippi, and in various districts of the United States,

Many writers have commented on the close similarity between the native tribes of America and the nations of Mongole lineage in the Old World ; and some regard the former as a ramification of the latter, or, in other words, as a branch of the Mongole stock. Such is the opinion of Lesson, who, in his manual, places his Rameau Américain under the Mongole section, observing, that " this branch, which constitutes the population of the American continent, presents numerous varieties : of these, the most remarkable are the Peruvian and the Mexican races, which, occupying intertropical territories, founded respectively two great empires. The second race is that of the Araucanians, which comprehends many sub-varieties. The third is that of the Patagonians, confined, with that of the Puelches, to the southern extremity of America. Numerous tribes, of Brazil, Guiana, the Floridas, and of Canada, again form groups characterized with difficulty : nevertheless, the Botacudos of Brazil appear to belong definitely to the Mongole family." Cuvier states it as his opinion, that the Americans are not distinctly referable to any of our Old World varieties ; while, at the same time, they are destitute of a character at once precise and constant, which would stamp them as distinct. As to their copper-red complexion, he remarks, it is not one of sufficient value ; but their hair, generally black, and their scanty beard, would induce physiologists to assign them to the Mongole type, did not their features, as prominent, their nose as well developed as that of the European, and responding to the European type of form, oppose such an arrangement. Their languages are as innumerable as are the tribes ; nor have demonstrative analogies, either among them, or between them and those of the Old World, been as yet detected. " If the Chaymas," says Humboldt, in his *Personal Narrative*, " and all the natives in general of South America and New Spain, resemble the Mongole race, in the form of the eye, in their high cheek-bones, their straight and flat hair, and the almost entire want of a beard, they essentially differ from them in the form of the nose, which is of moderate length, prominent in every part, and thick toward the nostrils, which, as in all the nations of the Caucasian race, are directed downward."

That the skulls of the American tribes, as is remarked by Dr. Prichard, display the same broad and pyramidal form as the heads of Turanian nations, has been repeatedly noticed by various travellers, who have all insisted upon the general resemblance which certainly exists between these two great sections of mankind. M. de Humboldt,

and who appear to have been more advanced in civilization than the present tribes, whose territories are now the possession of the white man. It is probably of a people antecedent to the foundation of the Peruvian empire by Manco Capac, that the elongated skulls brought from Titicaca are the relics. In New Andalusia, near the cataracts of the Orinoco, are subterranean excavations in the granite rock, containing both the bones and dried mummies of the ancient Aturians ; some are in baskets, others in sarcophagi of unbaked clay, ornamented with painted figures of Crocodiles.

in his comments on the ancient Americans, confirms the accounts of other observers, as to a striking analogy between the American and Mongole races; and states, that this analogy is especially evident in the colour of the skin and hair, in the defective beard, high cheek-bones, and in the direction of the eyes. It cannot be denied, he adds, that the human species does not contain races more resembling one another, than the Americans, Mongoles, Mantchous, and Malays. Another characteristic of the American nations is said to consist in "a facial angle more inclined, though straighter, than that of the Negro," an inclination resulting from the depression of the forehead, there being no race of men upon the globe "in which the frontal bone is more depressed backward," or which has this part of the skull less projecting.

It may here be remarked that, though the cheek-bones are high and bold, they have not the angular form, with an outwardly-turned lower edge, which is so characteristic of the Mongole; and that the zygoma is not so arched and prominent: besides which, the peculiar flatness of the forehead, in despite of any vertical elevation, which there is reason to believe is far from universal, also constitutes a marked and general distinction (though the Author has remarked it, very decidedly, in the skull of a Patagonian, and though Dr. Prichard figures the skull of a Chepewyan with a pyramidal vertex).^{*} Another hypothesis is, that many, if not all, of the American indigenes, and especially those of Mexico and Peru, are of Malay descent. (See Dr. Lang, *On the Origin and Migration of the Polynesian Nation*.) With regard to the Oceanic branch of the Malays reaching the coasts of Mexico and Peru, as they have extended themselves to the Sandwich Islands, there can be no question of its possibility.

Dr. Graves (*Dublin Journal of Med. and Chem. Science*, No. 15) entertains a very similar theory; viz., that the Peruvians are of Asiatic extraction. "The present inhabitants of the interior of Peru," he says, "belong to the same race which peopled the remainder of the continent of South America, and which is distinguished by a copper colour of the skin, a thinly-scattered beard, straight, strong, black hair, and a prominent nose. I am of opinion, that the present inhabitants of Peru are derived from an Asiatic stock, the last colony of whom migrated, probably, about the twelfth century. From these latter settlers sprang the dynasty of the Incas, or Ingas; which dynasty was overthrown by the Spaniards, after it had lasted about twelve generations. The Asiatic emigrants had gradually spread themselves over the western coast of South America, conquering, as they spread, the natives of the country; and it is to the latter, in all probability, that the skulls in question (the elongated depressed skulls found at

^{*} The large size of the orbits in some skulls of Americans, and especially in one of a Patagonian, has been observed by the Author.

Titicaca) belonged. Many sepulchres of the present race of Peruvian Indians occur along the coast of the Pacific Ocean; the skulls found in which agree, in every respect, with the form of that race; but in no instances do they possess the peculiar characters of those found in the interior. A careful examination of these skulls has convinced me that their peculiar shape cannot be owing to artificial pressure. The great elongation of the face, and the direction of the plane of the occipital bone, are not to be reconciled with this opinion; and, therefore, we must conclude, that the peculiarity of shape depends on a natural conformation. If this view of the subject be correct, it follows, that these skulls belonged to a race of mankind now extinct, and which differed from any now existing.* That pressure was used, however, there is every reason to believe; † nor was the practice confined to Peru. It prevailed among the Caribs, in Carolina, and is now continued by the Indians on the banks of the river Columbia and Nootka Sound; but, as it more immediately relates to the Peruvians, after the fall of the Incas dynasty, and under Spanish legislation, the practice was still continued, as is proved by an edict issued by the third synod of the diocese of Lima (1585), prohibiting this unnatural custom.

Another writer, who advocates the Malayan colonization of America, along its western coast, from California to Chili, is M. Bory St. Vincent; and, as he justly observes, it was by availing himself of the discord between the aboriginal tribes of Mexico and the foreign race, by whom the empire was founded, that Cortes succeeded in overthrowing the throne of Montezuma. ‡ He might have added, that Montezuma himself stated, that his ancestors came from a remote region, conquered the country, and founded a great empire, of which the chief city was Mexico, or Tenuchtitlan; and that, according to an ancient tradition, the person who founded the colony returned to his own country, promising that, at some future period, his descendants should visit them, assume the government, and reform their constitution and laws. † Nearly similar, if reduced to plain language, is

* The process of compressing the skull of the infant, in order to give it the form deemed essential to beauty, has been previously noticed (p. 206.)

† Cortes was joined by the natives of Tempoalla, Quiabislau, the Totonagues, a fierce mountain people, and the Tascalans, a warlike nation, all impatient of the domination of the Mexican empire.

‡ “According to the account of the Mexicans themselves, their empire was not of long duration. Their country, as they relate, was originally possessed, rather than peopled, by small independent tribes, whose mode of life and manners resembled those of the rudest savages. But, about a period corresponding to the beginning of the tenth century of the Christian era, several tribes moved, in successive migrations, from unknown regions, towards the north and north-west, and settled in different provinces of Anahuac, the ancient name of New Spain: these, more civilized than the original inhabitants, began to form them to the arts of social life. At length, toward the commencement of the thirteenth century, the Mexicans, a people more polished than any of the former, advanced from the border of the Californian Gulf, and took possession of the plains adjacent to the Great Lake, near the centre of the country: after residing there about fifty years, they founded a town, since distinguished by the name of Mexico, which, from humble beginnings, soon grew to be the most considerable city of the New World. The Mexicans, long after they were established in their new possessions, continued, like other martial tribes in America, unacquainted with regal dominion, and were governed in peace,

the tradition respecting the origin of the Peruvian empire. The aborigines were rude, independent tribes, wandering in the forests, without any fixed residence, or bonds of social union; naked and ignorant; when there appeared on the banks of the Lake Titicaca, a man and woman of majestic form, clothed with garments, who declared themselves the children of the sun, sent to instruct them. Manco Capac, and Mama Ocollo, for such were their names, became their lawgivers, and founded the Peruvian empire. Their successors were termed Incas.* The appearance of Manco Capac may be understood as figurative of the invasion and usurpation of the country by a colony of comparatively civilized people, who settled themselves, overawed or subdued the aborigines, extended their conquests, and established the Peruvian empire.

Acknowledging the probability of the Malay origin of the civilizers of Mexico and Peru,—the founders of those empires which were overthrown by the sanguinary and avaricious Spaniards,—it is nevertheless plain, that an indigenous race occupied the soil when they first landed upon it, and commenced their infant colonies: with this race, doubtless, they became more or less intermixed, and, while spreading the benefits of a certain degree of civilization around them, gradually adopted the language of the indigenes, or engrafted it upon their own. Certain established customs of the old possessors of the land would be retained in the midst of improvements, and in spite of attempts to suppress them; and hence the practice of flattening the skull, during infancy (a practice widely diffused), would not only be continued by the indigenes, but might even be adopted by the mixed descendants of these and the foreign colonizers, the pure race of whom would be preserved only in the royal line, as was said to have been the case in the line of the Incas.

Leaving, however, this hypothesis of the origin of the ancient Mexican and Peruvian empires, as one rather of probability than as based upon any tangible grounds, it remains now to investigate the general characters of the original inhabitants of the New World, adopting the three primary divisions instituted by M. Bory:—

COLUMBIAN BRANCH.—Notwithstanding the influx of Europeans, of

and conducted in war, by such as were entitled to pre-eminence by their wisdom or their valour. But among them, as in other states, whose power and territories became extensive, the supreme authority centred, at last, in a single person; and when the Spaniards, under Cortes, invaded the country, Montezuma was the ninth monarch in order, who had swayed the Mexican sceptre, not by hereditary right, but by election. From the first migration of their parent tribe, they can reckon little more than 300 years (*i. e.* to the invasion of the Spaniards). From the establishment of monarchical government, not above 130 years, according to one account, or 179, according to another computation."—Robertson's *History of America*.

* The Incas continued to rule in succession for twelve generations, till the year 1526. The twelfth Inca, Huanco Capac, subdued Quito, and married the daughter of the monarch of that province, and, after his death, a civil war between the son of Huanco Capac, by a mother of the Incas line, and a son by the daughter of the monarch of Quito, raged with great fury; but, opportunely for Pizarro, whose second landing took place at this juncture.

various nations, who have arrogated to themselves the territory of the Red Man,—and of Negroes, dragged in as slaves of the European, who, multiplying in the western world, still preserve their own characters,—the Columbic branch of the Occidental stock (*Homo Columbicus*, Bory) maintains itself, to a great degree, in purity: it is distributed through the wild forests of Canada, over the regions to the north-west and west of the United States, through the Antilles, Terra Firma, and Columbia, to the Amazon; but is everywhere encroached upon by the advances of European colonizers.

The physical characters of this branch, subdivided into innumerable tribes, may be summed up as follows:—The stature is moderate; the proportions are admirable; the limbs are formed for activity rather than strength; the feet are turned somewhat inward, instead of outward, as in Europeans; the forehead is flattened, and this natural depression is often increased by art, the head being a long oval, often elevated at the vertex; the nose is prominent and aquiline; the lips are moderately thin; the cheek-bones are elevated, but not angular, giving breadth to the face; the teeth are vertical; the eye is large, but lowering, the expression of the countenance, indeed, being austere, and often ferocious: the hair of the head is long, black, harsh, and glossy; the beard is very scanty, and the few hairs that appear are diligently eradicated: the colour of the skin is copper-red, varying in intensity and duskiness. The men are said never to have their hair grey with age.

SOUTH AMERICAN BRANCH.—The South American Branch (*Homo Americanus*, Bory) is thus characterized:—The head is large, and round, with the forehead greatly depressed; the superciliary ridge is boldly prominent at its external angles; the cheek-bones are projecting; the eyes are narrow and small; the nose is depressed, with patulous nostrils; the lips are thick; the mouth is large; the teeth are vertical; the skin is swarthy, or dusky, rather than tinged with copper-red; the hair of the head is long, black, and harsh. This branch occupies the sources of the Orinoco, the borders of the Amazon, Brazil, and Paraguay. According to M. Bory, the Araucanians of the interior of Chili, so different from the Malays (*Neptunians*) of the shore, to which the latter confine themselves, are probably, also, referable to it. With regard to the colour of the various tribes, it may be observed that the Botacudos are of a light brown, and sometimes white, even near the tropic; while the Guayacas, almost under the line, are perfectly white. The Charruas of Buenos-Ayres, under the fortieth degree south latitude, are, on the other hand, almost black, and without any tint of red. The Omaguas, under the fifth degree, are of the colour of bistre, with a tumid body, a thick beard, and a hairy chest. The Guaranis and the Coruados, on the contrary, are destitute of hair on the chin and chest.

PATAGONIAN BRANCH.—The characters of the Patagonian race, till recently, have been but imperfectly detailed. The great stature of the men attracted the notice of the early voyagers to the southern regions of America ; but, even on this point, the testimonies of different travellers are very contradictory. By Commodore Biron and his crew, who sailed through the Magellanic Straits in 1764, the common height of the Patagonians was estimated at eight feet and upward ; but the very individuals seen by Commodore Biron were measured by Captains Willis and Carteret, in 1776, and found to be only from six feet six inches, to six feet seven inches in height. Such is their stature, also, as given by M. Bougainville. Other writers confirm this statement. Tribes, however, of an inferior stature occupy the regions of Patagonia ; and the Puelches, or gigantic Patagonians, are a nomadic people, not always to be met with on the coast of that miserable portion of America.

According to Capt. Fitzroy, the Patagonians are divided into four parties, each occupying a separate territory : their country extends from the River Negro to the Strait of Magalhaens, or Magellan : they are tall in stature, with bulky bodies, and large heads and features ; but their limbs are neither so muscular nor so large-boned as might be anticipated from their height and bulk. The colour of the Patagonians is of a rich reddish-brown, between that of rusty iron and clear copper, rather darker than copper, but not so dark as old mahogany. The colour of the females is about that of pale copper. “Nothing,” says Capt. Fitzroy, “is worn upon the head, except their rough, lank, and coarse black hair, which is tied above the temples, with a fillet of platted, or twisted, sinews. A large mantle, made of skins sewed together, loosely gathered about them, adds so much to the bulkiness of their appearance, that one ought not to wonder at their having been called gigantic. I am not aware that a Patagonian has appeared, during late years, exceeding in height six feet and some inches ; but I see no reason to disbelieve Falkner’s account of the Cacique Cangapole, whose height, he says, was seven feet and some inches.” The head of the Patagonian is broad, but not high, and, in general, the forehead is small and low ; the brow is prominent ; the eyes are small, black, and restless ; their position is oblique ; the outline of the face is roundish, but the cheek-bones are large and projecting, and give great breadth to the upper part of the face ; the nose is rather depressed, narrow between the eyes, but broad at the nostrils, which are large and patulous ; the lips are thick and coarsely formed, with the edges turned out ; and the mouth is very wide : the chin is broad and prominent ; the hair of the head is long, loose, harsh, and black ; the face and body are almost destitute of hair, and, where it appears, it is always plucked out : there are no eyebrows, though, as stated, the superorbital ridge is very prominent ; and this deficiency pro-

duces a peculiar expression of mingled simplicity and shrewdness, daring and timidity, with a singularly wild look, never seen in civilized man. The body is long and large, the chest broad and expanded, the neck short and thick, the arms disproportionate to the body, as are also the thighs and legs. The females, in stature and physiognomy, so nearly resemble the men, that, unless by the hair, it is not easy for a stranger to distinguish them.

The annexed engraving (fig. 231) is a representation of the Patagonian physiognomy.

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Patagonian.

The Patagonians possess horses and dogs, which are used in the chase, and also oxen : their principal food is the flesh of Mares, Rheas, (or American Ostriches), Cavies, Guanacos, &c. ; but the flesh of Mares is preferred to that of other animals. Their arms are balls, similar to those used by the Indians of the Pampas, consisting of stone, or of hardened clay, or of bags of skin filled with iron pyrites, and then dried ; and of these balls, sometimes two, sometimes three, are connected together, by means of a thong of hide, from two to four yards in length : they can throw these with such dexterity as to entwine the thongs about

the limbs of any animal to which they give chase, and thus bring it to the ground. As a weapon of combat, a single ball, of about a pound weight, is used, attached to a thong of about a yard in length; whirling this ball with the utmost swiftness about their heads, they hurl it against their adversary, almost with the force of a shot: they use, also, a lance of great length, bows and arrows, and clubs; they have no boats or canoes of any kind, but always travel on horseback, and are of wandering habits. In language, disposition, and habits, the Patagonians (or, as they term themselves, Tehuel-het) differ from the natives of Tierra del Fuego, and its subordinate islets.

The Fuegians, or natives of Tierra del Fuego and the adjacent islets, are divided into several tribes, speaking distinct languages, or dialects; but none of them, as it is believed, radically differing from the original Chilian. Of these tribes, one termed the Yacana-kunny, inhabiting the north-eastern part of Tierra del Fuego, resembles the Patagonians in colour, stature, and general clothing; they use the same weapons, but have no horses. The Tekeenica, a tribe on the south-eastern portion, are low in stature, ill-looking, badly proportioned, and of a dark mahogany colour: the trunk of the body, however, is large; but the limbs are disproportionate and ill-formed. The Alikhoolip are a superior tribe to the latter, which they otherwise closely resemble. Besides these, may be enumerated the Pecheray, Huemul, and Chonos tribes: all live in low, miserable wigwams, and have small canoes, in which they traverse the narrow straits that divide the numerous islets near the shores of Tierra del Fuego. The general characteristics of the physiognomy of these tribes indicate an alliance to the Patagonians, than whom, however, they are in a far more degraded condition; they are always at war among themselves: two adjoining tribes, it is said, seldom meet without engaging in a conflict, and those who are vanquished and taken prisoners are killed and eaten by the conquerors. The arms and breast are eaten, as Capt. Fitzroy learned, by the women; the legs by the men; the trunk is thrown into the sea. When hard frost and deep snow prevent their obtaining their usual food, they then, also, resort to cannibalism; and, strangling the oldest woman of the party, they devour every portion of the body. The Fuegians have the forehead extremely small and low, and the superciliary ridge, or brow, very prominent; the eyes are oblique, small, sunken, and black; and the eyelids are usually in a state of continued inflammation, from the smoke of their low wigwams; the cheek-bones are largely developed; the nostrils are wide and open; the mouth is large, and coarsely formed, with thick lips; the hair of the head is lank, coarse, and black; it does not fall off, nor does it become grey, until extreme age is attained: few, if any, hairs are seen on the eyebrow; and the hairs of the chin, which would form a scanty, straggling beard, are pulled out by tweezers, made of mussel-shells.

The neck is short and strong ; the shoulders square and high ; the chest and body large ; and the trunk long, compared with the limbs and head. The arms and legs are rounder, and less sinewy and muscular, than those of Europeans ; the joints are smaller, and the calves of the legs less developed : the knees are, it is stated, strained by the custom of sitting continually on the heels, so that when straightened, the skin is wrinkled, and thrown into folds, both above and below the joint ; the legs are also rather bowed, and the feet turned inward. Ornaments of feathers are attached to a fillet made of the sinews of animals, and worn round the head. White feathers denote hostility ; red feathers are the emblem of peace. Red ochre, as a paint, is profusely used ; but, when preparing for war, white paint is added : daubs of black, the paint being made from charcoal mixed with grease, are the tokens of mourning.

Among the Fuegians, as above described, individuals occur with curly or frizzled hair, with rather high foreheads, and straight or aquiline noses, and who, in other features, resemble the natives of New Zealand, rather than the Fuegians. These are, probably, the descendants of Malay stragglers, or of people of some of the Polynesian Islands, who, at no distant period, have been driven upon this extreme portion of America, and whose features are not lost in the mixed race which has originated from their union with the indigenes.

In the gulf of Trinidad, lat. 50°, on the eastern coast of Patagonia, Lieut. Skyring met two canoes of Indians, taller and more finely formed than those of the Chonos Islands, or any of the Fuegian tribes that had been seen : one man among them had a high leathern cap, ornamented with feathers of gaudy colours, and was painted black from head to foot, with a circle of white round each eye. It is a curious circumstance, that three of the men had each lost an upper incisor tooth, which calls to mind the custom practised among the Australian savages, of having one of the upper incisors extracted, on arriving at manhood.

For farther interesting and valuable information respecting the Patagonian tribes, and the indigenes of Tierra del Fuego, and of the various adjacent clusters of islands, reference may be made to the *Voyages of the Adventure and Beagle*, by Captains King and Fitzroy, in which works their habits, customs, and ceremonies are graphically detailed.

The skull of a Patagonian (supposed of a female), in the museum of the Royal College of Surgeons, is remarkable for its great breadth and roundity, and its posterior compression ; the depth from the vertex to the base being very considerable. The forehead is broad and arched—an unusual character in the Patagonian skull ; the vertex, at the anterior part of the parietal bones, is slightly elevated, with a slope, rather flat on each side. The centre of each parietal bone is boldly prominent ; the orbits are large, ample, and projecting ; and the zygomatic

arches stand widely out: the nasal bones are small, but form a ridge, overhung by a bold projection, indicating the frontal sinuses. The

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superior orbital foramen is peculiarly large; but this is, no doubt, merely a casual circumstance. The alveolar margin is not oblique.

The round contour of this skull, viewed from above, and its vertical elevation, together with its antero-posterior contraction, and its facial breadth, give it a remarkable appearance.



Skull of Patagonian.

Notwithstanding the differential characters which have been drawn up, as separating the Columbian from the American branch (setting aside the Patagonian), these differences are not strictly and universally constant: there is a general similarity between them, both in outward and moral characteristics, which many travellers have particularly noticed. Colour, indeed, is very variable: the tribes of South America have broader and flatter faces, and a shorter stature, than the North Americans; nevertheless, they both appear referable to the same common stock. "The Indians of New Spain," M. Humboldt says, "bear a general resemblance to those who inhabit Canada, Florida, Peru, and Brazil: they have the same swarthy and copper colour; straight and smooth hair; small beard; squat body; long eye, with the corner directed upward toward the temples; prominent cheek-bones; thick lips, and an expression of gentleness in the mouth, strongly contrasted by a gloomy and severe look. Over a million and a half of square leagues, from Tierra del Fuego to the river St. Lawrence and Behring's Straits, we are struck, at the first glance, with the general resemblance in the features of the inhabitants: we think that we perceive them all to be descended from the same stock, notwithstanding the prodigious diversity of languages which separates them one from another."

This resemblance is, perhaps, in some measure, parallel to that which obtains between the numerous tribes of Africa: it varies in degree, and is often indistinctly marked. Differences among tribes, all unlike ourselves in physiognomy, are not easily seized upon by the unpractised eye of a European, who, as the same philosopher well remarks, is liable to a particular illusion, when making his observations upon barbarous nations, in which the physiognomy is peculiar rather to a tribe, or horde, than to any individual. "He is struck with a complexion so different from our own, and the uniformity of this complexion conceals from him, for a long time, the diversity of individual features. The new colonist can, at first, hardly

distinguish, from each other, individuals of the native race, because his eyes are less fixed on the gentle, melancholic, or ferocious expression of the countenance, than on the red, coppery colour, and dark, coarse, glossy, and

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Thayendanegea, a Mohawk chief.

luminous hair ; so glossy, indeed, that we should believe it to be in a constant state of moisture.”*

* The coppery red of the skin is, however, far from being a constant character. Humboldt himself observes, that “the denomination of copper-coloured men could never have originated, in equinoctial America, to designate the natives.”—*Personal Narrative*. Birkbeck remarks, of the natives whom he saw in the western territory of the United States, that “their complexion was various: some are dark, others not so swarthy as myself; but I saw none of the copper colour, which I had imagined to be their universal distinctive mark.” Cook states the natives of Nootka Sound to have a colour not very different from that of Europeans, but with a pale dull cast. Molino says, respecting the Chilians, “their complexion, like that of the other American nations, is of a reddish brown, but of a clearer hue, and readily changes to white. A tribe, who dwell in the province of Baroa, are of a clear white and red, without any mixture of the copper colour.”—*Civil Hist. of Chili*.

The preceding is the portrait of Thayendaneega, a chief of the Mohawks, or Six Nations, in whom, as in the Algonquin tribes, the Chippeways, and the natives of Florida, the nose is elevated, the eyes are large, and the face is broad and flat.

In the Carib tribes, the flatness of the forehead is still more conspicuous. The Caribs, or Caribbees,* are tribes which inhabit the missions of the Cari in the Llanos of Cumana, the banks of the Caura, and the plains to the north-east of the sources of the Orinoco, and are distinguished, among the American nations, by their almost gigantic stature. It was a branch of this race which occupied certain of the West Indian Islands at the time of their discovery by Columbus:† in physical characters, they agreed with the Caribs still extant on the Continent, from whom they were originally derived. European encroachment and persecution confined the last remnant of this race to the Isle of St. Vincent: they were here distinguished under the name of Red Caribs, in contradistinction to a tribe termed Black Caribs, the descendants of some Negroes, who escaped from a shipwreck, and whose numbers became gradually augmented. Between these Negro-Caribs and the true Caribs an inveterate hostility has subsisted, to the almost total extirpation of the latter. (See Edwards's *Hist. West Indies*, vol. i. p. 411.) The museum of the Royal College of Surgeons contains two skulls of the Carib race, both of which are very characteristic.

In these specimens, one of which is shewn at fig. 234, we are struck with the singular depression, not only of the frontal bone, but of the upper surface altogether (which, however, has a slight rise at the vertex), and with the preponderating volume of the posterior portion. The parietal bones are boldly convex; the nasal bones are tolerably prominent; the

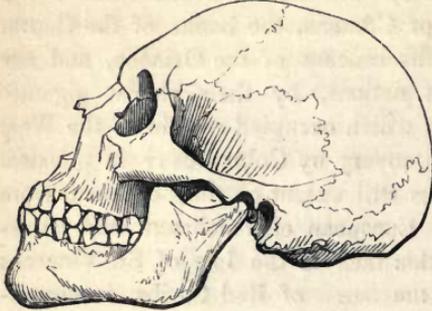
* These people were termed Carives by the first navigators, and are still known by this name in Spanish America.

† "As early as the first voyage of Columbus, he received information that several of the islands were inhabited by Caribbees, a fierce race of men, nowise resembling their timid neighbours. In his second expedition to the New World, he found this information to be just, and was himself a witness of their intrepid valour."—Robertson's *Hist. Amer.*

The following is a note upon the above passage:—"A probable conjecture may be formed with respect to the cause of the distinction between the Caribbees and the inhabitants of the larger islands. The former appear to be manifestly a separate race. Their language is totally different from that of their neighbours in the larger islands. They themselves have a tradition, that their ancestors came originally from some part of the Continent, and, having conquered and exterminated the ancient inhabitants, took possession of their lands and of their women." (Rochefort, 381; Tertre, 360.) Hence they call themselves Bana-ree, which signifies a man come from beyond sea. (Labat, vi. 131.) Accordingly, the Caribbees still use two distinct languages, one peculiar to the men, and the other to the women. (Tertre, 361.) The language of the men has nothing in common with that spoken in the large islands. The dialect of the women greatly resembles it. (Labat, vi. 131.) This strongly confirms the tradition I have mentioned. The Caribbees themselves imagine that they were a colony from the Galabis, a powerful nation of Guiana, in South America. (Tertre, 361; Rochefort, 348.) But, as their fierce manners approach nearer to those of the people in the northern Continent than to those of the natives of South America, and as their language has, likewise, some affinity to that spoken in Florida, their origin should be deduced rather from the former than the latter. (Labat, 128; Herrera, dec. i. lib. ix. c. 4.) In their wars they still observe the ancient practice of destroying all the males, and preserving the women, either for servitude or for breeding."

malar bone, large; the superior maxillary bone is long from the orbit to the alveolar margin, having a regular slope forward; the lower jaw is large and strong; the osseous structure of the whole is compact and hard. In Blumenbach's *Decades*, tab. x., in the skull of a

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Skull of Carib.

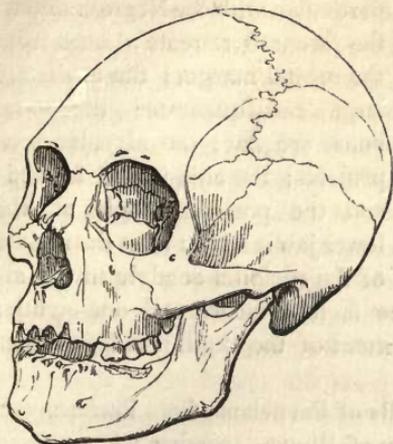
Carib (male) from St. Vincent's, remarkable for the great depression of the forehead, and the large patulous opening of the orbits, which are directed upward (*sursum quasi spectantes*), the parietal bones are protuberant; the nasal, long. In tab. xx. a second skull (female) of a Carib of St. Vincent's is figured, in which the forehead is still more depressed.

In these instances the great depression of the forehead is, doubtless, to be ascribed to artificial pressure; a mode, by which the ordinary flatness of the forehead, esteemed becoming (such is the force of habit in modifying ideas of beauty), is rendered more flat, and, therefore, more approximating to the American notions of the "beau idéal." According to Labat, the Caribs are well made, and with agreeable features, excepting that the forehead appears extraordinary, from its flatness and depression. These people, he adds, "are not born so; but they force the head to assume that form, by placing on the forehead of the newly-born child a small plate, which they tie firmly behind. This remains until the bones have acquired their consistence; so that the forehead is flattened to that degree, that they can see almost perpendicularly above them, without elevating the head." It would appear that this custom has been adopted by the Negro Caribs of St. Vincent's. In the narrative of the journey to the source of the Missouri, performed by Messrs. Lewis and Clark, we are informed, that the practice of flattening the forehead, by pressure, during early infancy, is almost universal among the tribes situated on the west of the Rocky Mountains,—a great range, running nearly parallel with the western coast of North America, whence the Missouri on the east, and the Columbia on the west, derive their sources.

The most distinguishing part of their physiognomy (according to these travellers) is the singular flatness and width of the forehead; a peculiarity, which they owe to the above-described custom, which prevails among all the nations west of the Rocky Mountains. To the east of that barrier, the fashion is so perfectly unknown, that there the Western Indians, with the exception of the Alliatan, or Snake Nation, are designated by the common name of Flatheads.

The process is commenced soon after the birth of the child, and the head is kept in the pressing-machine for about twelve months. The operation is so gradual, that it is not attended with pain; but its effects are

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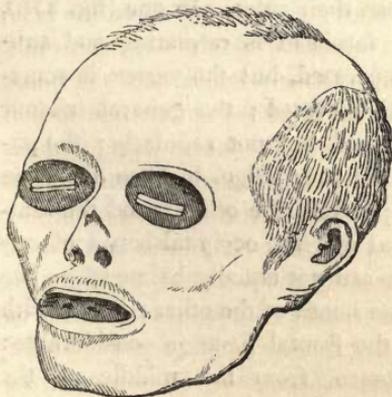
Skull of Aturian.

deep and permanent. In one tribe, on the Pacific, this custom did not exist; it is, however, noticed, as being prevalent among the Skilloots, the Wahkiacums, the Sokulks, and the Chinnooks.

In the skull of an ancient Aturian (fig. 235), brought, by M. Humboldt, from the caves on the borders of the Orinoco, and figured by Blumenbach (*Dec. v. tab. xlvi.*), the low, slanting forehead is, perhaps, natural. The zygomatic arches, less prominent than in the Mongole or Negro, are broader than in the latter, and the depth of the cranium and of the lower

jaw is greater; the nasal cavity is ample; the orbits are narrow: the texture of the whole is compact and solid.

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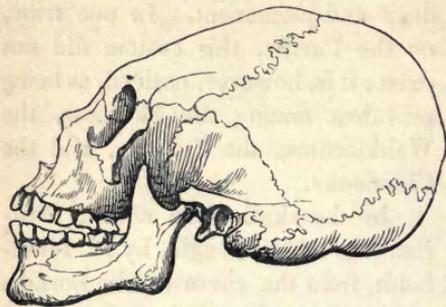
Skull of Brazilian.

A male Brazilian skull (fig. 236), preserved, with the skin dried, by means of a bituminous composition (*Dec. v. tab. xlvii.*), has the forehead depressed, and the general contour round. The colour of the skin is dusky copper: on the vertex is a patch of hair, short, strong, and black; around this, the skin is closely shaved; behind the ears the hair is longer; a short, scanty beard appears on the upper lip, and a few scattered hairs on the chin. It was adorned with splendid feathers of the scarlet Ibis, the Toucan, and various Macaws. The skull of a female Brazilian (*tab. xlviii.*) is tolerably well formed, with an arched forehead (*frons globosa*): the nose, however, is depressed; the olfactory cavity ample, and the frontal sinuses are strongly marked by prominences.

In the museum of the Royal College of Surgeons are three skulls of the ancient Peruvians from Titicaca and Pata Camaya, near Belen, Bolivia ($17^{\circ} 12'$ south latitude). Their frontal and vertical depression is excessive,

the skull being thrown, as it were, back, or developed only posteriorly ; so that the foramen magnum occupies a much more forward situation than

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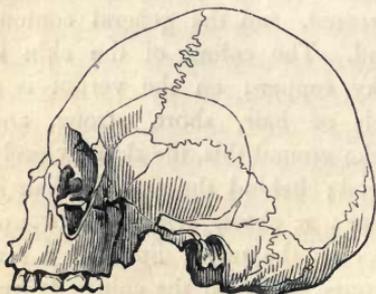
Skull of Titicacan.

in skulls moderately depressed, forming a striking contrast, in this particular, with the Negro cranium : the forehead retreats at once from the orbital margin ; the orbits are large and quadrate ; the nasal bones are flat ; the alveolar arch projects ; the chin is well formed ; and the posterior angle of the lower jaw is acute : from the middle of the occipital condyle to the alveoli of the front incisors, the distance is four inches and one-eighth ; from the same spot to the posterior extent of the skull, it is five inches and a half (see fig. 237).

The same museum contains two skulls of Peruvians, from Pachacamac, or the Temple of the Sun, in the valley of Rimac, together with a dried mummy, sitting in a crouched attitude, with the chin resting on the knees, and the hands placed on each side of the face. These remains are, probably, to be attributed to the period of the Incas dynasty.

The skulls are deserving of notice, for the inequality of their develop-

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Skull of Peruvian.

ment, or the want of harmony between their sides. In one (fig. 238), the forehead is retreating and sub-compressed, but the vertex is somewhat elevated ; the general contour is round, but not regularly ; the parietal bones bulge, but one differs in shape from the other ; and the temporal and the occipital bones of one side are not equally balanced by the same bones of the other ; the breadth of the frontal bone is considerable ;

the occiput is compressed ; the distance from the middle of the occipital condyle to the edge of the alveoli of the front incisor teeth being four inches and a half ; the occipital development beyond the same point, only three inches ; the nasal bones are small ; the malar bones are broken. In all essentials, the second skull resembles the preceding one, but is much less elevated, vertically ; the vertex viewed from the front being, indeed, in the form of a slightly-depressed arch ; the malar bones are large, and the external orbital angles prominent ; the alveoli are somewhat projecting ; the general contour is round and deep. The skull

of the mummy, as far as it is possible to form a judgment, very closely resembles the latter, excepting that its vertical elevation is much more considerable.

In the nations of South America generally, and particularly among the Brazilians, Von Spix and Martius, the German naturalists, traced a great resemblance to the Chinese, the physical characters of each closely approximating. They observed, however, that the figure of the Chinese is more slender; the forehead is broader; the lips are thinner; and the features, in general, are more delicate and mild than those of the American, who lives in the woods: nevertheless,—the small head, not oblong, as in Europeans, but of a roundish contour, angular, and rather pointed, with the crown broad; the frontal sinuses strongly marked; the forehead low; the cheek-bones pointed and prominent; the oblique position of the small narrow eyes; the blunt, proportionately small, broad flat nose; the thinness of the hair on the chin and other parts of the body; the long, smooth, black hair of the head; the yellowish, or bright reddish tint of the skin,—are all characteristics common to both races. In both, also, a mistrustful, cunning, and, as it is said, a thievish disposition, are to be detected.

On comparing the Mongole physiognomy with the American, traces of the series of developments may be perceived, through which the eastern Asiatic had to pass, under the influence, as these writers suppose, of climate,* in order, at length, to be transformed into an American. These anthropological investigations, it is added, lead to the important result, that certain characteristics, which constitute the principal difference of races, do not easily pass into others; while those of simple degree gradually vanish or degenerate. The same writers describe the Puris, Coropos, and Coroados, as having an extraordinary mutual resemblance in make and countenance; the features of individuals, probably from want of civilization, partaking more of one general model than is now the case in the other tribes. The Indians are of short or middle stature; the men from four to five feet high, and the women a little above four: all are of a robust, broad, compact make. It is very seldom that persons of a taller and more slender shape are seen among them. The breast is broad; the neck is short and thick; the female breast is not so pendent as in the Negresses; the abdomen is very prominent; the extremities are short; and the legs are far from being robust, the calves, in particular, being thin, but the arms round and muscular; the foot is narrow behind, and very broad before, having the great toe parted from the others: the hands are almost always cold, and the fingers are proportionably thin; the nails are very short: the hue of the skin is of a copper-colour, differing a little in depth, according to the age, occupation, and health of the individual. Infants

* That forms or modes of development are occasioned by climate,—that climate can render the Greek a Mongole, or the Mongole an American, may well be questioned.

are of a yellowish white, like Mulattoes: sick persons become of a brownish yellow colour: it is rare to find among them Albinos, or any that are dark spotted: on the whole, their colour is darker in proportion as they are stronger and more active. On the lower part of the body, and on the legs and arms, the red-brown colour sometimes changes to a blacker shade; at the joints it is paler, or whitish. The Indian cannot blush; and it is only after long intercourse with them that a change of colour, expressive of the emotions of their mind, can be detected. Their skin is fine, soft, and shining, and, when exposed to the sun, inclined to perspiration; their long, coarse, stiff, and glossy hair, hangs down in a thick and disorderly manner; the beard of the men is in general thin, but some have thick beards; the crown of the head and cheek-bones are broad, corresponding with the breadth of the breast; the forehead is low; the temples projecting, narrow above, and falling very much back: the back part of the head by no means hangs so low as in the Negro, whose skull is, indeed, narrow, and much more oblong than that of the Indian: the countenance is broad and angular, and projects much less than in the Negro, but more than in the Calmuc or the European; the ears are small and neatly formed; rather turned outward, and not pierced and disfigured by heavy bodies; the eye is small and dark brown, placed sideways, the inner corner turned toward the nose; the eyebrows thin, and very high in the middle; the nose is short, slightly depressed above, broad below, but not so spread as in the Negro; the nostrils are wide, standing very little out; the lips are by no means so thick and swollen as in the Negro; the upper, not the lower, projects a little, or both are alike; the mouth is smaller and more closed than in the Negro; the teeth are white, the front teeth very broad and even; the eye-teeth (canines) projecting. In general, the contour of the Indian is robust, broad, and short; whereas that of the Negro is tall and slender: thus it approaches nearer to the form of the other races, especially to that of the Chinese and Calmucs; though the latter have lighter complexions and better-formed features. Deformed persons, or cripples, are rare among the Indians; and it is believed, by some, that such are put to death immediately after birth. For many interesting details, Von Spix and Martius (*Reisen durch Brasilien*) may be consulted with advantage.

Don Antonio Ulloa, than whom few had greater opportunities of observing the natives of South America in different districts,* describes their characteristic features as consisting of a very small forehead, covered

* Don A. Ulloa visited a great part of Peru and Chili, the kingdom of New Grenada, and several provinces bordering on the Mexican Gulf, while employed in the same service with the French mathematicians, during the space of ten years. Afterward he had opportunities of observing the natives of North America, of whom he says, "If we have seen one American, we may be said to have seen them all, their colour and make are so nearly the same."

with hair towards its extremities, as far as the middle of the eyebrows ; small eyes ; a thin nose, small, and bending toward the upper lip ; the countenance broad ; the ears large ; the hair very black, lank, and coarse ; the limbs well turned ; the feet small ; the body of just proportion, and altogether free from hair, until old age, when they acquire some beard, but never on their cheeks. M. le Chevalier de Pinto, in a manuscript in the possession of the late Dr. Robertson, well delineates the general characters of the tribes with which he was acquainted : he describes them as being of a copper colour, with some diversity of shade, not in proportion to their distance from the equator, but according to the degree of elevation of the territory which they inhabit. Those who live in a high country are fairer than those in the marshy lowlands on the coast. Their face is round, farther removed, perhaps, than that of any people from an oval shape ; their forehead is small ; the extremities of their ears are far from the face ; their lips are thick ; their nose is flat ; their eyes are black, or of a chestnut colour—small, but capable of discerning objects at a great distance ; their hair is always thick and sleek, and without any tendency to curl : they have no hair on any part of the body but the head. At the first aspect, a South American appears to be mild and innocent ; but, on a more attentive view, one discovers, in his countenance, something wild, distrustful, and sullen.

The Americans, then, as all accounts tend to prove, are distinguished from other nations by a certain combination of features, and other physical peculiarities, entitling them to a rank as distinct from the European or Indian as the Mongole or the Negro. They constitute a distinct stem of the human race ; but to what extent they subdivide into clearly-marked ramifications, analogous to the Celtic, Teutonic, or Arabic branches of the Japetic stock, it is almost impossible to determine. Our acquaintance with them is only of recent date, and their multitudinous languages have engaged, comparatively speaking, but little attention. A rigid analysis of these languages is, indeed, a task, to which few would devote themselves, and the undertaking is, moreover, almost impracticable.

The traditions of the indigenes, when gleaned, are found to be meagre, vague, and dateless. Among a wild, unlettered people, sunk in barbarism, and roused from a state of habitual apathy, only by the desire of vengeance, or the calls of hunger, the most important events make but little impression : they are forgotten in a few generations, or, if preserved, are distorted, and referred to an indefinite epoch of remote antiquity.

ON THE DATE OF MAN'S EXISTENCE ON THE SURFACE OF THE GLOBE.

WHILE the researches of geologists accumulate proofs of the antiquity of our planet, and of a long series of revolutions, by which its surface has become modified; while they teach us, by appealing to the silent language of their reliquia, that races of organic beings have tenanted the globe, previously to the existence of our continents and islands, at a time when its surface exhibited a condition, of which we can form only a plausible conjecture, but of which these relics are the faithful records; while they convince us that successive eras have taken place, and, on the fragments recovered from the buried Herculaneum of Nature, enable us to decipher the hieroglyphics which announce the progress of creation,—they assure us that Man is but of recent date, the ultimate of animals called into life and being. It would appear to be now well established, that, in none of the older strata, in none of what are termed secondary formations, in none of the tertiary formations, in none of the regular strata of the globe, do the fossil relics of Man occur. In the beds, which contain the remains of ancient races, the types of forms blotted out of creation,—even in the deposits containing the bones of Elephants and Rhinoceroses, which have now their living representatives, we search in vain for the fossil remains of our species. Once, indeed, the huge bones of extinct animals were regarded as human, and philosophers speculated upon the stature of a race more mighty than the Anakim, of which these were deemed the relics,—an error, at which we now smile. “Many of the labourers,” says Cuvier, “in the gypsum quarries about Paris, believe, that the bones, which occur so abundantly in them, are, in a great measure, human; but I have seen thousands of these bones, and I may safely affirm, that not one of them has ever belonged to our species. I have examined, at Pavia, the groups of bones brought, by Spallanzani, from the island of Cerigo; and, notwithstanding the assertion of that celebrated observer, I affirm, also, that there is not one among them that could be shewn to be human.”

It is not, however, affirmed, or pretended, that no fossil relics of Man have been found, or may be found,—for the existence of such is ascertained; but they do not occur in such formations, or under such conditions, as indicate his contemporary existence with the Palæotheria, the Anaplotheria, or the Dinotheria,—the Mammoths and the Mastodons; and their situation is such as to corroborate the deduction, from other proofs, that Man is a new, and, geologically speaking, a recent denizen of the surface of our planet.

The most remarkable fossil remains of our species are those which occur in a tufaceous deposit, of modern date, and daily increasing, in the island of Guadaloupe: a fine specimen of an almost entire skeleton, im-

bedded in this calcareous matrix, is in the British Museum; another (fig. 239) is in the Museum of Paris. In both, the skull is wanting.

These fossil skeletons of Guadaloupe, as Cuvier observes, all more or less mutilated, are found near Porte de Moule, on the north-west coast of the mainland of Guadaloupe, in a kind of slope, resting against the steep edges of the island. This slope is, in a great measure, covered by the sea at high water, and is found to be nothing else than a tufa, formed, and daily augmented, by the very small debris of shells and corals, which the waves are perpetually detaching from the rocks, the accumulated mass of which assumes a great degree of cohesion in the places that are most

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Skeleton from Guadaloupe.

frequently left dry. It is found, on examining them with a lens, that several of these fragments have the same red tint as a part of the corals contained in the reefs of the island. Formations of this kind are common in the whole archipelago of the Antilles, where they are known to Negroes under the name of *Maçonne-bon-dieu*. Their augmentation is proportioned to the violence of the surge; and they have greatly extended the plain of Cayes, in St. Domingo, in which sometimes are found fragments of earthen vessels, and of other articles of human fabrication, at a depth of twenty feet. Various conjectures have been made, and even events have been imagined, in order to account for the deposition of these skeletons of Guadaloupe. But, from all the circumstances of the case, M. Jonnés, correspondent of the Academy of Sciences, who has been on

the spot, and to whom Cuvier is indebted for numerous details, thinks, that they are merely bodies of persons who have perished from shipwreck. Their discovery occurred in 1805. In the rock, which incrusts these bones, M. Kœnig detected fragments of *Millepora miniacea*, of several *Madrepores*, as well as the fragments of shells, which he compares to *Helix acuta*, and *Turbo pica*; and Cuvier states that, in the specimen at Paris, which was sent there by General Donzelot, there are embedded shells of the neighbouring sea, and land shells, which are still found alive in the island; namely, the *Bulimus Guadaloupensis* of Ferussac. Sir Humphry Davy subjected small portions of the skeleton in the British Museum to chemical analysis, and found that the bones contained part of their animal matter, and all their phosphate of lime.

Independently, however, of the existence of fossil reliquia of Man at Guadaloupe, human bones, but scarcely to be termed fossilized, have been found in other places. They not unfrequently occur in caverns, or fissures of rocks, mixed with articles of human fabrication: they are sometimes found in such places, buried in fine mud, beneath a layer of stalagmite, and sometimes incrustated in the latter. In these caves and fissures, where the wandering savages of a thinly-peopled country might occasionally find refuge, or into which they might have been accidentally precipitated, are found the remains of many extinct Mammalia; viz., of extinct species of Bears, of Hyænas, Lions, or large feline animals; Deer, Elephants, Hippopotamuses, &c.; as well as of animals now extant—Horses, Oxen, Sheep, Dogs, Wolves, and Foxes. Thus, in the cave of Gaylenreuth, there occurred, according to Rosenmüller, the bones of Men, Horses, Oxen, Sheep, Deer, Roes, Mules, Badgers, Dogs, and Foxes, besides the bones of Bears, Hyænas, and Tigers; but, from the researches made by him, in the cave itself, and from the state of preservation, in which the bones of the former animals were found, it was evident that they must have been deposited at periods much more recent than those of the latter. In some of the grottoes of the cave of Klanstein, M. Rosenmüller found two human skeletons, superficially placed, and incrustated with stalactite,—a proof of their modern deposition. In the celebrated cave of Kirkdale, in Yorkshire, in which bones of the Elephant, Hippopotamus, Tiger, Hyæna, Wolf, &c., occurred in abundance, many of them bearing the marks of the teeth of the animals that had gnawed them, and intermixed with the excrements of the Hyæna, no human bones have been discovered; but, in the caves of Paveland, in the county of Glamorgan, at the entrance of the English Channel, the clergyman and surgeon of the neighbouring village of Portinan, found the skeleton of a Woman, together with bones of the Elephant, Rhinoceros, Horse, Bear, Hyæna, Fox, Rat, and, also, of birds. Many of these bones, however, were modern; and the diggings, made at remote and unknown periods, had displaced the ancient bones, and not only mixed them with the modern, but also with shells of the present sea. (Vide Notes by Professor Jameson, in his translation of Cuvier's *Theory of the Earth*.) It is to be regretted that, upon the discovery of caves containing bones, persons, anxious to examine them, yet little aware of the importance of leaving them undisturbed in their respective situations, for the investigation of the geologist, begin to dig, and collect, mixing them together, so as to prevent the possibility of ascertaining their respective order of deposition. In the celebrated cavern of Adelsberg, in Carniola, the Chevalier de Lowengreif discovered, in 1816, a hole in one of its walls, at the height of fourteen fathoms: this conducted him to a series of new caves, of vast extent, and of incomparable beauty, from the lustre and variety of their stalactites. A part

of these caves, however, it is proved, must have been formerly known, and either are, or have been, accessible by some other entrance; for inscriptions were found in them, with dates from 1393 to 1676, together with human bones and entire carcasses that had been buried there. Through these caves, M. Volpi (Director of the School of Commerce and Navigation, at Trieste) asserts his having proceeded for more than three leagues, almost in a straight line, and that he was stopped only by a lake, which rendered it impossible to go on. It was about two leagues from the entrance that he discovered bones of animals, which he describes under the name of Palæotheria, but which belonged to the extinct Bears, whose remains occur in the bear-caves of Germany.* The remains of Man, therefore, found in the caves which contain, with the bones of recent animals, those of extinct species, prove nothing in favour of the contemporary existence of the latter and the human race; any more than the circumstance of finding the coins of the present century with those of the Saxon era, or of ancient Rome, at the bottom of a pit, or lake, would prove a coincidence of time in their fabrication.

* According to M. Bertrand du Geslin (*Ann. des Sc. Nat.* 1826), who visited this cave, M. Volpi only found the bones where he did, because he had not been at the trouble of searching for them elsewhere. The great line of chambers has the floor formed of a yellow and reddish, clayey mud, from one to two feet thick, and more or less impregnated and covered with crusts of yellow stalagmites. In this mud are the bones of Bears (*Ursus spelæus*) in considerable quantities. Large blocks, or masses, of compact white limestone also occur in some of the chambers, having their fissures and interstices filled with clay, the whole being covered with stalactite: in an interstice, in a mass of this kind, about fifteen feet high, and twenty in diameter at the base, the skeleton of a young Bear was discovered. M. Geslin only advanced an hour and a quarter's progress, always finding bones, when, the oil of his lamp failing, he was obliged to return, without reaching the block in which M. Volpi found his specimens. He observes, that the bones occur in two different ways. First, scattered in the clayey mud, which forms the floor of the chambers; secondly, buried in heaps, formed of blocks of white, secondary, compact limestone, and yellow, clayey mud: and he adds: "The hypothesis which Cuvier admits as the most probable for explaining the presence of these bones in the caves, is that which would make these caves to have served as a retreat to carnivorous animals. The presence of bones in the clayey mud of the floor of the Adelsberg cave accords well with this hypothesis, but the case is different with those which I found in the heaps of limestone blocks and clayey mud. The bones are not at the surface of the heap, but rather toward its middle part, buried among the blocks, and crusted by them. From this position, and the height at which the skeleton occurs from the floor of the cave, it cannot be supposed that it formed part of the bones with which the bottom of the cave is strewed; nor that the blocks had fallen upon it. The bones contained in the heap in question must have been brought into their present position at the same time, and by the same cause, as the limestone blocks. They could not, therefore, have belonged to animals which inhabited these caves, and died there peaceably. If it be remarked that these blocks, which are sometimes very large, heaped up above one another, and mixed with clayey mud, have their angles perfectly fresh, and are of the same nature as the limestone of the walls of the cave, it cannot be admitted that they have been brought from a distance. This mode of arrangement could only have been produced by their falling from the roof of the cave. The following facts also give support to this opinion. In the cave of Galenreuth, a fissure of the third grotto was the means, in 1784, of disclosing a new one, fifteen feet long and four broad, where the greatest quantity of Hyæna or Lion bones were found; the aperture was much too small for these animals to have passed through it. It must also be remembered, that the surface of the secondary limestone of Carniola is covered with a layer of reddish clay; and, moreover, that the clayey mud of the heaps in the Adelsberg cave is mineralogically the same as that which forms the floor of the cave: may it not be supposed, that the same catastrophe which produced the heaps in the cave, at the same time introduced into it the reddish, clayey mud of the surface, which, by extending itself over the floor of the cave, would have contributed to cover the bones that were lying there?"

One thing, however, is clear, that, at the period when our Continent had assumed its present general form, it was the abode of species of Mammalia which have passed away, and whose representatives now live only in the hotter regions of the globe. The circumstances attendant upon their deposition in these caves, where they are often found in recesses, the entrance to which could not have admitted the living animal, involve many speculations : but the subject is alien to our present purpose ; nor do we profess to be able to throw more light upon it than has been done by our learned and zealous geologists.

We may here allude to the fossil human relics found near Kösritz, and said to have been discovered consolidated in the limestone rock, together with the remains of the Rhinoceros, Lion, Hyæna, &c. M. de Sclotheim, by whom these organic remains were discovered, throws a doubt upon this point, and considers the human bones to have been deposited at a later epoch than the bones of the animals referred to, and in this opinion he is borne out by Dr. Buckland, who observes, that “ the case of Kösritz affords no exception to the general fact, that human bones have not been discovered in any of those diluvial deposits which have hitherto been examined.”

The discovery of human bones in peat-bogs, in tumuli of unknown antiquity, in mines, &c., does not bear upon the present subject.

The opinion, then, of the best informed and most observant geologists, is, that Man is of recent creation,—that he was called into being when the surface of the earth, having undergone a series of modifications, and having assumed, on a broad scale, its present aspect, became fitted for his reception. Against the opinion of his comparatively modern date, some philosophers have brought the chronological records of the Chinese and Brahmins, and the presumed zodiacs of the ancient Egyptians. With respect to the fabulous chronology of the Chinese and the Brahmins, it is unworthy of serious notice, as evidence in the case. With respect to the zodiacs of the Egyptians, it is now, we believe, admitted, that the great temple of Dendera, whence the celebrated zodiac, now in Paris, was obtained, is not anterior to the time of Augustus : the small temple of Esné, that of which the origin, as indicated by the zodiac there discovered, was, according to the lowest calculation, near 3,000 years anterior to the Christian era, has a column sculptured and painted in the sixth year of Antonine, 147 years after Christ ; and it is painted and sculptured in the same style as the zodiac which is near it.

These celebrated planispheres have been the test to which many philosophers have, as they thought, triumphantly appealed, in favour of the antiquity of our race. Dapius referred the construction of the zodiac of Dendera to an era 13,000 years before the present : and others, of no little learning, have fallen into conclusions as extravagant. After

all, it appears, that these zodiacs have nothing to do with the precession of the equinoxes, or with the displacement of the solstice: they are not true zodiacs, nor were the Egyptians profound astronomers. Cuvier observes, that "a mummy-case, lately brought from Thebes, by M. Caillaud, and containing, according to the very legible Greek inscription upon it, the body of a young man, who died in the ninth year of Trajan, 116 years after Christ, presents a zodiac divided at the same points as that of Dendera; and all the appearances indicate, that this division marks some astrological theme relative to the individual; a conclusion which may, probably, be equally applied to the division of the zodiacs contained in the temples."

In fact, as already observed, neither the tables of the Chinese and Brahmins,* nor the zodiacs of the Egyptian temples, are worthy of the slightest serious attention. Thus, neither monuments, nor the productions of Man, discovered in tumuli, in the ruins of ancient cities, or mines, worked at an unknown period, such as glass ornaments, weapons, tools of brass or stone, stamped bricks, and the like,—nor tradition, extravagant as may be its pretensions,—nor history,—throw back to a remote era the commencement of the existence of the human race; and the assignment of 6000 years, as the average of the period during which Man has acted his part on the surface of the globe, accords alike with the inferences of the geologists and the cosmogony of the Mosaic writings.†

* "Mr. Bentley discovered that the tables of Tirvalour, on which the assertion of Bailley (respecting the great antiquity of the science of astronomy among the Indians) especially rested, must have been calculated about 1281 of the Christian era, or 540 years ago; and that the *Surya Siddhanta*, which the Brahmins regard as their oldest scientific treatise on astronomy, and which they pretend to have been revealed upward of 20,000,000 of years ago, could not have been composed at an earlier period than about 760 years from the present day."—See Bentley's *Mem. on Antiq. of Surya Siddhanta*, *Calcutta Memoirs*, vol. vi.; and on *Astron. System of the Indians*, *ibid.* vol. viii.

† Cuvier, in his *Theory of the Earth*, has collected together a mass of information on this point, which may be consulted with advantage.

ORDER II. QUADRUMANA.

THIS ORDER CONSISTS OF THREE FAMILIES—

SIMIADÆ ; OR, MONKEYS OF THE OLD WORLD.

CEBIDÆ ; OR, MONKEYS OF THE NEW WORLD.

LEMURIDÆ ; OR, LEMURINE ANIMALS.

THE GENERAL CHARACTERS OF THE QUADRUMANOUS ORDER.

THE structure of the Quadrumanous Mammalia exhibits a semblance of approach, more or less appreciable, to that of the human race ; diminishing, however, in proportion as it is strictly examined. The conditions of their existence, to meet which their conformation is accordingly modified, involve certain structural peculiarities, which, in connexion with the development of their brain, the form of their skull, their system of dentition, and other details, justly entitle them, but not without a wide interval, to succeed Man in the scale of animal organization.

For the most part tenants of the forest, and peculiarly qualified as climbers, their extremities are each furnished with organs of prehension, which, when we compare them with the analogous organs of the succeeding groups, may be well defined as hands, but of which the posterior are really the most hand-like, having the thumb more apart, more powerful, and antagonizing more decidedly with the fingers, than is the case on the fore-hands, where it is always feeble, and sometimes even destitute of the quality that justifies its attribute. The extraordinary freedom and activity, among the branches of the forest, which this modification of the limbs bestows, become much diminished when the animals descend to the level ground : on a plane surface, their movements want energy and decision : some, it is true, scamper along with tolerable speed on all-fours ; but their gait is oblique and uneasy : others, again, are slow, awkward, and embarrassed in the extreme.

The anterior limbs, or arms, are comparatively more vigorous than the posterior ; and the power of pronation and supination, enjoyed by the fore-arms, gives them a marked advantage. The form and situation of

the head vary: it may be taken, however, as a rule, that the occipital condyles are thrown far more backward than in the human skull; in many, indeed, their situation is rather posterior than basal; while, at the same time, the muzzle becomes elongated; the spinous processes of the cervical and dorsal vertebræ being, accordingly, developed for the attachment of the muscles appointed for the retention of the head in an oblique or, in some instances, almost an horizontal position. The orbits, as a general rule, have the outer ring complete, and are walled within, being, as in the human skull, separated from the temporal fossæ.

The usual attitude of the Quadrumana is crouching, or more or less diagonal, a posture intermediate between the upright and horizontal; the thighs are ordinarily drawn up to the body, the femur forming an acute angle with the tibia; whence, by the sudden extension of the knee-joints, the animals spring with great vigour and facility.

The teeth consist of incisors, canines, and molars; the latter crowned with tubercles, blunt or acute.

The teats are two, and pectoral;* and the females produce one or two, rarely more, at a birth; and manifest toward their offspring the greatest attachment, nursing them with care and solicitude.

The Quadrumana are all natives of the hotter regions of the earth: their food consists of vegetable aliment; not, however, to the exclusion of animal substances; many devour insects, eggs, and small birds and reptiles, with the utmost avidity.

The order, Quadrumana, comprehends the Monkey tribes, both of the older continents and of America, together with the lemurine group, consisting of a race of animals concentrated in the Island of Madagascar, and thence spread, but sparingly, through the hotter regions of Africa, the Molucca, and Indian islands, and also along the southern border of the Indian continent.

The Monkeys of the Old and of the New World were formerly regarded as constituting a single family, divisible into two or, perhaps, three sections.† Cuvier, however, regards the Ouistitis, or Marmozet

* The Tarsiers have the teats inguinal; and the Loris, in addition to two pectoral, have two inguinal.

† Buffon, who appears to have studied the Quadrumana with much attention, divides the Monkeys into five tribes:—first, true Apes, without a tail; secondly, Papios, with a short tail; thirdly, Guenons, with a long tail, and callosities; fourthly, Sapajous, with a tail long and prehensile, and destitute of callosities; and, fifthly, Sagoins, with a long but not prehensile tail, and no callosities. Erxleben, adopted these divisions, which, after all, modern naturalists have not much improved upon, respectively terming them Simia, Papio, Cercopithecus, Cebus, and Callithrix; and hence it is that the terms Cebus and Callithrix, given by the ancients to certain Monkeys of the Old World, have been received by naturalists as the designations of Monkeys of the New. Buffon was not only aware of the distinctions between the Monkeys of the two great portions of the globe; namely, the Old and New; but of their mutual bearing upon each other, as holding correspondent places in their respective regions: "As the Apes, the Baboons, and the Guenons, are found only in the older continents, the Sapajous and Sagoins must be regarded as their representatives in the New; for these animals have nearly the same form, both externally and internally considered, and have, also, much in

Monkeys, of America, as a distinct family, intermediate between the Monkeys and the Lemurs, thus dividing his order into three primary groups; *viz.*, Monkeys, Ouistitis, and Lemurs; the same value being accorded to the intermediate group as to the first and last. Geoffroy St. Hilaire, on the other hand, with more adherence to Nature, divides the Quadrumana into the following primary groups, or families; namely, I. Catarrhini (*κατα*, downward; *ῥιν*, the nose); or Monkeys of the Old World. II. Platyrrhini (*πλατυς*, wide), or Monkeys of the New World. III. Strepsirhini (*στρέφω*, to turn or twist), or Lemurs, and the genera in alliance with them.

The names chosen by Geoffroy St. Hilaire, besides being harsh, are otherwise unfortunate: descriptive only of certain characters, they convey no ideas beyond; they do not lead us to the selection of any typical form, as the representative of either of the groups, from which some general notion of the whole may be at once acquired; points, in which pure family names, or patronymics, taken from that of the normal or typical group, have so decided an advantage. Instead of the terms used by Geoffroy, the following appellations (having a patronymic form), Simiadae, Cebidae, and Lemuridae, may be substituted, as being not only more expressive and appropriate, but, also, and which is not altogether unimportant, more easily borne in remembrance.*

As has been already expressed, it is rather by comparison, than absolutely, that the term hands can be applied to the grasping organs of the Quadrumana; but, even in this modified sense, the term is not always applicable; and, here, allusion is made more particularly to two forms, respecting which naturalists have widely differed, but which, notwithstanding their structural aberration in certain details, still exhibit such affinities to the Lemuridae as to induce the Author to remove them

common, as respects their natural habits."—Buff. *Hist. Nat.* 4to., vol. xiv. p. 367. We may farther observe, that the Opossums of America were also regarded by him as the representatives of the Lemurs; a point in which some naturalists concur most fully; but which, to say no more, admits of being questioned.

* On due consideration, the termination *idæ*, or *adæ*, as the ultimate syllable of the word may require, is adopted as the sign of a family name. Family names, for the sake of uniformity and convenience, and the principle being once known, of clearness and certainty, should have, in every case, a similar termination. In the assumption of a patronymic form for such words, it becomes a matter of little consequence whether or not their meaning be strictly conformable with the patronymics of which the classics afford examples, and in which likeness to, descent from, or consanguinity with some person, on whose name the patronymic is modelled, is implied, but in which the person himself cannot be included. On the contrary, the family names, with a patronymic termination, adopted by the naturalist, necessarily include the group on the name of which that of the family is constructed: thus, Vultur, Vulturidae, the latter including the restricted genus Vultur; Muscipapa, Muscipapidae; the latter including the genus Muscipapa; Anas, Anatidae, &c. This application of a patronymic term may not be strictly classical or correct; nevertheless, so much precision and convenience result from it, that few hesitate in its adoption. A rule once established should never be broken: if, for example, family names be distinguished by the termination *idæ*, or *adæ*, then, to make Simiæ, Vultures, Muscipapæ, the family names of groups, and Simiadae, Vulturidae, Muscipapidae, the family names of other groups, also having a resemblance to the preceding, because of such resemblance, is to produce confusion and misapprehension.

from the situations assigned them by Cuvier and others, and restore them to their true and legitimate station. The animals in question are, the Aye-Aye (*Cheiromys Madagascariensis*), and the Colugo (Gen. *Galeopithecus*, Pallas). With respect to the Aye-Aye, though pedimanous, or with the feet having a true thumb, the fore-hands are not thus organized, nor is its dental system such as generally exists in the Quadrumanous order; yet Schreber appreciated the affinities of the Aye-Aye; and though Cuvier placed it among the rodents (as did Gmelin, under the title of *Sciurus Madagascariensis*), he, at the same time, acknowledges its relationship to the Lemurs, to which family Schreber referred it.

The Colugo is neither furnished on the fore nor hind feet with an opposable thumb: notwithstanding this circumstance, however, the totality of its characters sufficiently vindicates its claim to a place among the Lemuridæ; to which group it was referred by Linnæus, under the title of *Lemur volans*. It may farther be observed, that it is not in the typical, but in the aberrant families of an order, that the great fluctuations of characters, which pervade it as a whole, are to be looked for: in every aberrant, or abnormal family, extreme links in the chain are often found to depart so much from the type, that it is only by a careful analysis of the whole group, that the naturalist can detect their affinities, follow the gradual loss of some characters, or the rise and progress of others, and, at length, confidently assign the group to its true situation. The non-opposable condition of the thumb in the fore-hands of the Aye-Aye, and in all the extremities of the Colugo, is an exception to the general rule among the Lemuridæ: not so, however, is it among the Cebidæ, or Monkeys of the New World, in which, as affecting the fore-hands, this peculiarity becomes a standard character.

Some naturalists of eminence object to the application of the term hands, to organs which, furnished, as they may be, with flexible and hand-like fingers, have the thumb incapable of antagonizing with them; and hence they deny the title *Quadrumana* to all the groups included by Cuvier in the order thus denominated. It is true that Cuvier was not aware of the universality of this fact in the Cebidæ; nevertheless, he perceived it in the *Ouistitis*, and observes: "All their nails are compressed, or pointed, with the exception of those on the thumbs of the hinder hands; while the thumbs of the fore-hands are separated so little from the other fingers, that one hesitates to give to these animals the name of *Quadrumana*."

The non-opposable character of the thumb was long since observed and pointed out by Azara, as a characteristic in certain species of the genera *Cebus*, *Mycetes*, and *Pithecia*;* but was universally overlooked

* Azara, *Quad. du Parag.*, tom. ii. pp. 213. 233. 244.

by subsequent naturalists, and so continued, till, in the year 1838, in an article on the "Zoology of America," in the *Penny Cyclopædia*, vol. i. p. 442, Mr. Ogilby published the results of his personal observations, unaware, at the time, of Azara's statements, which independent investigation thus tended to confirm. Without any knowledge of the observations made either by Azara or Mr. Ogilby on the subject, the non-opposability of the thumb of the fore-hands in the American Monkeys was also observed by the Author of this work, and alluded to in a paper on the *Ouistiti*, published, Dec. 1835, in the *Penny Magazine*, as follows:—"It is among the forms of this section (the American section of *Simiæ*) that the prehensile tail, given as an accessory organ for grasping, is met with; together with a departure, in the structure of the hand, from its perfect model. In the genus *Ateles*, embracing the Spider-Monkeys, with prehensile tails, the thumb is wanting, or reduced to a mere rudiment beneath the skin; while, in other genera, the hand can no longer retain this appellation."

In a valuable memoir, read before the Zoological Society, March 8, 1836, and published in the *Magazine of Natural History* for September, 1837, but of which an abstract had previously appeared in the *Proceedings of the Zoological Society*, Mr. Ogilby pursues, at some length, the deductions which he conceives necessarily to result from a discovery, "one of the most important," as he remarks, "that has been made of late years in mammalogy, more especially in regard to its connexion with the principles of natural classification in this department of zoology."

To this paper, which embodies the results of his investigations, (and in which a new arrangement of the Monkeys and Lemurs, comprehending also the pedimanous marsupial animals, as the Opossums and Phalangers, is proposed,) the attention of the scientific reader is directed. An examination of the principles upon which the arrangement in question is based is here inadmissible, as it would lead to a long discussion, irrelevant to the plan of the present work. If the views of the learned author are not adopted in the present instance, it is not because they have not been maturely considered. Few naturalists entertain precisely the same views; but their differences of opinion, happily, tend to the advancement of the science cultivated; they stimulate to farther researches and observations; to a more extended application of assumed principles, in order to test them; and they open the door to improvements and modifications.

The *Quadrumana*, as before stated, are primarily divided into three families, answering to the *Catarhins*, *Platyrrhins*, and *Strepsirrhins* of Geoffroy; namely, the *SIMIADÆ*, or Monkeys of the Old World; the *CEBIDÆ*, or Monkeys of America; and the *LEMURIDÆ*, or lemurine animals of Madagascar, Africa, and Asia. The following figures (240,

241, and 242,) represent the features, and the position of the nostrils, characteristic of each family; and, as far as these parts are concerned, convey a clear idea of the distinctions between them.

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Illustration of the family, Simiadae, or Monkeys of the Old World.

241



Illustration of the family, Cebidae, or Monkeys of the New World.

242



Illustration of the family, Lemuridae, or Lemurs.

FAMILY, SIMIADÆ; OR, MONKEYS OF THE OLD WORLD.

FORE-HANDS with a thumb (except where rudimentary), capable of antagonizing more or less thoroughly with the fingers.

DENTITION anthropoid. Incisors, $\frac{2}{2}$; canines, $\frac{1-1}{1-1}$; molars, bicuspid, $\frac{2-2}{2-2}$; true molars, $\frac{3-3}{3-3}$; = 32.

NOSTRILS divided by a narrow septum, and converging obliquely downward.

ISCHIATIC CALLOSITIES generally present, but not absolutely universal.

CHEEK-POUCHES often present, but not a universal character.

MEMBRANEOUS LARYNGAL SACCULI, not a universal character.

The Simiadae are divided between the hotter regions of Asia and Africa; each of these sections of the Old World having its own peculiar genera. It is doubtful whether any species is indigenous in Madagascar,* near as it is to the shore of Africa; the place of the Simiadae appears to be occupied, in that island, by the Lemurs, which tenant its forests in their stead: in the island of Fernando Po, however, they are very numerous; and, as respects India, the islands are even more decidedly the stronghold and nursery of the Asiatic Simiadae than is the continent. Borneo and Sumatra may be termed their metropolis, and "dilecta Cypros."

From the Indian Islands the Simiadae do not extend to Australia;

* One species (*Simia Aygula*, Linn.), is said, by M. Julien Desjardins, to exist in the Island of Mauritius (see *Proc. Zool. Soc.* 1831, p. 45); but, like all the Mammalia of that island, it is, doubtless, a naturalized importation. Two examples of a Monkey (*Cercopithecus albogularis*) have been brought from Madagascar, but it is not clear that they were natives of that island.

none tenant the woods of that immense Continent. With respect to Europe, there is one isolated point, the rock of Gibraltar, where a single species, the Magot, or Barbary Ape, dwells in freedom, and continues to breed: it is, however, very probable that it must be regarded in the light of a naturalized colonizer of the place, to which accident or design may have introduced it, and not as an aboriginal; if, indeed, there were not, at some ancient period, as many conjecture, a connexion, at this point, between the shores of Europe and Africa, which the sea has dissolved, gradually widening the interval, till the straits have gained their present breadth. Under these circumstances, the rock of Gibraltar may have been the primitive abode of the ancestry of the troops of Apes that now find refuge and food among the crags: in which case it ought to be regarded, zoologically speaking, as a portion, not of Europe, but of Africa.

However this may be, the Barbary Ape is common along the northern shores of Africa, extending even to Egypt. It was known to the ancients, under the title of *Pithecus* (*πιθηκος*), which seems to have been a general appellation for the larger Monkeys, or Baboons; the discrimination of species being but little attended to. The organic adaptation of the Monkeys for their climbing habits has already been explained. The arms of all the *Simiadæ* are much longer, in proportion to the body, than in Man; in the Orangs and Gibbons, their length is at its maximum, as is also the length of the hands, which, when the animals raise themselves erect on their hinder limbs, nearly touch the ground. In the semi-terrestrial Baboons, on the contrary, the arms but little, if at all, exceed the lower limbs in length; and the hands, also, are much more abbreviated, the length of these organs being in a corresponding ratio to that of the arms. The arms, it may be stated, differ, to a certain extent, both as to length and muscularity, even among allied species; and this is particularly the case in the genera *Cercopithecus* and *Macacus*.

It has been stated, by some authors, that the inner condyle of the humerus is usually pierced with a foramen, for the passage of the median nerve and brachial artery, as in the Cat, Badger, Mole, and many other Mammalia, in which either violent or long continued action of the arms is habitual. In the skeleton of the Orang, Chimpanzee, Mandrill, White-eyelid Monkey, Proboscis Monkey, and many others, which have been purposely examined, no such foramen exists: it does not appear to exist in any species of Old World Monkey; but is observable in some of the American genus, *Cebus*, and in some of the Lemurs.

The fore-arm and humerus are generally nearly equal; but, in many species, the fore-arm greatly exceeds the humerus; of the ulna and

radius (the two bones constituting the fore-arm), the radius is the stoutest, a condition the reverse of that which obtains in the human skeleton. This inferiority of the ulna is carried through all the *Quadrumana*, till, in the *Galeopithecus*, its humeral extremity alone is free, being continued from the olecranon, a feeble slender bone, soon anchylosing with the radius, into which it ultimately merges, to the restriction of the power of the rotatory motion, which, in the Monkeys, that bone so eminently possesses.

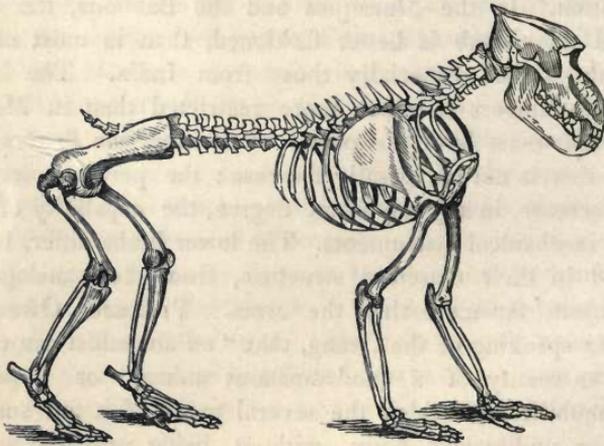
The fore-hands are narrow and elongated; and the palm is flat, instead of being gently concave, as in Man. The carpal bones occupy but little space, and consist of nine, instead of eight, as in the human subject, owing to a division of the *os trapezoides*. The metacarpal bones are long; that supporting the fore-finger is the longest; whence they gradually decline to that of the little finger. The metacarpal bone of the thumb is not much more than half the length of that of the first finger; and the phalanges, added to it, scarcely make the thumb pass beyond the first finger's basal joint: but, in this respect, there is some variation. In the *Macaques* and the *Baboons*, the fingers are shorter, and the thumb is better fashioned, than in most of the long-tailed Monkeys, and especially those from India. The independent action of the fingers is much more restricted than in Man: it has been said, that none have the power of dividing the fingers from each other; but this is not universally the case: the power, however, is too limited to increase, in any important degree, the capability of the hands to serve as mechanical instruments. The lower limbs differ, both in their osseous and in their muscular structure, from their analogues in the human subject, far more than the arms. Professor Owen has well remarked, in speaking of the *Orang*, that "no anatomist can contemplate the lower extremity of a quadrumanous animal, or experience the degree of mobility, of which the several parts of it are susceptible in the living or undissected body, without being prepared to find corresponding modifications of the muscular system, and consequent deviations from the structure of these parts as they exist in Man." Varying in length and muscular development, in different genera, the lower limbs never equal, much less exceed, the arms, as in Man. In the *Orang*, they are very disproportionate, and are the same, also, in the *Gibbons*. In other Monkeys, the proportion between the fore and hind limbs is not so considerable. The admeasurements of these parts, in a skeleton purposely examined, are as follow: Humerus, seven inches and three quarters; femur, from the top of the trochanter to the lower end, seven inches and a quarter; radius, eight inches and three quarters; tibia, six inches and a quarter.

In the *Macaques*, and the *Baboons* more especially, the proportions

are more equal : being semi-terrestrial in their habits, and inhabiting, as many do (the Chacma and Magot, for example), the recesses and summits of rocks, the extent of reach possessed by the truly arboreal species is not needed ; and, besides, arms disproportionately long would render their movements on the ground slow and embarrassed : as it is, their shuffling canter enables them to escape, except from enemies of tolerable fleetness. The shape of the pelvis has been previously described : it may here be added, that the thigh-bone (or femur) is straight, and the interspace between the tibia and fibula, greater than in Man. The os calcis projects ; the foot is narrow, and the fingers are slender ; but the thumb is well developed, and its metatarsal bone, though shorter than that of the first hind finger, far exceeds it in stoutness.

The sole of the foot is obliquely inward, owing to the mechanism of the ankle-joint, of which the motion is very free. As may be easily conceived, this position of the foot, or posterior grasper, is of the greatest advantage to a quadrumanous climbing animal, inasmuch as it renders

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Skeleton of Mandrill.

the application of the sole to the trunk of a tree, or to a branch rising perpendicularly, unforced and natural. Hence is it that the Monkey grasps a pole so readily with his hind feet, while climbing up, or while descending.

The position of the skull, with respect to the spine, preponderating, as it does, anteriorly, requires a far greater development of the trapezii, serrati, rhomboidei, and the other muscles inserted into the occipital bone, as well as a larger attachment of them : hence the neck appears short and thick, especially in some species (the Mandrill, for example), which have a large head, an elongated snout-like muzzle, and which habitually move on all-fours, carrying the body horizontally. In the Mandrill, and other

Baboons, there is, as in the Tiger, or Hyæna, a bold, rugged, occipital crest, denoting the power and extent of the muscles supporting the skull. The preceding sketch of the skeleton of the Mandrill (fig. 243) will render these observations at once intelligible. The shoulders are very muscular, and the chest is capacious, but compressed laterally, so as to be deeper, from the spine to the sternum, than from the centre of the arch of one rib to the centre of its fellow. In this respect, however, there is considerable difference; and in the Orang and Chimpanzee, the chest is broader than it is deep.

The flexures of the spinal column, so decided in Man, are very slight in the spine of the Simiadæ generally, but not in the Orang and a few others.

Ischiatic callosities (that is, a coarse, naked, thickened, callous skin, covering the tuberosity of the ischium) are universal, except in the Orang: in the Gibbons, they are very small; in the Baboons, of large extent.

The larynx, in many species, communicates, by means of an opening at the base of the epiglottis, with a membranous sack, sometimes double, occupying the anterior part of the neck, below the skin, and often extending beneath the clavicles: this sack can be filled with air at pleasure, but its use is not very apparent.

The greater number of Simiadæ have cheek-pouches, carried back from the inside of the cheeks, below the ears, which serve as a receptacle for the conveyance of grain and fruits.

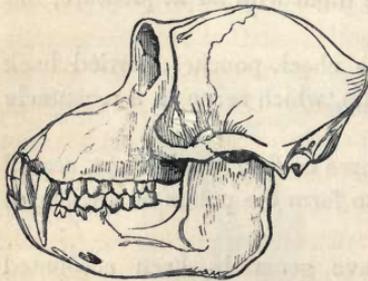
The tongue is thick and fleshy, and three or four papillæ are seated on its upper surface, near the base, so as to form the points of a triangle, its apex being directed forward.

The Monkeys of the Old World have generally been accounted frugivorous; and though to a certain point this is correct, few are exclusively so; and many are truly omnivorous, animal food being received with a satisfaction not to be mistaken. With respect to the Mandrill, for example, this is peculiarly the case; receding, in form, from the more typical Simiadæ, and approaching (with its congeners) to the Carnivora in general structure, it equally approaches them in instincts and appetite. It has been known to destroy and devour living prey with the avidity of a Tiger. Most of the Simiadæ relish insects: the Dog-faced Baboon, or Chacma, of South Africa, hunts greedily in quest of Scorpions, which it devours alive by multitudes; having first, by an instantaneous action, almost too quick to be perceived, broken off the latter part of the tail, which is terminated by a sting. In trials made upon different species of Monkeys, with a view to discover the extent and predilection of their carnivorous appetite, wide differences have been observed, not only in the selection of animal food, but in the manner of taking and devouring it. The quadruped, or bird, which some would pounce upon, and tear to pieces with quickness and

ferocity, others would either shrink from, in apparent fear, or simply examine with inquisitive playfulness: the insect, which would be eaten by one group, would be rejected by another; and several, which cast meat from them, with an appearance of disgust, would eat a Fly or a Spider with every sign of gratification. It would, therefore, appear, as might reasonably be anticipated, that the different groups, or even species, are endowed with gradations of the carnivorous appetite, or with modifications of it, both as to extent and direction.

The dentition of the Simiadæ accords with the nature of their food: in the Orang, which feeds on hard or shelled fruits, as the cocoa-nut, the outside fibrous bark of which it has to tear away, the teeth, and especially the incisors and canines, are of prodigious size and thickness, and must prove formidable weapons in combat: in most Monkeys, and especially in the Baboons, the canines remind us of those of a Tiger, excepting that they are more compressed. Compared with that of the human subject, the dentition of the Monkeys exhibits many characteristic differences. The incisors are more obliquely projecting in the

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Skull of one of the Simiadæ.

upper jaw; the two middle incisors, parted at their roots, converge toward each other; and the outer incisors follow their direction, to the increase of the space between them and the upper canines — a space for the reception of the lower canines, when the mouth is closed: the upper canines are long, sharp, and compressed, with a posterior cutting edge, and usually an anterior groove, or channel: the bicuspid molars are two on each side; the first small, and, with the outer tubercle, acutely pointed: the true molars are three on each side, and each is crowned by four tubercles, more acute than in Man.

In the lower jaw, the incisors are small and compressed, but deep from front to back; the canines are large, and assume a tendency to follow the direction of the incisors; being also placed, from the narrowness of the latter, more anteriorly than are the canines above: this tendency is carried out in the Lemurs to its maximum; the lower canines nearly resembling the incisors in form, and quite so in position. The molars are as above; but the first bicuspid, or, rather, false molar, is large, simply conical, and compressed; it leans back from the canine, and has, moreover, a certain semblance to the canine tooth, as it exists in many Mammalia: it has, however, double fangs. In most of the genera, the posterior molar below has an additional, or fifth tubercle, beyond the four, in pairs. In the Mandrill, this tubercle is not only very marked, but it terminates a

distinct fifth lobe, or division of the tooth. It occurs in the Barbary Ape, in all the Macaques, in the Semnopithecus and the Colobus, and in the White-eyelid and Mangabay Monkeys; but it is wanting in the true Cercopithecus. The figure (244) will convey a clear idea of the general characters of the dentition of the Simiadae.

With respect to the digestive organs, it may be observed, that the stomach is simple, as in Man, except in the Semnopithecus, in which this organ is highly complicated. The caecum is moderate, and sacculated, but destitute of the appendix vermiformis, excepting in the Orang, Chimpanzee, and Gibbons, which, in this point, resemble the human subject.

Of the habits of the Simiadae, in a state of nature, little is correctly known: unfortunately, the observations of most travellers are superficial; and even these have been narrated in a style too exaggerated to enable us to form a just estimate of the degree of intelligence displayed by these animals in their native condition. Most, if not all, are gregarious; individuals of the same species associating together in large troops, which act in concert: warned, by the cries either of a leader or sentinels, of the approach of an enemy, they unite in annoying or repelling their aggressor, or collectively betake themselves to flight. Among their natural enemies, the Leopard, the Panther, and other feline animals, together with large Serpents, are the most formidable. They do not construct nests,* but it is probable that the females retire to a hollow place, in some aged tree, in which to bring forth their young. They produce one or two at a birth, and manifest the utmost attachment to their offspring.

When sleeping, the Simiadae sit on their hams, grasping the branch, or perch, with their feet, for security, the arms crossing the front of the chest, and the head bent forward, so as to rest between the knees, which are thus elevated.

Though there can be no doubt but that a great portion of the celebrity which the Simiadae have obtained, for an apparent possession of superior rationality, may be fairly attributed to the approach which their figure displays to that of Man, still their actions sufficiently prove that, with the superiority of their organization to that of the lower Mammalia, is associated a corresponding ratio of intelligence. A Monkey, foiled in his endeavours to break a nut, by striking it against the floor, or the bars of his enclosure, will take up a stone (using both hands for the purpose), and hammer with it till he succeeds. Even in their frolics and gambols with each other, they often exhibit the most diverting traits of intelligence.

In the manifestation of their passions, good or evil, the Simiadae are quick and violent in the extreme: both their attention and feelings, how-

* It appears that the Chimpanzee and Orang form exceptions to this general observation.

ever, are very transient ; and the playful liveliness, and the gentleness, not, indeed, unmixed with petulance, which they exhibit, while young, gradually disappear, and ultimately become replaced by ferocity and indomitable obstinacy. The disgusting habits, the ungovernable rage, and the malice of some of the larger Monkeys and Baboons, when fully adult, are conspicuous features of their character.

When numbers tenant the same enclosure, though perpetually squabbling, they are less vindictive toward each other than might be expected ; and it often happens that one, the youngest and weakest of the party, becomes the object of care and solicitude to the rest, who, when menaced, will huddle together, with their protégé in the middle, and threaten with grimaces their supposed enemy.

The curiosity and amusing mimicry of these animals, especially while young, appear to be the result of an excessive irritability of temperament, inconsistent with that kind of tractability so eminently displayed by the Dog. "They seem," says Mr. Bennett (*Tower Menagerie Quad.* Lond. 8vo. 1829, p. 141), "to give a momentary—and but a momentary—attention to every remarkable object that falls in their way ; but never appear to remember it again ; for they will examine the same object, with the same rapidity, as often as it occurs, and apparently without in the least recognising it as that which they had seen before." They never become thoroughly domesticated and reclaimed. It is true, that the perseverance and ingenuity of Man, stimulated by necessity, have, as is well known, conquered their indocility, to a certain extent, for the purposes of exhibition : they have been trained, not without cruelty, to perform various tricks and feats of address or agility, at the command of their master ; having been disciplined to connect the word of command with the feat to be performed. But it is only in their adolescence that they will thus bend to discipline, or brook chastisement : in their fully adult state they are, with very rare exceptions, savage, malicious, dirty, and indomitable. Indeed, it may decidedly be said, that, to whatever extent disciplined,—however aptly they may learn, and adroitly practise, the most cunning tricks, and apparently affectionate as they may be to those who feed and indulge them,—their innate disposition remains unaltered : an inherent love of mischief, a dangerous capriciousness of temper, and a proneness to disgusting habits. Unlike the numerous valuable animals, in the other orders of the Mammalia, which have been reclaimed by Man, they appear incapable of obedience beyond the moment during which they are actually under the fear of punishment ; the instant their keeper is out of sight, the same offence, for which they have just been corrected, is committed, with the same daring impudence as before. It would seem, indeed, as if it were impossible to render them sensible, in the smallest degree, of the mischief they have perpetrated. Hence, though a few

individuals may be tolerated, or even admired, for their beauty, or considered philosophically interesting from their intelligence, the whole of them are, still, repulsive and obnoxious.

The voices of the Simiadæ are very various, in the several groups ; and different tones are uttered by each species, under the excitement of different passions. Moaning, whining, a hoarse, guttural barking, squeaking, screaming, and chattering, are heard, by turns, wherever these animals are congregated, according as they are influenced by grief, pain, love, or anger. Of all the passions, anger, or rage, is that expressed with the utmost intensity, both in look and gesture. Some, when irritated, pout the lips, gaze with a fixed and savage glare on their foe, and make repeated short starts, or abrupt movements of the body, as if about to spring forward, uttering, at the same time, inward guttural sounds, expressive of malevolence. Many display their anger by suddenly advancing, making abrupt starts, at the same time opening the mouth, and pursing up the lips, so as to conceal the teeth, while the eyes are daringly fixed on the enemy, as if in savage defiance. Some, again, and principally the long-tailed Monkeys, or Guenons, display their teeth, and accompany their malicious grins with a sharp, abrupt, reiterated cry, or chattering ; while others, as the larger Baboons, jabber, by rapidly moving the under lip, uttering no other sound than that which the lip itself makes, in striking against the gums and teeth.

In their native woods, the Simiadæ are all diurnal. With the first beams of the sun they emerge from their retreats, and, active, lively, and chattering, begin their search for food : it is then that the troops, haunting woods which skirt the cultivated grounds reclaimed by human industry from the wilderness, visit the garden and the plantation, and commit their depredations. They are now all alert ; but, as the oppressive heat of the day comes on, lulling into unbroken silence the thickly-peopled forests of the torrid zone—when the busy, feathered tribes have sought a shelter from the sun's fierce glare, and when the murmur of the insects has ceased—then do these lively beings retire to take their siesta in the shady recesses of the wood, or in the rifts and chasms of the rock, till the meridian heat be past ; at which period they resume their activity, and again venture forth in quest of food : but when the shadows of evening commence, and the Leopard and the Tiger rouse from their lair, they betake themselves to their leafy fastnesses till the dawn of morning.

Endowed with quick sight, and acute hearing, and vigilant in the extreme, they are not to be surprised without difficulty ; nor is it easy to lure them into traps. Most that are taken alive, and brought to Europe, are the young, or nurslings, of parents shot by the bow or rifle : such is the way in which the young Chimpanzees and Orangs,

which, within the last few years, have been exhibited in London, are said to have been procured; and in this manner, we are told, are the young Baboons and Monkeys obtained, which stock our menageries. The climate of England is uncongenial to the Simiadæ; and the observation also applies to all the more northern parts of Europe: some, however, bear it far better than others; and several species have produced young, not only in France, and the more temperate parts of the neighbouring Continent, but even in England,—a circumstance which has occurred several times at the Gardens of the Zoological Society. Still it is very evident, that our changeful climate is unfavourable to their health: their constitution is peculiarly susceptible of transitions from heat to cold; and a wet and murky day evidently produces depressing effects throughout all the tenants of the Monkey-house, who may be seen huddled together, for the sake of warmth. Hence, without much care and attention, few struggle through a severe winter; fewer survive two or three years; and but a small proportion attain to the natural term of their existence. One cannot help feeling a sort of sympathy for them, the more especially as the disease, under which most sicken and die, is pulmonary consumption; the symptoms of which correspond with those too often witnessed among our own species; as do, also, the morbid appearances of the lungs.

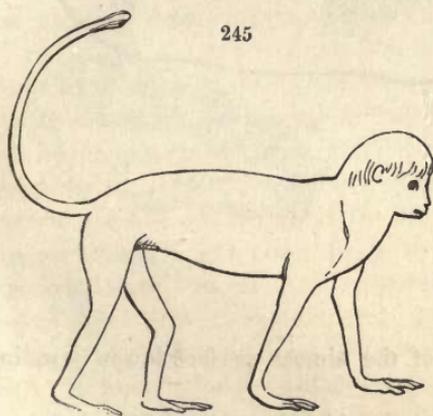
The acquisition of the second, or permanent teeth, is a period of considerable danger to the Simiadæ: their development is accompanied by much irritation of the system, and a great determination of blood to the brain; and numbers are suddenly carried off, unable to struggle through the ordeal. It would appear to be during the growth of the canine teeth that the greatest mischief arises; and this the more so, in proportion to the magnitude these teeth attain. In the large Baboons, for example, whose canine teeth are enormous, and with huge fangs deeply implanted in protuberant alveoli, the development of these parts is often attended by violent convulsions, which usually have a fatal termination. Of several young Mandrills which, from time to time, have been brought under the Author's notice, not one survived this critical epoch. If a collection of the skulls of Monkeys, which have died in our menageries, be examined, in a great proportion of them it will be found that the canines are but partially evolved, and were, consequently, in progress at the time of death. That the Simiadæ, in their free and natural condition, are much more exempt from this danger than when kept in a state of confinement, and that, too, in an unpropitious climate, may readily be imagined.

Another disease, to which the Simiadæ are subject, has not been hitherto noticed by naturalists. It consists in a softening of the bones, from the composition of which the calcareous particles are absorbed, or,

perhaps, into which they are not duly deposited. Several instances have been noticed, in which the bones of all the limbs have been mere cartilage, capable of being bent in any direction; while the texture of the bones of the skull has been so soft as to be little firmer than coarse blotting-paper; and, when macerated and dry, capable of being reduced to powder, by rubbing between the fingers. This disease may be rationally imputed to cold, innutritious food, and confinement, by which the vital energies of the system become enfeebled.

What extent of knowledge the Greeks and Romans had, respecting the Simiadae, is not very easy to determine: still, however, though the Chimpanzee, the Orangs, and Gibbons may be regarded as modern discoveries, several species, at least, must have been well known; especially those tenanting continental India, and, still more so, those indigenous in the north-western regions of Africa. Nearly 1000 years before the Christian era, Apes were among the exports of India: Apes, ivory, and Peacocks, together with gold and silver, were brought, we are told, by the ships of Tarshish, to Solomon, as worthy the purchase or acceptance of the monarch of Judea. (2 Chron. ix. 21.)

Among the Egyptians,* the Ape was a sacred animal: figures of one



Monkey represented on an Egyptian tomb.

or two species of large Baboon occur abundantly among the sculptured emblems which decorate their pillars and temples; and are also depicted on mummy-cases. From the earliest ages to the present, the Brahmins of India have held one or more species (the Entellus particularly) in reverence, as a sort of deity; nor, among the enlightened inhabitants of our western world, have there been wanting those who, arrogating to themselves the name of philosophers

have regarded, or pretended to regard, these animals, as but one step removed (and that not insurmountable) from the human race. The annexed figure (245) is an outline of a Monkey, represented on an Egyptian tomb: it is, apparently, a Cercopithecus.

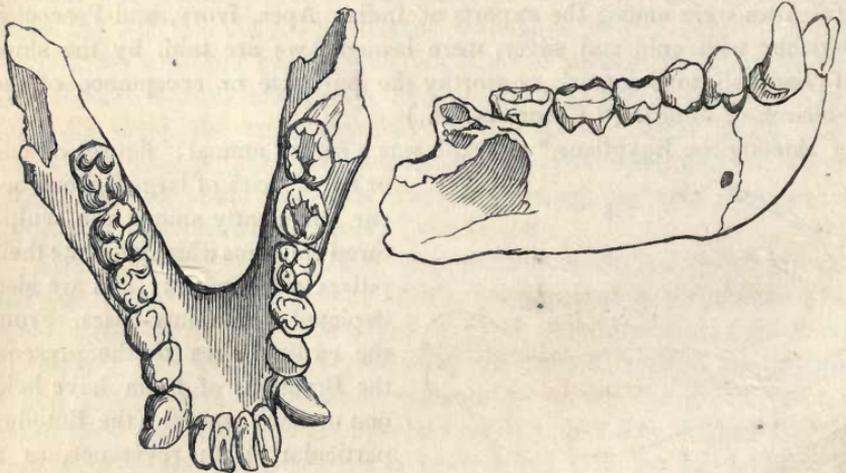
* " Quis nescit, Volusi Bithynice, qualia demens
Ægyptus portenta colat? Crocodilon adorat
Pars hæc: illa pavet saturam serpentibus Ibim:
Effigies sacri nitet aurea Cercopitheci."

Juv. Sat. xv.

You enter, says Lucian, into a magnificent temple, every part of which glitters with gold and silver. There you look attentively for a god, and are cheated with a Stork, an Ape, or a Cat.

Till very lately, the Simiadæ (and, indeed, the Quadrumana generally) were regarded as having no fossil prototypes; an opinion now proved to be erroneous. M. Lartet, in a communication published in the *Proceedings of the Academy of Sciences*, January, 1836, and also read at a meeting of the Geological Society of France, announced his discovery of fossil bones of a large Monkey. They were found at Sanson, two leagues south of Auch (in the department of Gers), in a tertiary formation, extending from the south of Auch to the foot of the Pyrenees, and apparently the result of a long succession of water alluvia: they consist of a lower jaw, with its dentition complete; a molar tooth, with four tubercles; a bone of one of the fingers; a portion of the thigh-bone; together with the bones of the instep, &c.

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Above (fig. 246) are sketches of the almost perfect lower jaw, in two views.

According to M. Blainville (*Osteographie Fasc. iv. p. 54*), the perfection of the teeth in the lower jaw, their number, and the slight degree in which they are worn, prove that the animal must have perished in the prime of maturity. The incisors are four in number, somewhat oblique, and, which has never been seen in any Ape existing, so elongated as to have their points on a level with the points of the canines: they are of a conical, or cuneiform figure, with long, sharp roots, and touch each other only at the base, above the neck of the root. The canines are short, with a furrow on the posterior surface, to the base, indicating that the upper canine did not pass beyond the lower, as is usual. The last molar, besides the usual four tubercles, as in the *Semnopithecus*, *Maccaci*, &c., has a fifth tubercle, having two or three cusps. There can

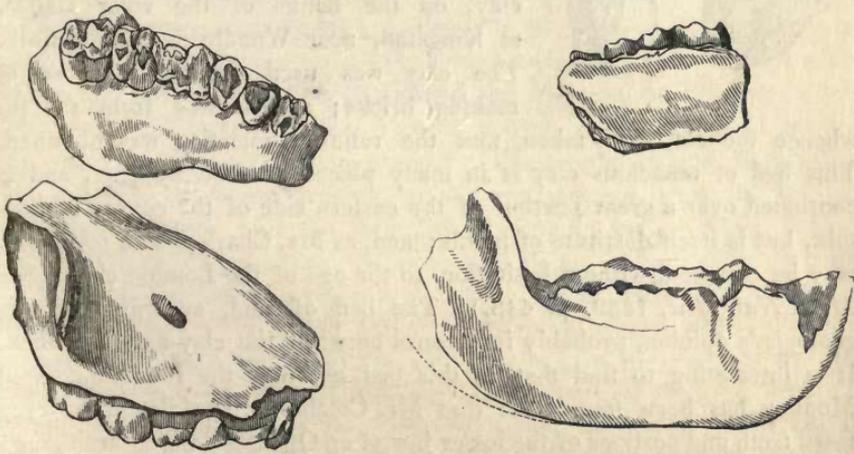
be no doubt that the animal belonged to the Old World section of the Simiæ; but it is probable that it is referable to a genus no longer extant. M. Lartet has named this fossil species *Pithecus antiquus*. A portion of another lower jaw, containing the canine and molar teeth, presents the same characters.

With these relics occurred, also, those of the Mastodon, Deinotherium, Rhinoceros, Palæotherium, gigantic Manis, Antelopes, Deer, and a large carnivorous animal.

The discovery of M. Lartet is not a solitary instance. Within the last few years, the fossil reliquia of three species have been discovered in the Sewalik Hills (a portion of the Sub-Himalayan range), imbedded in a tertiary stratum. (See *Journal of Asiatic Society of Bengal*, vol. v. p. 739, vol. vi. p. 357.) Two of these species are due to the researches of Captains Falconer and Cautley, and one to the labours of Lieutenants Baker and Durand. Figure 247 represents a portion of the upper jaw, with the teeth, in two views, of the fossil species discovered by Baker and Durand. Figure 248, a portion of the lower jaw of the two species which we owe to the researches of Falconer and Cautley:—they are given of half the natural size.

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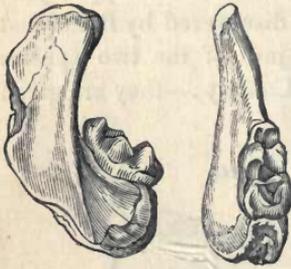
Of these fossil Simiadæ, one, as the fragments would indicate, probably exceeded, in size, any living species of the present day; the second was also a large animal, far superior to the *Entellus* in size, but still inferior to the first; the third appears to have been about equal to the *Entellus*, and was probably an Orang.

Fossil remains of extinct *Quadrumana* have been discovered by Dr. Lund, a Swedish naturalist, in the basin of the Rio des Velhas, in South America; and it is worthy of observation, that they evidently belong to

a form allied to the group of American Monkeys termed Sapajous; but these extinct species were, as their reliquia prove, more than double the size of any of this group existing in the present day. The fragments in question were, with those of other animals, imbedded in a red earth, at the bottom of a series of caverns, hollowed out in a secondary calcareous deposit. To the larger of the animals, which must have exceeded four feet in height, he gives the name of *Protopithecus Brasiliensis*, regarding it as the type of a distinct genus; to the other, that of *Callithrix primævus*.

It is not, however, only on the continents of Europe, or in Asia and America, that quadrumanous relics have occurred: geologists have been surprised and interested by the discovery of the fossil remains of extinct Monkeys found in some of the series of tertiary deposits of our

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own island. The first example is that of the last molar teeth, and a portion of the lower jaw, as seen in the annexed sketches (fig. 249) of a Macaque, which, with the teeth of sharks, were found, in 1827, by Mr. Colchester, in a deep layer of whitish sand, beneath a stratum of blue clay, on the banks of the river Deben, at Kingston, near Woodbridge, in Suffolk. The clay was used for the purpose of making bricks; and it was from the pit

whence the clay was taken, that the relic in question was obtained. This bed of tenacious clay is in many places overlaid by crag, and is continued over a great portion of the eastern side of the county of Suffolk, but is itself destitute of fossils; and, as Mr. Charlesworth considers, may be assigned, without hesitation, to the age of the London clay. (See *Mag. Nat. Hist.* 1839, p. 448.) The bed of sand, according to this geologist's opinion, probably intervenes between the clay and the chalk. It is interesting to find that, in this bed, not only the relic of a fossil Monkey has been found, but that Mr. Colchester has also discovered fossil teeth and portions of the lower jaw of an Opossum, which are figured in the *Magazine of Natural History* for 1839, p. 450. That the relic assumed to be that of a species of Monkey (*Macacus*), is truly so, there cannot be the slightest doubt. It has been rigorously examined by Professor Owen, who, in the above publication, has given a detailed account of it. The tooth, it may be here observed, is somewhat narrower than in any recent species of *Macacus*; but the posterior fifth tubercle (one of the characters of the genus) presents, as in most of that group, two cusps, instead of being simple, as in the genus *Semnopithecus*. In the *Annals of Natural History*, for November, 1839, Professor Owen describes a

second tooth, found in the same locality, which he indentifies with the second molar of a *Macacus*; and which evidently belonged to an aged animal. It differs, he observes, from the corresponding tooth of a recent *Macacus*, of the same size, in having a slight ridge along the base of the anterior part of the crown; and the same characters, he adds, distinguish the posterior molar of the *Macacus* described in the September Number of the *Magazine of Natural History*, 1839. Thus, then, is the fact established, of the existence of *Quadrumana* in our island (if then an island) at some remote epoch.

ON THE ARRANGEMENT OF THE SIMIADÆ.

WHEN Linnæus framed his *Systema Naturæ*, the limited number of Simiadæ and Cebidæ, then known, enabled him to do little more than throw them all into a single genus, viz., *Simia*; with a triple subdivision of it, into Apes, Baboons, and Monkeys. Buffon, who, as already stated, first clearly pointed out the distinction between the groups peculiar to the Old World, and those of the New, divided the former into—1. Apes, or Singes propre, sans queue; 2. Baboons, or Papions à queue courte; and, 3. Monkeys, or Guenons—Guenons à queue longue; between which latter and the Baboons, he considered the Maimon, or Pig-tailed Monkey, and the Rhesus, or Patas à queue courte, with other allied species, to constitute an intermediate group.* These subdivisions, founded on the absence, or, where present, on the comparative length of the tail, Erxleben stamped with the formality of genera; viz.,—*Simia*, including the Orang, Chimpanzee, and Gibbons; *Papio*, including the Baboons and the Pig-tailed Monkey; and *Cercopithecus*, including the Long-tailed Monkeys of Asia and Africa. But these genera, which a farther acquaintance with the structure and economy of the animals has led naturalists to subdivide and re-arrange, serve only to shew the futility of taking generic characters from one organ, to the exclusion of others. For, though the tail, where well developed, in the Old World Monkeys, takes a decided part in their economy, it does not, therefore, follow that all species with long tails come under one group; and that all with short tails, again, belong to one genus; neither is it a proof of generic unity: for few, it is to be supposed, would place the Orang, the Chimpanzee, and the Gibbons in one genus, any more than they would associate the *Semnopithec*i with the *Cercopithec*i.

* Cuvier erroneously observes, that the *Macaque à queue courte* of Buffon (*Supp.* vii. pl. xiii.) appears to be merely a true *Macaque* (*Macacus cynomolgus*) with the tail cut off.

In the *Journal de Physique*, Messrs. Cuvier and Geoffroy announced their discovery of a method whence, as they conceived, correct and philosophical data could be obtained, upon which to institute an arrangement of the animals under discussion: this was by measuring the degree of the facial angle (a process originally invented by Camper), and of making the degree, thus ascertained, the test both of rank in the family and of natural affinities. But a plan of this kind cannot be adopted with precision; and is, at best, calculated only to mislead. In their progress from youth to maturity, the skulls of the Simiadæ universally undergo very marked changes; and, besides, there is much difference between the crania of males and females. It happens, also, that the most anthropoid species, the Chimpanzee, has, when adult, the muzzle more produced, and, consequently, the facial angle more acute, than the Gibbons or the Semnopithecæ; in fact, as much so as the Baboons; so that the facial angle, even where correctly ascertained, will be found to be nearly the same in species widely differing from each other in structure and general economy. The fallacy of this rule being felt, naturalists, without abandoning it (and the same observation applies to the tail), have sought for other characters, by which, in conjunction with this facial angle, the natural groups of this family might be distinguished. Of these, the shape of the teeth; the presence or absence of laryngeal sacculi, and of cheek-pouches; the presence and magnitude of callosities; the condition of the thumb; and the length of the tail,—are the principal ones upon which naturalists have founded the modern subdivisions. There is, however, a want of fixedness in these characters; they do not accompany each other in the same unvarying order, but are often perplexingly interchanged; so that it becomes impossible to generalize on them. If, for instance, it be laid down as a rule, that all the Monkeys with callosities and tails possess laryngeal sacculi, and a fifth tubercle on the last molar below, we shall find it, though of extensive, not of universal application; for the Cercopithecæ, with two exceptions, have the last molar destitute of the fifth tubercle; and many, certainly, want laryngeal sacculi.

Again, the Gibbons, allied as they are to the Orang, possess small callosities; and the Chimpanzee, placed by Cuvier in the same genus with the Orang, is destitute of those external laryngeal sacculi which, in this latter animal, and in the syndactyle Gibbon, are remarkable for development. The fact is, that the very variableness of these characters proves their non-importance beyond a certain point, no less than the impossibility of taking them, unitedly or singly, as the standard of the natural groups composing the family. With these difficulties around him, the naturalist will find them vanish, if he proceed at once to analyze the family, and to determine, according to the results of his analysis, the

affinities of the members composing it. He will meet, at the outset, with a group nearer to Man, in certain structural details, than the rest; viz., the Chimpanzee, the Orangs, and the Gibbons, forming three genera, obviously allied to each other, and as obviously separate from all that succeed. Amidst the numerous genera still remaining, he will discover that some present a strange and, indeed, unexpected structure of the stomach, accompanied by an exclusively frugivorous appetite. Instead of being simple, the stomach is complex and sacculated; and the molars, as if to keep up the analogy to the ruminant form, are deeply indented by re-entering folds of enamel; so that, when worn, they remind us of those of the deer or sheep. In addition to these characters, he finds great elongation of the organs of prehension, and an abbreviated or even rudimentary condition of the fore-thumb.

The importance of these structural characters, accompanied, as they are, by corresponding habits, and minor details of organization, will indicate at once the distinctness of such a group. Hence, the genus *Semnopithecus* of India, and, provisionally, the genus *Colobus* of Western Africa, will constitute a second sub-family. The remaining Simiadæ he will find to consist of several omnivorous genera, beginning with the genus *Cercopithecus*, and advancing gradually through a series of transitions to the Baboons (*Cynocephalus*), which in carnivorous propensities, ferocity, and canine-like development of muzzle, exceed all the rest; but, as he traces the gradation of form, the manner in which the *Cercopithecæ* approximate to the *Macaci*, and how, again, these seem, as it were, to merge into the *Cynocephali*, he will conclude that they form a third natural group, or sub-family; and he will perceive the discordance of the divisions of Buffon with those indicated by Nature. The following representations (figs. 250, 251, 252, 253) shew the transition, as far as physiognomy and the form of the head are concerned, from the *Cercopithecæ*, through the *Macaci*, to the *Cynocephali*. Such, then, is the general result of an analysis of the Simiadæ. It must, indeed, be acknowledged, that the views of many writers differ from those here expressed; for the *Semnopithecæ* are still placed, by some, among the "long-tailed Guenons," or group of which the genus *Cercopithecus* constitutes a leading part; while, on the contrary, the *Macaques* and *Baboons** are regarded as forming a group *per se*. The very remarkable and important structural peculiarities, however, of the *Semnopithecæ*, separate them (and their immediate allies) as distinctly from the *Cercopithecæ* as they do from the *Gibbons*.

* Some writers prefer associating the *Macaques* with the *Cercopithecæ* group, reserving the *Baboons* (*Cynocephalus*, Cuv., and *Papio*, Bris.) as a sub-family by themselves. Mr. Ogilby refers the long-tailed *Macaci* to the genus *Cercopithecus*, and founds a new genus, termed *Papio*, for the *Macaques* with short or with tuberculous tails.

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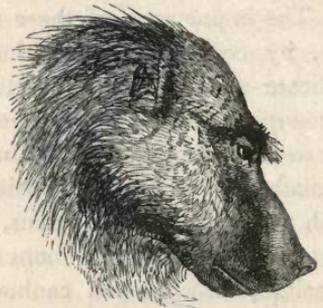


Fig. 250. The Malbrouck Monkey, a genuine representative of the genus *Cercopithecus*.

Fig. 251. The Bonnet Monkey, of the genus *Macacus*, closely allied to the *Cercopithecii*.

Fig. 252. The Pig-tailed Monkey, also a *Macacus*, but more widely removed from the *Cercopithecii*, and approaching the *Cynocephali*.

Fig. 253. The African Baboon, or *Chacma*, one of the *Cynocephali*, with the muzzle developed to the utmost.

With respect to the Baboons, it will be easy to shew a regular gradation between them and the *Cercopithecii*. In some of the *Macaques*, with a moderately produced muzzle, the tail is elongated, as in the *Cercopithecii*, to which they also approximate in the form and contour of the limbs and body. Others of the *Macaques*, on the contrary, as the Pig-tailed *Macaque*, with a dog-like muzzle, have an abbreviated tail, and, as already shewn, closely approach the genus *Cynocephalus*. The genera *Cercopithecus*, *Macacus*, and *Cynocephalus* (including the sub-genera into which naturalists may divide them), are, in fact, merely modifications of one type: and it may be added, that it is in such a group, the most remote from the highest of the family, that the fluctuations and extremes in external characters are to be expected; such as in the length of the tail and the projection of the muzzle; while, at the same time, it may be observed, that, in proportion to the distance of a group from the highest (whether that group be one of sub-family,

family, order, or class), the value of these fluctuating characters diminishes; for it may be laid down as a rule, that the importance of characters increases as we ascend the scale, and *vice versâ*. Hence, in the third sub-family of the Simiadæ, the variations of Nature, on one model, ought neither to startle us nor disguise the affinities of the members composing it.

The arrangement of the sub-families and genera of the Simiadæ will stand as follows:

FAMILY, SIMIADÆ.

SUB-FAMILY I.	Genera.
Tail wanting; arms long; general figure anthropoid; stomach simple; cæcum with vermiform appendix.	{ Troglodytes. Pithecus. Hylobates.
SUB-FAMILY II.	
Tail long; no cheek-pouches; stomach complex; figure slender; laryngeal sacculi; no vermiform appendix.	{ Semnopithecus. Colobus. (?)
SUB-FAMILY III.	
Tail variable; cheek-pouches; stomach simple; laryngeal sacculi variable; general figure more robust, often massive.	{ Cercopithecus. Macacus. Cynocephalus.

SUB-FAMILY I.—At the head of the Simiadæ is the sub-family consisting of the anthropoid Apes; viz., the Chimpanzee, the Orangs, and the Gibbons; the mutual affinities of which have not been overlooked; so far from it, indeed, that, from this very circumstance, much discrepancy is to be found in the arrangement of them by different naturalists, each taking different views as to the value of their distinguishing characters. Thus, for example, the Gibbons, though possessing small ischiatic callosities, are included, by M. Geoffroy, together with the Orang-outan, in his genus *Pithecus*; while for the Chimpanzee he institutes a distinct genus, under the title *Troglodytes*. On the other hand, Illiger regarded the Gibbons as distinct from the Orangs, and established the genus *Hylobates* for their reception,—a genus adopted by Cuvier, who, again, refers the Chimpanzee to the genus *Pithecus*, as an Orang, differing only in the comparative shortness of the arms, and in the absence of an elevated forehead, which falls back immediately behind the superciliary ridge. (Cuv. *Reg. An.* 1829, p. 89.)

In the present work, the members of this group are arranged under three generic heads, adopting, for the reception of the Chimpanzee, the term *Troglodytes*, Geoff., which Cuvier has subsequently applied to a genus in ornithology (the true Wrens). These three genera will therefore stand as follow—*Troglodytes*, *Pithecus*, and *Hylobates*; and it is among the members of these genera that the nearest anatomical approach to the human subject exists. This is exemplified less in

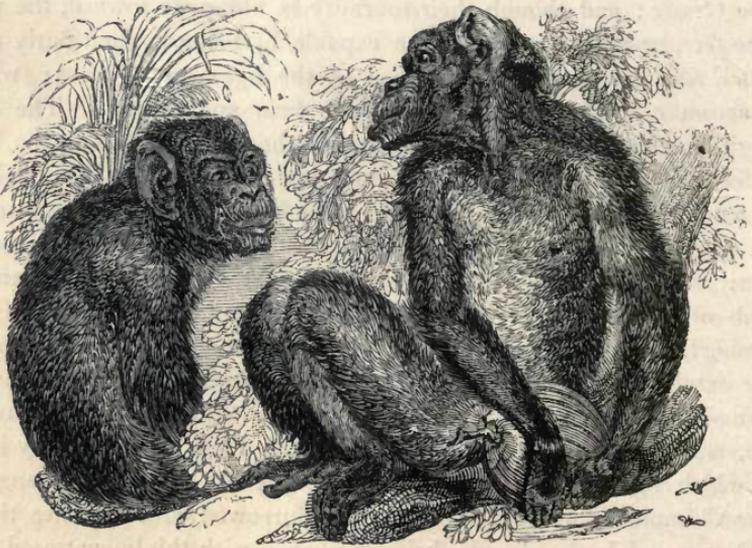
the shape of the teeth, except that the molars are bluntly tuberculate, than in the condition of the lungs and liver; the position and appearance of the intestinal canal; the attachment of the vermiform appendix to the cæcum; the structure of the stomach, which, however, is thicker and narrower at the pylorus; and in the disposition of the arteries arising from the arch of the aorta. They differ, moreover, from the succeeding groups, in a certain superiority of cerebral development, connected with a grave demeanour, and a degree of intelligence, at one time, perhaps, too highly estimated; but, with every abatement, exalting them to the head of the Simiadæ. The most remarkable external characters in which they agree, consist in the absence of a tail and of cheek-pouches, and in the extraordinary length of the anterior extremities, compared with the posterior. Of the three genera in question, the Orangs (*Pithecus*) and the Gibbons (*Hylobates*) approach, in some points, the closest together, and more particularly in the presence of extensive laryngeal sacculi, in the extreme length of the anterior extremities, and in the narrowness of the hands and feet; but not in general anatomical structure, aspect, or clothing. A small, round head, a compressed face, a narrow under-jaw, slender proportions, deep, woolly fur, and ischiatic callosities, distinguish the Gibbons both from the Orangs and the more anthropoid Chimpanzee. On the other hand, the Chimpanzee and Orang are less immediately related than Cuvier seems to have considered them. In most respects, the Chimpanzee approaches more nearly to the human type of structure; and particularly in the presence of a pendulous uvula at the back of the palate, which is wanting in the Orang; and in the structure of the larynx, in which the laryngeal sacs are not developed, as in the Orang, but are produced into a cavity in the body of the os hyoides, "presenting the first indication," as Mr. Owen has observed (*Zool. Proc.* 1830, p. 5), "of the excavation which is carried to so great an extent in the Monkeys of the genus *Mycetes*" (family, *Cebidæ*). Still, however, the Chimpanzee and the Orang are more closely related to each other than the Gibbons are to the latter. They are, moreover, the representatives of each other in their respective portions of the globe; the one tenanted the secluded depths of the forests of Western Africa, the other the recesses of the still denser forests of Borneo and Sumatra.

The Chimpanzee and Orang are the largest of the Simiadæ, and the most powerful: but the Orang is more exclusively arboreal, and, therefore, not so much at ease on the ground as the Chimpanzee, which is less decidedly organized as a climber. With respect to the limbs of the Orang, the inferior extremities are not only very short, but, also, bowed inward at the ankles; and the foot so articulated to the tibia as to allow of little more than the outer edge being fairly applied to the ground; and there is not only

a want of development in those peculiar muscles which enable the human subject to walk with ease and vigour, but the ligament (ligamentum teres) which binds the head of the thigh-bone to the bottom of the socket, is altogether wanting; an arrangement which diminishes the firmness of the joint, while, at the same time, it adds very considerably to its freedom and flexibility. Thus, the short, ill-turned, and loosely-jointed legs of the Orang render its movements on the ground tottering and unsteady, when, as it sometimes does, it balances itself upon them, and waddles awkwardly along: in ordinary locomotion on the ground, its arms are its principal agents; these are of enormous power and length; they actually touch the ground, and serve as crutches; for, resting his weight on the bent knuckles, the Orang swings, or drags, the body along, the legs performing only a secondary part in the efforts of progression. Among the trees, however, this awkwardness is exchanged for great activity and freedom; there, its long arms, its hook-like hands and feet, its obliquely fixed and flexible hinder limbs, and the strength of its thickset shoulders, combine to its advantage. But, in the Chimpanzee, its adaptive structure for arboreal habits is less in the extreme. In the first place, its lower limbs are larger in proportion than in the Orang; and though their tournure is obliquely inward, the palms of the feet, or hinder graspers, are capable of being applied fairly to the ground, and the hip-joint is secured by the ligamentum teres; whence the action of the lower limbs is more firm and steady. The arms, though long, reach only a little way below the knees, and both the hands and feet are broad, comparatively short, and have less of that hook-like character which is so remarkable in the Orang. The thumb of the hand has not, it is true, the same development as in Man; otherwise, this organ nearly resembles, in form, that of the human hand; and the thumb of the foot is of considerable development; while, in the Orang, it is short, and often destitute of the terminal phalanx. With respect to other external differences, it may be observed that, in the Orang, the ears are small, and lie flat on the skull; while, in the Chimpanzee, they are large, and stand out from the head. In both there is a similarity in the face, which is grave, and even melancholy, especially that of the Orang; but in the Chimpanzee the cheeks are more furrowed with wrinkles than in the Orang; while the muzzle, being furnished with thinly-scattered white hairs, gives to the young individual a grotesque appearance of age, in contrast with the playful habits of a child. In both animals the lips are endowed with great mobility, and are capable of extraordinary protrusion; but the chin is larger and more prominent in the Chimpanzee than in the Orang; in which latter, this part retreats at once from the protruding lips, and over these no white hairs are scattered. In the Chimpanzee the hair of the head radiates from a centre, and the back of the fore-

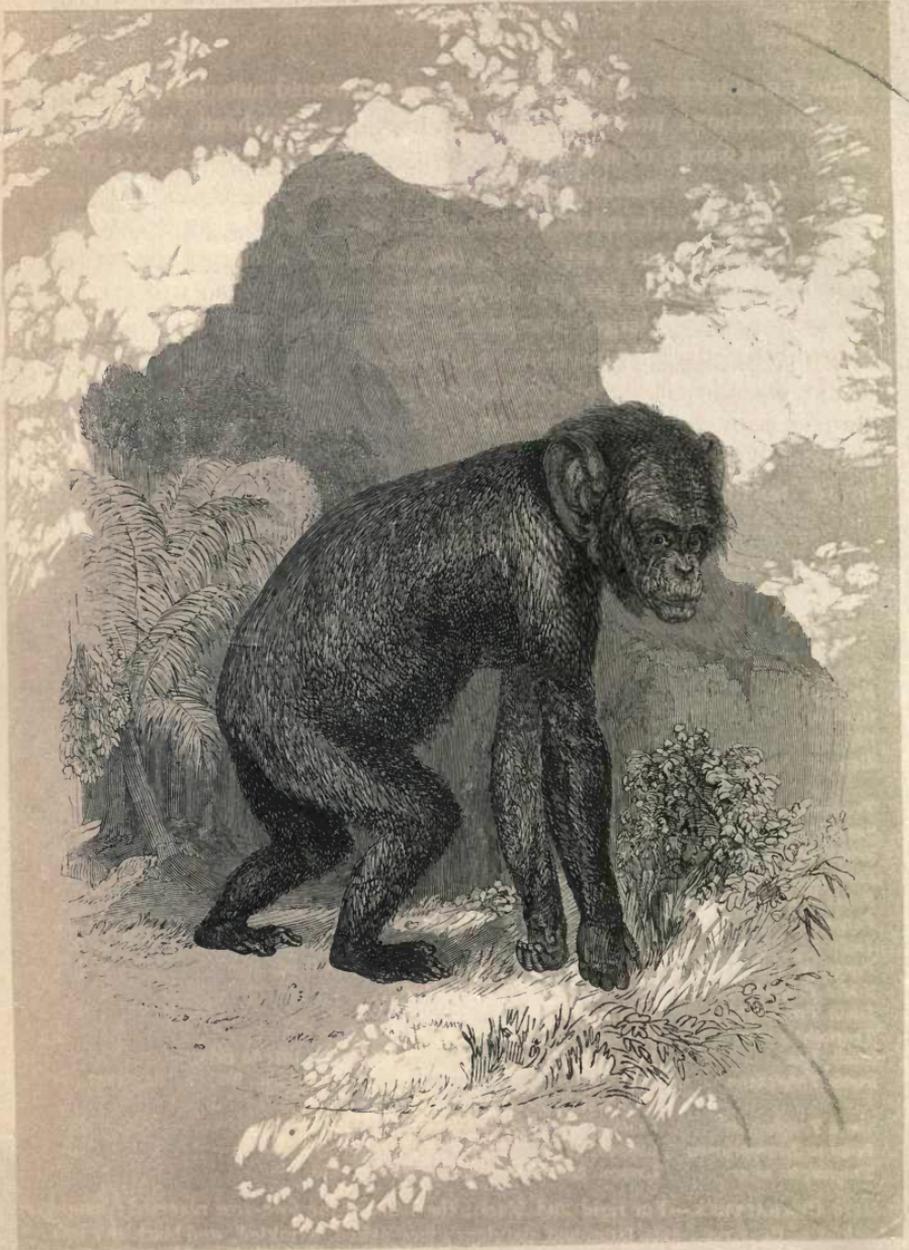
hand is naked to the wrist ; in the Orang the hair of the head is all directed forward, there being no centre of radiation on the vertex, and the back of the fore-hand is covered with hair ; in both animals the hair of the fore-arm is reverted to the elbow. In the young living Chimpanzee the forehead is low and flat ; in the young Orang, large and convex, with a slight, perpendicular, elevated line, indicating the suture between the two frontal bones. In the voices of the two animals (judging always from the young individuals of which opportunities of examination have been afforded) there exists a remarkable difference. The young Chimpanzee lately living in the Gardens of the Zoological Society was capable of uttering deep guttural sounds of considerable power, as well as louder cries : but the ordinary voice of the young Orang (in the same Gardens), was a feeble, plaintive whine ; when, however, the animal was irritated or disappointed, it uttered a shrill querulous scream, which it would reiterate until pacified.

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THE CHIMPANZEE.

(Troglodytes niger, Geoff.)



THE CHIMPANZEE (YOUNG MALE).

(*Troglodytes niger*, Geoff.)

GENUS.—TROGLODYTES.

- Troglodytes* GEOFF. Ann. du Mus. xix. 1812.
Simia in part, ERXL. Syst. Regni An. 1777.
Pithecus in part, CUV. Règne An. 1829.
Mimetes LEACH.

GENERIC CHARACTERS.—MUZZLE long, and truncated anteriorly; SUPRA-ORBITAL RIDGES prominent, behind which the forehead recedes directly backward; NO CRANIAL RIDGES; FACIAL ANGLE 35°; EXTERNAL EARS large and standing out; TAIL wanting; ISCHIATIC PROTUBERANCES covered with naked callous skin, in the adult; ARMS reaching below the knee-joint; FEET wide, the thumb extending to the second joint of the adjoining toe, and always furnished with a nail; DENTITION normal; CANINES large, overpassing each other, their points being lodged respectively in intervals of the opposite teeth; INTERMAXILLARY BONES ankylosed to the maxillaries during the first dentition; RIBS, thirteen pairs; NO CHEEK-POUCHES; LARYNGAL SACCULI small.

COUNTRY.—Western Africa, bordering the torrid zone, between lat. 12° or 14° north, and 10° south.

THE CHIMPANZEE.

TROGLODYTES NIGER. (*Troglodytes niger*, GEOFF. Ann. du Mus. xix. 1812.)

- Pongo* and *Engeco* BATTEL, in Purchas's Pilgrims, ii. 1625
Barys, *Baris*, and *Quojas Morrou*, BARBOT, DAPPER. 1670, *et aliorum*.
Homo Sylvestris TYSON, Anat. of a Pigmie, c. fig. 1699.
Smitten (?) BOSMAN, Reise nach Guinea. 1708.
Quimpesé (?) M. DE LA BROSSE, Voy. l'Angola. 1738.
Chimpanzee SCOTIN's Print. 1738.
Baris or *Barris*, *Pigmeus*, *Guineensis*, and *Chimpanzee*, Descr. of some curious Creatures, &c. London, 1758, p. 6, c. fig.
Troglodytes, *Homo nocturnus*, LINNÆUS, Syst. Nat. 12th ed. 1766.
Simia Troglodytes SCHREBER, Mamm. fig. I. c. 1772.
Simia Satyrus SCHREBER, fig. II. fig. II. B.
Simia Agrias SCHREBER, fig. II. c.
Simia Troglodytes GMELIN. 1788.
Pongo BUFFON, Hist. Nat. Suppl. vii. 1789.
Joeko AUDEBERT, Fam. i. sect. i. fig. 2. 1797.
Pongo, or *Great Black Orang*, SHAW, Gen. Zool. 1800, vol. i. p. 9, c. fig.
Simia Troglodytes BLUMENBACH, Handb. 1803.
Simia Troglodytes KUHL, Beitr. 1820.
Troglodytes niger DESMAREST, Mamm. p. 49. 1820.
Simia Pan DONOVAN's Natural Repository, No. 19. 1821 to 1828.
Simia Troglodytes F. CUVIER, Dict. des Sc. Nat. xxxvi. p. 285, c. fig. 1825; et "Mammifères."
Simia Troglodytes FISCHER, Synops. Mamm. p. 9. 1829.
Pithecus Leucoprymna LESSON, Illust. de Zool. pl. 31. 1836. (young).
Troglodytes niger LESSON, Species des Mamm. p. 37. 1840.

SPECIFIC CHARACTERS.—Fur rigid and black; the hairs of the fore-arm reversed; hands naked to the wrist; ears large and patulous; face naked, wrinkled, and blackish; lips and chin sprinkled with short white hairs.

LOCALITIES.—Sierra Leone, Guinea, Congo, Loango.

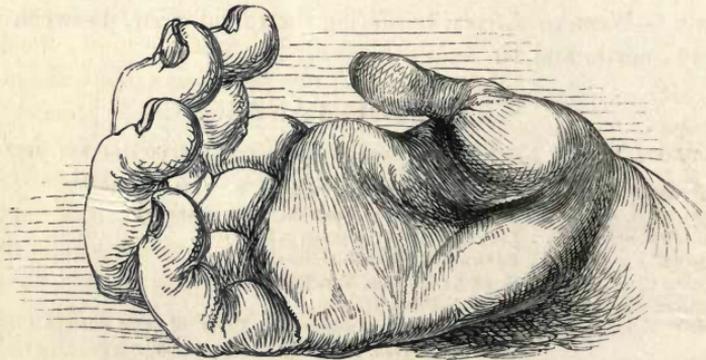
DESCRIPTION.—The skin of an adult male, not quite perfect, in the Museum of the Zoological Society, presents the following characters:—

The fur is coarse, harsh to the touch, long, and of a black colour, moderately glossy; that on the fore-arms is reverted. On various parts grey hairs are intermixed with the black, and prevail especially on the lower part of the back, the haunches, and thighs; and, being equal in number, on the lower part of the back, to the black hairs, produce there a grizzled appearance. The cheeks are furnished with thinly set grey hairs, with black intermixed; the ears are large and naked; there are decided ischiatic callosities (in their greatest breadth about two inches and a half),—a fact which most naturalists have overlooked, or denied. M. Isidore Geoffroy, however, in his interesting paper on the genus *Eriodes* (in *Mem. du Mus. d'Hist. Nat.* 1828), points out their existence; and the correctness of his observation is verified by the specimen in question.

The length of the head and body is two feet six inches.

The hand (fig. 255), which is preserved entire, in spirits of wine,

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measures, in length, nine inches and a half; its breadth across the palm is three inches and four lines; the thumb is one inch and ten lines; the middle finger three inches and six lines.

The total height of the animal, in the erect attitude, is about four feet.

The following description was taken from a living specimen (very young), which died in 1826, in the Menagerie of the Zoological Society.

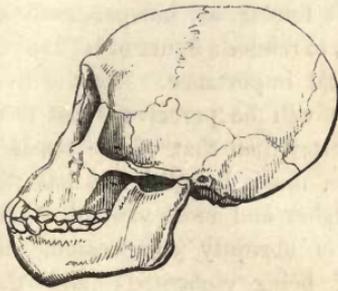
General figure short and stout; chest broad; shoulders square; abdomen protuberant; forehead retreating behind the supra-orbital ridge, the cranium otherwise well developed; nose flat; nostrils divided by a very thin septum; lips extremely mobile, and traversed by vertical wrinkles; ears large and naked; eyes lively, deep set, and chestnut-coloured; neck short; arms slender, but muscular, and reaching, when the animal stands as erect as possible, just below the knee; all the four hands well developed, and with opposable thumbs; the nails human-like; the hair moderately coarse and straight, longest and fullest on the head, down the back, and on the arms; thin on the chest and abdomen; on the fore-arm

it is reverted to the elbow; backs of hands naked to the wrist; muzzle with a scanty beard of very short white hairs; skin of the face dusky black, darker round the eyes; ears and palms a dusky purplish black; hair glossy black.

	ft.	in.
Height from heel to top of head	2	0
Length of arm from shoulder to end of fingers	1	4½
Height from heel to extremity of thigh-bone	0	11½
Hand, from wrist to end of middle finger	0	5¼
Circumference of hand	0	4½
Breadth of palm	0	2
From heel to extremity of longest toe (middle)	0	5½
Breadth of sole at origin of thumb	0	2½
Length of ear upward	0	2¾
Transverse diameter of ear	0	1¾

In the young Chimpanzee, during the first few years of its life, previously to the acquisition of the permanent teeth, the cranium (fig. 256), owing to the early development of the brain, greatly preponderates

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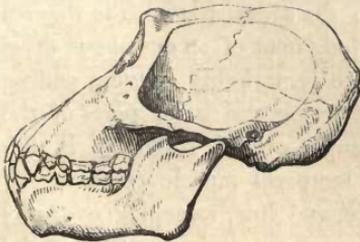


Skull of young Chimpanzee.

over the face; hence the facial angle is more open than in the adult: the depth of the lower jaw is also proportionally less, and the zygoma more slender. The cranium arches well from the supra-orbital ridge, and, altogether, its similarity to the human skull is very close. With the process of the second dentition a change takes place, both in the relative proportions and position of the parts composing it. The forehead sinks below the bold supra-orbital ridge; the jaws expand; the volume of the face enlarges, and preponderates over that of the cranium; and the zygomatic arch becomes robust. A great, and, in many particulars, an unexpected difference exists between the skulls of the adult

male and female. In the adult female, the cranium (fig. 257) is of an ovate form, depressed above, narrow, and destitute of the strong frontal and interparietal crests, so conspicuous in the Orang; the extent of the temporal muzzle is, however, marked by an osseous border, commencing boldly from the outer part of the supra-orbital ridge, but soon diminishing to a rough and slightly raised line, which traverses the parietal bone, and joins the

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Skull of adult female Chimpanzee.

lambdoidal ridge, which latter is not developed in the immature animal, and is never so strong as in the Orang. The volume of the cranium

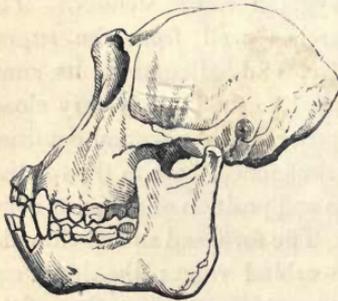
posterior to the auditory foramen is very considerable, the occipital portion of the skull appearing as if drawn out; so that the occipital foramen is farther removed from the posterior projection of the cranium than in the immature male, and its plane is less oblique. The muzzle projects in an obliquely straight line from the interorbital space to the alveolar margin of the upper incisor teeth, at an angle as acute as in the Baboons, and, to a great extent, the face being produced anteriorly: hence the ascending ramus of the lower jaw slopes backward, at a considerable angle; the base of the lower jaw is slightly convex from the posterior angle to the symphysis of the chin.

The supra-orbital ridges continued into each other, across the glabella, form a sort of barrier between the cranium and the face, and, in a front view, almost hide from sight the cranium, which falls back, and is depressed behind them.

The sutures of the frontal, temporal, parietal, and occipital bones are all distinct and unobliterated.

The skull of the adult male presents such extraordinary distinctive characters, compared with that of the adult female, as, independently of

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Skull of adult male Chimpanzee.

its rarity, to render a figure of it (258) of the highest importance. At the first glance, it will be perceived, that it is much shorter than that of the female; it is, also, much broader, and has the vertex higher and more vaulted. The occiput is abruptly compressed, instead of being elongated; and the muzzle, instead of being greatly produced, and sloping in an obliquely straight line from the interorbital space,

is abbreviated; and its fall from the orbits to the alveolar margin of the upper incisors is gently concave; the interorbital space is prominent and convex; the orbits are large, and nearly circular; and the supra-orbital ridge is thick, bold, and greatly developed; the zygomatic arch is thrown over a very deep temporal cavity, for the lodgment of an enormous mass of temporal muscle; the temporal bones are remarkably convex, adding to the great and singular breadth of the posterior and basal parts of the skull. From the external angle of the supra-orbital ridge, as in the female, a raised osseous boundary to the temporal muscle commences; which, however, sinks immediately into a rugged line, sweeping over the parietal bone to the occipital ridge, which is more conspicuous than in the female, but still not boldly prominent: the rugged lines do not coalesce on the vertex, but only approach each other, an inch intervening between them where they approximate the closest: the nasal orifice is somewhat oval,

one inch and one-eighth long, by one inch in 'the broadest part. If the skull is shorter than in the female, it is greatly deeper from the vertex to the base of the lower jaw, being six inches thus measured; in the female, not above five. From the shortness of the muzzle, the form of the lower jaw is materially affected; the posterior ascending branch, instead of sloping backward, rises up perpendicularly from the angle, and is of great breadth, measuring two inches across; and the articulating condyle rises higher than the coronoid process, which advances rather forward; the lower margin of the ramus, from the posterior angle to the symphysis of the chin, is concave, instead of convex; and the distance between the posterior angles, owing to the breadth of the skull, is very considerable; the osseous palate is remarkably flat, the alveolar margin scarcely rising, except at the posterior molars: the texture of the whole skull is dense and solid, and all trace of sutures is obliterated; the breadth of the skull, from one auditory foramen to the opposite, is five inches; the length of the skull, from the glabella to the occiput, five inches and a quarter; the total length, from the front teeth to the occiput, seven inches and one-third; the orbits, one inch and a half in diameter; the vertex rises, at its highest part, three-quarters of an inch above the plane of the supra-orbital ridge; the length of the osseous palate is two inches and two-thirds, its breadth, between the posterior molars, being one inch and a half; from the angle of the lower jaw to the articulating condyle the distance is three inches (in the female, two inches and a quarter); the length of the lower jaw, from the alveolar margin of the incisor teeth to the angle, is four inches and three quarters; the distance, from angle to angle of the lower jaw, three inches and two lines.

The incisor teeth have their depth, from front to back, far greater than their breadth, and are much worn.

The bones of the rest of the skeleton agree, in their form and measurement, with those of the female Chimpanzee described by Professor Owen.

It has been stated, by Tyson, that the os hyoides both of the Chimpanzee and Orang resemble the same bone in the human subject; but, with respect to the os hyoides in the Chimpanzee, that it differs in having the cornua minora more developed, and the body of the bone expanded into a triangular form, and hollowed out posteriorly for the reception of a laryngal sacculus. In the Orang the os hyoides has a broader body, and shorter cornua, than in the human subject; but the body is not concave posteriorly, as in the Chimpanzee.

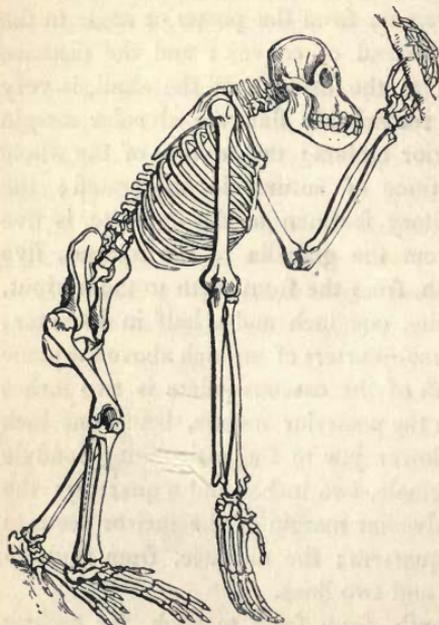
It may not be out of place here to offer a few general observations on the skeleton of the Chimpanzee, the most man-like in its form of all the Simiadæ; and to contrast with it that of the Orang, its Indian representative. The general differences will be at once perceived by a comparison

of the following sketches ; fig. 259 being the skeleton of the Orang, distinguishable at once by the extreme length of the arms ; fig. 260, that of the Chimpanzee.

In the Orang, the backward position of the occipital condyles, and the weight of the face, which is thus thrown forward, require a commensurate development of the spinous processes of the cervical vertebræ ; added to

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Skeleton of the Orang.



Skeleton of the Chimpanzee (female).

which, the general anterior inclination of the vertebræ themselves renders the length and robustness of these processes the more imperative. In the Chimpanzee, the spinous processes, though necessarily developed, are so in a less degree than in the Orang ; the anterior inclination of the cervical vertebræ being less decided, and the weight of the face less oppressive. In both animals (and, indeed, in all the Simiadæ) the cervical region is shorter than in Man, and, therefore, better fitted for sustaining the weight of the head, which preponderates anteriorly.

In the Chimpanzee the dorsal vertebræ are thirteen, and the ribs, consequently, consist of thirteen pairs ; the lumbar vertebræ are four in number, being one less than in Man ; their bodies are smaller, in proportion, than in the human subject ; but the spinous processes are comparatively longer than in the Orang. In this latter animal the number of the dorsal vertebræ is twelve, as in Man ; and the number of the lumbar

vertebræ four, as in the Chimpanzee; occasional differences, however, occur in the number of the vertebræ, both in Man and the Orang, for the skeleton of a Pongo, or adult Orang, in the museum of the College of Surgeons, has five lumbar vertebræ instead of four; as is the case, also, with the skeleton of an Australian man, in the same museum. In both of the animals the amplitude of the chest is conspicuous.*

The following are the admeasurements of the adult skeleton of the Chimpanzee (female):

	ft.	in.
Total length from vertex to heel	3	10
Length of humerus	0	10 $\frac{3}{4}$
Ditto fore-arm	0	10 $\frac{1}{4}$
Ditto hand, to tip of middle finger	0	8 $\frac{1}{2}$
Ditto femur	0	11
Ditto tibia	0	8 $\frac{1}{2}$
Ditto foot, from heel to the end of toes	0	8 $\frac{1}{4}$

Mr. Owen gives the following admeasurements of the skeleton of a female Orang, in the College of Surgeons, which appears to have scarcely arrived at its complete growth.

	ft.	in.	lines.
Total length from vertex to heel	4	1	6
Length of humerus	1	1	4
Ditto radius	1	1	7
Ditto hand	0	10	5
Ditto femur	0	10	3
Ditto tibia	0	9	0
Ditto foot	0	10	0

GENERAL HISTORY.—Little is known of the habits and manners of the Chimpanzee; it is an animal of comparatively recent discovery, though, probably, alluded to in a work of great antiquity—naturalists are indebted to Mr. Ogilby for directing their attention to a passage in the *Periplus Hannois*,† respecting the discovery, in an island near the African coast, of wild men who were, in all probability, animals of this species. It appears that a Carthaginian navigator, named Hanno (A. c. 500, or about that period),

* "The agile and powerful locomotive actions of the Chimpanzee," observes Mr. Owen (*Trans. Zool. Soc. i. p. 353*), "require a proportionally ample development of the respiratory system, and the size and expansion of the thorax is accordingly a prominent character in its skeleton. The transverse exceeds the antero-posterior diameter of this cavity, but not to the same extent as in Man. The chest has the same amplitude of development in the Orang as in the Chimpanzee; it equals in size that of the human subject, and the transverse diameter is greater than the antero-posterior."

† The original, of which only a Greek translation is extant, was written in Punic by Hanno, and is a narrative of a voyage he made, by order of the Carthaginian senate, with a fleet, along the African coast, for the establishment of colonies in that part of the world. Many celebrated men of the name of Hanno have lived at different times; but who the Hanno in question was, and what the exact date of his voyage, are not well ascertained. Mr. Dodwell has endeavoured to prove the work spurious, and to be the composition of a Greek who assumed that name; but M. de Montesquieu and M. de Bougainville have done much towards proving its authenticity.

sent on an expedition of discovery, coasted Western Africa, and sailed from Gades to the Island of Cerne (Arguim?) in twelve days, and thence, following the coast, he arrived, in seventeen days, at a promontory called the West Horn (Cape Palmas?), thence, skirting a burning shore, he arrived, in three days, at the South Horn, and found an island inhabited by what were regarded as wild men, called, by the interpreters, Gorilloi,* who were covered with long black hair, and who fled for refuge to the mountains, and defended themselves with stones. With some difficulty three females were captured, the males having escaped; but so desperately did they fight, biting and tearing, that it was found necessary to kill them; their preserved skins were carried by Hanno to Carthage, and hung up in one of the temples, as consecrated trophies of his expedition, and as specimens of a wild tribe in the remote regions of Africa, ever reputed a "tellus monstorum ferax." From this remote epoch a long interval elapses before any definite or tangible accounts of the Chimpanzee are to be collected. In the fifteenth century the western coast of Africa was, it may be said, re-discovered; and, in the following century, through the medium of Europeans visiting Western Africa for the purposes of traffic, the existence of an anthropomorphous Ape became known, about the same time that the Orang-outan was discovered in the Islands of Borneo and Sumatra. Under such circumstances, it is not surprising that these animals were, for a long time, regarded as the same, and that their respective histories have been commingled. It is, indeed, only within the last few years that they have been extricated from the maze of confusion and misrepresentations with which travellers and naturalists concurred in surrounding them, and, even now, much that concerns them is unknown. With regard to the Chimpanzee, though Europeans have been long in the habit of visiting,—nay, though numbers permanently reside on the coast of that portion of Western Africa which it inhabits, a full and lucid account of its manners and economy, in a state of nature, is yet a desideratum.

The regions of Western Africa, to the extent of ten or twelve degrees north, and as much south, of the torrid zone, including Guinea, Benin, Congo, Angola, &c. constitute the habitat of the Chimpanzee, and, in some districts, it would seem to be tolerably common. Bowditch (see his *Mission from Cape Coast Castle to Ashantee*, &c. Lond. 1819. 4to. pp. 440-1) informs us that it is not rare at Gaboon, and that it is known to the natives, under the names both of Inchegeo and Ingeno. From the Negroes, whose accounts, coloured by fear and ignorance, are not to be received without some allowance, he also learned that these animals, when

* It is very probable that the word Gorilloi may be identical with the terms Drill and Mandrill—old African names still given in some districts to the Chimpanzee, and, therefore, belonging to it, rather than to the Baboons,—so called by European naturalists.

adult, generally attain the height of five feet, the breadth of the shoulders being very considerable; that their paw is disproportionate in size to the breadth of their bodies, and that one blow from it is fatal; that they are seen commonly, by those who travel to Kaylee, lurking in the bush to destroy passengers; that their food consists principally of wild honey; and that they possess so little sagacity as often to sacrifice themselves, by imitating men carrying burdens of wood, or Elephants' teeth, under which they sink exhausted. The same traveller also describes a half-grown individual, which he saw at Gaboon, in a state of captivity, as having the cry, visage, and action of a very old man; as being obedient to the voice of its master; and as evincing great agony at the sight of a panther.

Among the earlier travellers, in whose works some accounts of this animal are to be found, may be noticed Andrew Battel, Jobson, Dapper, Bosman, and others, who visited the inter-tropical parts of Western Africa. The details of its manners and habits, as represented by these writers, might well startle the most credulous; yet they appear to have been received as truth, and have even influenced the reasoning and opinions of philosophers. Whether these travellers were themselves deceived—whether from ignorance, or misled by their imagination, they mingled together the manners of some savage tribes, inhabiting the forests, with those of the Chimpanzee, Mandrill, or other large species of Monkey, so as to produce a tissue of utter disorder—or whether they purposely invented their stories, or magnified into the marvellous, details which, when viewed in their true light, have little of the wonderful, it is now impossible to ascertain.

One of the most trustworthy of these writers, Andrew Battel, a sailor, who was taken prisoner in 1589, and lived many years in Congo (Purchas's *Pilgrims*, ii.), distinguishes two animals, one under the name of Pongo, the other under the name of Enjeco;* the former as high as, and stouter than, a Man; the latter much less, being, as there is reason to suspect, the young of the former. The Pongo (or Chimpanzee), he states, had sunken eyes, long hairs on the sides of the head, a naked face, ears, and hands, and the body slightly covered; the limbs differed from those of Man, in being destitute of calves, but the animal walked upright. In its disposition it was grave and melancholy, and even, when young, far from being frolicsome;—at the same time it was swift and agile, and was sometimes known to carry away young Negroes. He further states, that these animals constructed arbours among the branches of the trees, in which they slept; and that, in walking upright, they generally carried the hands clasped on the hinder part of the neck,—an attitude assumed, no doubt, to counterbalance the tendency of the body to fall forward, and thus to maintain an equilibrium. He adds, also, that they subsisted wholly upon

* Perhaps the same word as Inchego, or Ingeno.

fruits and nuts, and possessed such muscular power, that the strength of ten men was insufficient to hold one of them; and that, upon the death of a member of their community, the survivors covered the body with leaves and branches of trees. According to the same traveller, they were known, in the neighbourhood of Angola, to crowd shivering around the remains of the fires lit at night by those who travelled through the forests of that country, for the purpose of keeping off the more ferocious wild beasts; but they retreated into the woods when the last embers had expired, without attempting to renew the source of comfort.

Bosman* (who calls them Smitten) affirms that they attacked and destroyed such Negroes as they met with in the woods, carried off the women, pelted with stones those who disturbed them in their retreats, and drove away even Elephants, either with sticks, or with their fists alone. Once, he states, a number of them attacked, overpowered, and were proceeding to poke out the eyes of two slaves, when a party of Negroes arrived to their rescue.

Froger (see *Relation du Voyage de Gennes*) states that, on the shores of the river Gambia, are Apes of greater size, and more wicked, than in any other place of Africa; the Negroes fear them, and cannot go alone into the country without running the risk of being attacked by these animals, which present them with a stick, and oblige them to fight. Often have they been seen to carry children, of seven or eight years old, up the trees; and it has required incredible trouble to rescue them. The common opinion of the Negroes is, that these animals are a strange people, which have come down to settle in their country, and that if they do not speak, it is because they fear being made to work. François Pyrard (*Voyage de Fr. Pyrard de Laval.*, Paris, 1619, tom. ii. p. 231,) relates that, in the province of Sierra Leone, is found a species of animal called Baris, very stout and muscular, and so industrious that, when taken young and educated, it may be made to work. These animals, he adds, generally walk on the hind limbs only. Whatever is given them to pound in a mortar, they pound; and they will take small vessels to the river for water, bringing them back full, on their head; but as soon as they arrive at the door of the house, if the vessels are not immediately taken from them, they let them fall, and, on seeing them broken, commence weeping and lamenting. Le Pere du Jarrie, quoted by Nieremberg (*Hist. Nat. Pereg.*, lib. ix. cap. xl.), says the same; and Schoutten (*Voyages de G. Schoutten*), and Le Guat (*Voyages de Fr. Guat*, tom. ii.), speak in terms as extravagant of the Indian Orang.

In Barbot's *Guinea* the Chimpanzee is called Barrys, and Quojas

* "A New and Accurate Description of the Coast of Guinea, &c. Written originally in Dutch, by W. Bosman, and now faithfully done into English." London, 1721.

Morrou, which titles are given to it, also, by Dapper,* in his *Description of Africa*. The latter name is adopted by Tulpius, who also terms it the "Satyre of Angola;" but he confounded the Orang-outan of India with it. (See his figure and description in *Obs. Medic.* l. iii. cap. lvi.) The same animal, which was brought from Borneo, and presented to Frederic Henry, Prince of Orange, and died in 1777, was also described by Vosmaër in 1776.

Linnæus, who appears to have given credit to the exaggerated accounts of the travellers alluded to, introduced an imaginary being—half Man, half Ape—into his *Systema Naturæ*, under the title of Troglodytes, *Homo nocturnus* (Linn. *Syst. Nat.* 1766, 12th ed.); which Gmelin, in his edition, 1788, sunk into *Simia Troglodytes*.

Edwards, in his *Gleanings*, plate 213, figures an animal which he terms, Man of the Woods, Wild Man, Pigmy, Orang-outang, Chimpanzee, &c.; this figure is accompanied by the sketch of a head in profile, which, short as are the arms in the figure, proves the animal in question to have been the Orang of the Indian Islands. He says, indeed, it is the same as Tyson's; but it must not be forgotten, that the distinctions between the Indian and African species were not then (1757) ascertained.

Buffon, who adopted the terms Pongo and Jocko (from Pongo and Inhego, or Engeco, or Enjocko), in vol. xiv. of his great work (1756), gives a sketch, in many respects very erroneous, of a living Chimpanzee which he saw at Paris in the year 1740, and which died, the following year, at London. After being opened, it was sent back to Paris in spirits of wine, and placed in the Museum. It was taken in Gaboon, on the coast of Angola, and was larger than that described by Tyson, in 1699, being two feet four or five inches high, while Tyson's specimen scarcely exceeded two feet. At that time Buffon was not aware of any distinctions between the African and Indian species; in his *Supplement*, however (*Supp.* vii.), he clearly distinguishes between the two; and even notices the absence of the last joint of the thumb of the foot (which is a common occurrence) in the one from India. To the African animal, or Chimpanzee, he applies the term Pongo, and regards the Indian species as the Jocko; a confusion in nomenclature, rather than in facts: at all events, the term Pongo, to whichever species it of right belongs, is now, by common consent, appropriated to the Indian Orang.† Following Buffon,

* "*Description de l'Afrique, traduite du Flamand, d' O. Dapper, D.M. à Amsterdam,*" 1686.

"On y trouve de trois sortes de singes, et il y en a d'une certaine espèce qu'on nomme Baris, qu'on prend étant petits, qu'on eleve, et qu'on apprivoise si bien, qu'ils rend presque autant des services qu'un esclave," p. 249. "On trouve dans les bois une espèce de Satyre, que les Negres appellent Quojas-Morrou, et, les Portugais, Salvage. Ils ont la tête grosse, le corps gros et pesant, les bras nerveux, &c." p. 257.

† Buffon's figure of the Orang-outan, *Supp.* vii. pl. i. is altogether fictitious, and unworthy of our notice.

Shaw (*Mammalia*, 1800, vol. i. p. 9) observes, that "there are two distinct species of this animal; viz., the 'Pongo, or great black Oran-otan,' which is a native of Africa, and 'the reddish-brown, or chestnut Oran-otan,' called the 'Jocko,' which is a native of Borneo, and some other Indian islands." The latter is distinguished, he adds, "by having no nails on the great toes; whereas, in the Pongo, or black species, they are conspicuous." He does not, however, notice the more important distinctions between them in the comparative length of the arms, the characters of the skull, and the length of the ears.

That the Chimpanzee and the Orang should have been confounded together, is, after all, not to be wondered at; in addition, however, to this confusion, the history of the former has been confused with that of the Mandrill. It must be borne in mind, that the travellers who visited Western Africa, in the fifteenth and sixteenth centuries, were not naturalists; and, consequently, did not, generally speaking, care to gain a knowledge of these animals by personal examination; besides which, had opportunities so fallen in their way, most of them were but indifferently qualified as describers; and were, therefore, very likely, not only to overlook specific distinctions, but also to attribute the manners and habits of one large Ape to another. The vagueness of the native names, or rather, perhaps, the mistaken application of them, may have also contributed to error. It would appear that the terms, Smitten, Baris, Boggo, &c., which have been applied by the early travellers, apparently, to the Chimpanzee, refer, as there is reason to believe, really to the Mandrill. At all events, the supposed Chimpanzee, described by Capt. May, of the Dutch service, to Professor Allamand, and which was brought from Guinea to Surinam, where it lived for twenty-one years, was, undoubtedly, a Mandrill; and Buffon's idea, that it was some variety of the "Pongo," or "Great Orang-outang," has not the shadow of a foundation. Though it is stated to have been destitute of a tail,—which was, perhaps, lost by accident,—its long, blue snout, furrowed cheeks, and large, naked callosities, at once indicate its real character. It was a large Mandrill (its size, doubtless, is somewhat exaggerated); and Professor Allamand considers it to be identical with the Smitten of Bosman, and the Quimpesé of M. de la Brosse (*Voyage to the Coast of Angola*, 1730); which, however, is not very probable. M. de la Brosse describes the Quimpesé as attaining the height of six or seven feet, and being possessed of matchless strength and courage. These animals, he also states, endeavour to surprise the Negresses, whom they carry into the woods and force to live with them, feeding them plentifully; but, otherwise, doing them no injury. An instance of this kind came under his own observation: "I knew," he says, "a Negress, at Lowanjo, who had lived three years amongst these animals. They build huts, and arm themselves with

clubs; their face is smooth; their nose flat; their ears without inverted rims; their body covered with long hair, thinnest in front; their heel elevated about half an inch from the ground; and they walk either upon two feet or four, just as their fancy prompts them."

Notwithstanding all the confusion and exaggeration, too palpable in the accounts of the early travellers, it cannot be doubted that with their descriptions is mixed a considerable portion of truth; but the difficulty is, to separate it from the fiction which obscures it.

Were we to judge from the young individuals which have been brought to Europe, we should attribute not only great intelligence, but also docility, to the adult Chimpanzee; it is, however, most probable, that, on arriving at maturity, its disposition undergoes that change for the worse which is so remarkably the case with the Simiadæ generally. It may, indeed, be reasonably concluded, in the absence of positive information, that the conditions of its existence require the perpetual exercise of caution; and that it is frequently involved in desperate combats with its natural enemies, to overcome which requires great force and determined resolution. As maturity, therefore, approaches, and the animal begins to live independently of its parents, the protectors of its youth,—caution, distrust, cunning, ferocity, and untameable obstinacy may be engendered, and, becoming habitual, take the place of that gentleness and docility which render the young so interesting.

Lieutenant Matthews, R. N., who resided at Sierra Leone during the years 1785-6-7, and whose letters, describing this part of Africa, appeared in 1788, informs us that the Chimpanzees, or Japanzees, are social animals; and that they "generally take up their abode near some deserted town or village, where the papau-tree grows in abundance, of the fruit of which they are very fond; and build huts, neatly in the form in which the natives build their houses, which they cover with leaves; but these are only for the females and young to lie in; the males always lie on the outside. If one of them is shot, the rest immediately pursue the destroyer of their friend; and the only means to escape their vengeance, is to part with your gun, which they directly seize upon, with all the rage imaginable, tear it to pieces, and give over the pursuit."

In the foregoing description, confirmatory, in the main, of the details given by the more trustworthy of the older voyagers, two circumstances are peculiarly forced upon our attention: first, the terrestrial, rather than the absolutely arboreal habits of the animal in question; secondly, the construction of huts, or arbours, for places of residence. With respect to the terrestrial habits of the Chimpanzee, the observation may be repeated, that its anatomical conformation renders the erect, or, perhaps, rather semi-erect, attitude far more easy for it to assume, than for the Orang. Not only are the limbs more developed, more firm and mus-

cular themselves, but the hip-joint is secured by the ligamentum teres; so that they constitute organs of support and progression, which, aided more or less by the arms, render the animal alert and active on the ground. Besides, the soles of the feet are fairly applied to the ground, the Chimpanzee being, in this respect, an exception to the Simiadæ generally, and especially to the Orang, which latter animal treads on the outsides of its folded, narrow, hook-like feet. The breadth of these organs in the Chimpanzee tends to render its footing stable; indeed, in the form of these parts (setting aside the opposableness of the thumb), but especially in the form of the hands, this animal is far more human-like than the Orang; and, therefore, far more capable of handling objects with adroitness and precision.

With respect to the construction of huts, recollecting the labours of the Beaver, we might, perhaps, be disposed to regard that point as of little importance in leading us to an estimate of the intelligence and capabilities of the animal; but, combining this with its more truly biped mode of progression than is enjoyed by any mammal, excepting Man,—with its pre-eminently social habits, with its adoption of artificial weapons, with its mode of putting its dead out of sight, added to what is known positively of the habits of its race in captivity,—we must accord to the Chimpanzee the highest rank, subordinate to Man, in the scale of creation.

Many points, however, it must be confessed, are yet desiderata, to be obtained, ere we can give a complete history of the Chimpanzee.

The period of gestation; how frequently the female produces young; at what age the fulness of maturity is completed; and the average length of the animal's existence, are all problematical.

In a young male Chimpanzee, of two feet in height, lately living in the Gardens of the Zoological Society, London, the dentition corresponded to that of our own species, from about the third to the seventh year; the incisors being $\frac{4}{4}$, the canines $\frac{2}{2}$, the molars $\frac{4}{4}$, all of which belonged to the deciduous series.

This Chimpanzee was brought over to England in September, 1835, having been procured on the Gambia coast, about 120 miles in the interior. It was a nursling in the arms of its mother, who was shot by its capturers. Her height is stated to have been four feet six inches. The young individual, at the time of its capture, was supposed, by the natives, to be about two years old; hence, therefore, it is improbable that the female should produce young oftener than once in two years; a mother may be surrounded by three or four young ones of different ages, forming a family, which continue long together in company. We learn that the Chimpanzees are usually seen in small troops, consisting of two or three families; and it is said that the females are

devotedly fond of their young, which they nurse with tender assiduity; and that the adult males protect the females and their offspring with great resolution. It is, perhaps, when the females have retired to bring forth young, or when they are engaged with their newly-born progeny, that the males, guarding the precincts of their habitations (which are reported to be left, at this season, entirely to the females), have attacked persons unwarily venturing within their territorial limits. After all, it is with the disposition and manners of the young only that we can pretend to have a tolerable acquaintance. From the time of Tyson to the present day,* six of these animals (including the one which he dissected, in 1698) have been imported into England; and it is from these, principally (not omitting the individual seen by Buffon, in Paris), that our knowledge has been derived.

The first living Chimpanzee known to have been brought into this country, namely, that dissected by Tyson, was a young male, brought from Angola, in 1698. He is described by Dr. Tyson as having completely assumed the erect attitude; but, from various passages in the account, it is evident that he often went on all fours.† He alleges that it had calves on its legs, though "not large, being much emaciated;" the delineation, however, not only contradicts this statement, but displays the lower limbs much bent; the animal, in one plate (fig. 261), supporting himself by a rope; and, in the other (fig. 262), resting on a staff; for, "being weak," says Tyson, "the better to support him, I have given him a stick in his right-hand."

The second specimen, of uncertain locality, was exhibited in 1738. In reference to this individual, Shaw (*Mammalia*, vol. i.) notices the mildness and docility of the "Oran-otan," and its aptitude for learning a "variety of actions in domestic life." Thus, he adds, "it has been seen to sit at table, and, in its manner of feeding and general behaviour, imitate the company in which it was placed; to pour out tea, and drink it without awkwardness or constraint; to prepare its bed with great exactness, and

* Since writing the above, other young specimens have been imported.

† "The fierceness of the Cynocephali is taken notice of by all: our Pygmie was quite of another temper—the most gentle and loving creature that could be. Those that he knew on ship-board he would come and embrace with the greatest tenderness, opening their bosoms and clasping his hands about them; and, as I was informed, though there were Monkeys aboard, yet 'twas observed he would never associate with them; and, as if nothing akin to them, would always avoid their company," (p. 7.) "After our Pygmie was taken, and a litle used to wear clothes, it was fond enough of them; and what it could not put on himself, it would bring in its hands to some of the company to help him to put on. It would lie in a bed, place his head on the pillow, and pull the clothes over him, as a Man would do; but was so careless, and so very a brute, as to do all nature's occasions there," (p. 8.) "I was told by the owners, that once it held the bason itself to be trimmed." "As it uses its hinder feet, upon any occasion, as hands, so, likewise, I observed, in our Pygmie, that it would make use of its hands to supply the place of feet. But when it went as a Quadruped, on all fours, 'twas awkwardly, not placing the palm of the hands flat to the ground, but it walked on its knuckles, as I observed it to do, when weak, and had not strength enough to support its body."—Tys. *Anat. Pyg.* p. 13.

compose itself to sleep in a proper manner." Buffon gives a similar account of the one (a male) which he saw in Paris, in the year 1740.*

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The third individual, a female, was brought, in 1818, from the banks of the Gaboon. Dr. Traill, who dissected it, states, from the information of Captain Payne, in whose vessel the animal had been conveyed from the Isle of Princes, in the Gulf of Guinea, to Liverpool, that, when first taken on board, "it shook hands with some of the sailors, but refused its hand, with marks of anger, to others, without any apparent cause. It speedily, however, became familiar with the crew, except one boy, to whom it was never reconciled. When the seamen's mess was brought on deck, it was a constant attendant; would go round and embrace each person, while it uttered loud yells, and then seat itself among them to share the repast. When angry, it sometimes made a barking noise like a Dog; at other

* The male observed by Buffon, he says, "always walked upright on his two feet, even when carrying heavy articles. His air was melancholy, his deportment grave, his movements measured, his temper mild, and quite different from that of the other Simiæ; he displayed neither the impatience of the Magot, the wickedness of the Baboon, nor the extravagance of the Guenons. He had been, one may say, perhaps, instructed and well taught. The others I have just cited, and compared with him, had also their education: but while a sign or a word was sufficient to direct our Orang-outang, a cudgel was required for the Baboon, and a whip for the Guenons, which nothing but blows scarcely could render obedient. I have seen this animal present his hand to shew out persons who had come to visit it, and walk gravely, and as one of the company, with them. I have seen him sit at table, unfold his napkin, wipe his lips with it, make use of a spoon and fork when eating, pour out his drink himself in a glass, touch the glass of a person with his own when invited to do so, fetch a cup and saucer, place them upon a table, put sugar in the cup, pour out some tea, leave it to cool before drinking it,—all without any instigation but a sign or a word from his master, and frequently of his own accord. He did no mischief to any one, advanced to persons with circumspection, and presented himself as though he desired to be caressed. He was prodigiously fond of sweetmeats, and took such quantities, for everybody presented them to him, that, no doubt, as he had a frequent cough and an affection of the chest, they contributed to abridge his existence. He ate almost everything, but preferred ripe and dry fruit to any other kind of food. He drank wine, but only in small quantities, and willingly abandoned it for milk, tea, or other mild liquors."

times it would cry like a pettish child, and scratch itself with great vehemence. It expressed satisfaction, especially on receiving sweetmeats, by a sound like *hem!* in a grave tone; but it seemed to have little variety in its voice. In warm latitudes it was active and cheerful, but became languid as it receded from the torrid zone; and, on approaching our shores, it shewed a desire to have a warm covering, and would roll itself carefully up in a blanket when it retired to rest. It generally walked on all fours; and it was particularly remarked, that it never placed the palm of the hands of its fore extremities to the ground; but, closing its fists, rested on the knuckles: a circumstance also noticed by Tyson. This animal did not seem fond of the erect posture, which it rarely affected; though it could run nimbly on two feet, for a short distance. In this case, it appeared to aid the motions of its legs by grasping the thighs with its hands. It had great strength in the four fingers of its superior extremity; for it would often swing by them on a rope upwards of an hour, without intermission. It ate readily every sort of vegetable food; but, at first, did not appear to relish flesh, though it seemed to take pleasure in sucking the leg-bone of a fowl. At that time it did not relish wine; but afterwards seemed to like it, though it never could endure ardent spirits. It once stole a bottle of wine, which it uncorked with its teeth, and began to drink. It shewed a predilection for coffee, and was immoderately fond of sweet articles of food. It learned to feed itself with a spoon, to drink out of a glass, and shewed a general disposition to imitate the actions of Men. It was attracted by bright metals; seemed to take pride in clothing, and often put a cocked-hat on its head. It was dirty in its habits, and never was known to wash itself. It was afraid of fire-arms, and, on the whole, appeared a timid animal."—*Memoirs of the Wernerian Nat. Hist. Society*, vol. iii. p. 4, *et seq.*

The fourth specimen was brought from the Gold Coast, in 1819. The fifth, from the neighbourhood of the River Gambia, in 1832. Both these became the property of Mr. Cross; the former died very shortly after its arrival at Exeter Change; the latter, which was a male, also died after a short residence in our uncongenial climate.

In the fifth volume of the *Magazine of Natural History*, p. 305, *et seq.*, will be found an account, by Mr. Warwick, of this individual, and also of a female Orang-outan, its companion in captivity.

The sixth specimen, and the most interesting of all, is the one already alluded to as having lived in the menagerie of the Zoological Society. It reached our shores in good health, in September, 1835; and, for some months, continued in so favourable a state as to lead to the hope that it would prove an exception to its predecessors, and, by escaping their early fate, enable the scientific world to form a correct and thorough estimate of the capabilities, manners, and instincts of its species. These

hopes were, however, frustrated by its death, in September, 1836. (See *Proc. Zool. Soc.* April 12, 1836, p. 41, *et seq.*)

In the *Zool. Proceedings* for 1835 (p. 160, *et seq.*), will be found an account of the habits of this individual, by W. J. Broderip, Esq.; some observations by the Author of this work, also, appeared in the *Penny Magazine* for February 13, 1836, accompanied by a very tolerable wood-engraving, erroneous only as representing the hair of the fore-arms directed forward, instead of being reverted to the elbow.

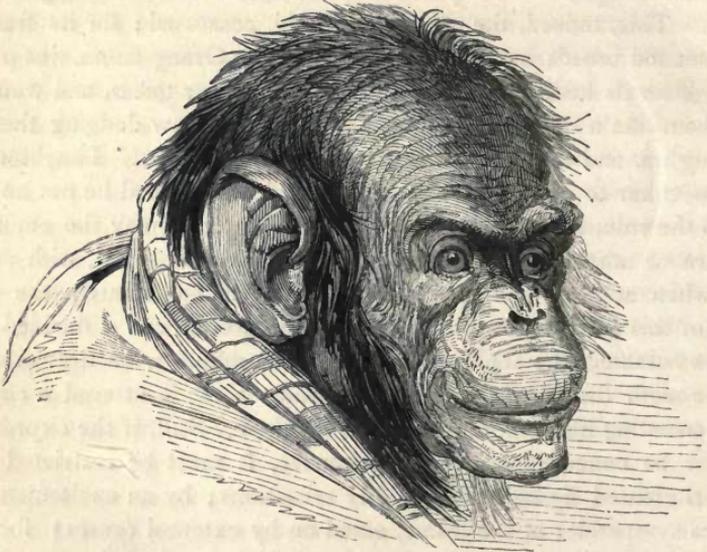
On entering the room in which the Chimpanzee was kept, the first thing that struck the attention of visitors, was its aged appearance, and its resemblance to an old, bent, diminutive Negro. This appearance of age was much increased by a spare beard of short white hairs, which was spread over the muzzle, and by the deep wrinkles which furrowed the cheeks. It was not until being informed of its age, which, as proved by its dentition, was, in all probability, about two years and a half, that a person, ignorant of the natural history of the Chimpanzee, would have considered this specimen in the light of an infant; its actions, however, were those of a child, capable of running about and amusing itself; lively and playful, yet neither mischievous nor petulant; it was alive to everything which took place about it, and examined every object within its reach, with an air so considerate and thoughtful as to create a smile on the face of the gravest spectator. In its cage, or den, to which it was occasionally restricted, was a swing, upon which it delighted to exercise, throwing itself into a variety of attitudes, which at once bespoke its security and its fitness for the waving branches of the forest. Sometimes it would stand in the swing, grasping the rope by its hind feet, and holding by one hand; then it would swing suspended by one foot, or hand, or throw itself over the rope in an easy and frolicsome summerset. When tired with this play, it would roll about the floor, or climb the bars, or run hobbling about, which it did very quickly, generally assisting itself by resting the knuckles of the two first fingers of the hands on the ground, to do which, it stooped its shoulders a little forward; it could, however, and did, frequently, walk upright (the limbs being somewhat bowed and straddling), and independently of the assistance of the arms, except as balancers. Its pace was a sort of waddle, and not performed, as in Man, by a series of steps, in which the ankle-joint is brought into play at each successive step, the heel being elevated, and the body resting on the toes; on the contrary, the foot was raised at once, and set down at once, in a thoroughly plantigrade manner, as in stamping; an action, which it often exhibited, first with one foot, for some time, then with the other; sometimes with both, in alternate strokes; at other times with one only. Mr. Broderip says: He leaped upon the top of a cage, in which were some Marmozets; and, when there, continued jumping furiously, evi-

dently with a mischievous intention to astonish the inmates, who huddled together in consternation. The Author of this work has often seen him jump in the same manner as a child; an action indicative of a firmness of limb adequate, at least, for a semi-erect attitude and terrestrial progression. It was curious to observe how firmly he grasped with his hind feet, which were broad and strong; and how easily, while thus resting on the back of a chair, or on a perch, he could throw himself completely backward, and raise himself again into his previous position; a feat indicating great bodily power. This, indeed, the animal evidently possessed; for its frame was thick-set and broad; but the abdomen, as in the Orang-outan, was protuberant. With its keepers it was on the most familiar terms, and would play with them like a child, now running round them, now dodging them, now climbing up, and throwing its arms round their necks. Laughter is said to be peculiar to our race; and, certainly, if this animal be not an exception to the rule, in none does the face so much display the emotions of pleasure or mirth. It has more than once been observed, with surprise, that, when at play with its attendants, and tickled smartly, the countenance of this individual exhibited what most would call a decided laugh; its eyes twinkled, the angles of the half-open mouth were drawn upward, and the teeth displayed; while, at the same time, it uttered a chuckling noise, sounding like that of smothered laughter. Still, if the expression of laughter be conceded to the Chimpanzee, it must be restricted to that which is created by agreeable bodily sensations; by an excitement of the nervous sympathies of the frame, acted on by external causes; for laughter, from mental emotions, from mirth or pleasure of mind, created by the imagination alone, is peculiar to Man: in this respect he stands isolated. The propensity of the Chimpanzee in question, to put everything into his mouth, was very remarkable. On being presented with a tin rattle, he took no notice of the noise of the instrument, made by shaking it, but at once tried to crush it between his teeth. After carrying it about, he would abandon it, take up something else, leave that, and return to it again. He was, however, always very anxious to obtain what was out of his reach; and which, when obtained and examined, was soon neglected. From the gentleness of his disposition, he was not easily put out of temper; but when this was the case, as occasionally happened, he evinced his displeasure by a hoarse guttural sound, and by protruding the lips, at the same time looking intently, and with an expression of anger, at the offender. This expression was rendered more marked by the vivacity of the eyes; which, though small and deeply set, were quick and piercing: their colour was dark hazel. Mr. Broderip, describing his appearance, says: "His aspect was mild and pensive, but that of a little, withered, old man; and his large eyes, hairless and wrinkled visage, and man-like ears, surmounted by the black hair of his head, rendered the resemblance very

striking, notwithstanding the depressed nose and the projecting mouth." The accuracy of this picture, in every respect, excepting the large eyes, may be readily admitted.

The subjoined figure (263) is a very spirited portrait of this individual, taken during its life ; it well depicts the furrows of the lips and face, and the expression and characters of the physiognomy.

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Head of young Chimpanzee.

In the various antics and sportful play of this lively little Chimpanzee, there was nothing of that brusquerie, and that restless quickness, which are so observable in the actions of the Monkey ; nothing of that chattering and grinning on every surprise ; and it is in these minutiae that we recognise its superiority, and the approximation of its manners, however distant, to those of the young of our own race.

Farinaceous food, fruit, cooked meat, milk, &c. constituted the diet upon which the interesting little Chimpanzee was fed. It was also fond of tea, but refused wine, beer, and spirits. It was, certainly, amusing to see the creature take a cup of milk, or tea, in its hand, and, as if in imitation of our actions, sip the contents, and set down the cup with due propriety. The Author has seen him apply his protruded lips to the orifice which had been bored through the shell into a cocoa-nut, and thus suck out the milk, holding up the fruit with both hands ; which, after the juice was drained, he gently laid down. Sometimes, however, he was less orderly. Mr. Broderip says : " I presented him with a cocoa-nut, to the shell of which some of the husk was still adhering ; the tender

bud was beginning to push forth; this he immediately bit off and ate. He then stripped off some of the husk with his teeth, swung it, by the adhering knot of husk-fibres, round his head, dashed it down, and repeatedly jumped upon it with all his weight. He afterwards swung it about, and dashed it down with such violence, that, fearing his person might suffer, I had it taken away. A hole was afterwards bored through one of the eyes, and the cocoa-nut was again given to him. He immediately held it with the aperture downward, and applied his mouth to it." It is, doubtless, by thus violently dashing down this fruit, after stripping the fibrous covering, by means of its strong teeth, that the adult Chimpanzee fractures the shell, which he then wrenches in pieces, to obtain the kernel. The young animal in question failed in doing what he would have easily effected when grown up; but he exemplified the manner of doing it.

Like most animals in a reclaimed state, the Chimpanzee had his favourites: among these was the cook (for he was kept in the kitchen, where the meals of the keepers were dressed), and also the person appointed to take immediate charge of him. On their approach he testified the most unequivocal signs of pleasure; he recognised even their footsteps, and watched for them with evident impatience; the moment he saw them, he would pout his lips, utter a low sound of satisfaction, and, if at liberty, at once make toward them, climb upon them, and commence a fondling, sportful play. The cook, indeed, sometimes found the little creature's attachment troublesome; for it was difficult to disengage herself from him; and, if not prevented, he would go about the place with her, holding by her gown, like a child. On one occasion, he opened the lattice-window of the kitchen, and was seen looking very composedly about him, as if in admiration of the novelties offered to his view. On the supposition that he might escape into the garden, and not be induced, without some difficulty, to return, he was ordered to come away (for he felt the force of a command, from the tone in which it is uttered); and he not only obeyed, but closed the window, and descended to his attendant.

The Monkey tribe have, as is well-known, a horror of the larger kinds of Snakes; the Pythons, for example, to which they often fall a prey. It was considered worth the trial to ascertain whether, in an animal so young, and which, most probably, had never seen a formidable Snake, this feeling was fairly displayed. Accordingly, under the direction of Mr. Broderip, a Python was so placed that the Chimpanzee should come upon it unawares; on seeing it, the poor animal shrunk back with terror, and hastened to his keeper for protection; nothing would tempt him to approach the dreaded object; nor, when the lid of the basket, in which the Snake lay coiled, was closed, and an apple was placed upon

it, much as he desired the fruit, would he venture to approach the lurking-place of his foe. At last, the basket and snake were removed, and the apple placed upon a chair; then, after a most cautious and keen scrutiny, and many doubts and misgivings, the timid creature at length ventured to take the offered prize. "He manifested," says Mr. Broderip, "aversion to a small living Tortoise; but nothing like the horror which he betrayed at the sight of the Snake. I was induced to shew him the former, by the account of the effect produced by the Testudinata on the Asiatic Orang, whose habits are so admirably described by Dr. Abel and Captain Methuen, who brought the animal to England." It may here be observed, that the surprise, or fear, which the first sight of a Tortoise produces on these animals, soon wears off: Tortoises were kept in the room both with the Chimpanzee and the Orang; and, though the first impression produced was surprise, not unmixed with fear, they soon became indifferent to the presence of the crawling reptiles. The Chimpanzee did not manifest toward other animals the same fear as he did toward the Snake. In the same room was a Maltese, or hairless, female Dog, with a litter of young; and, notwithstanding the snarling and barking of their mother, he would often intrude upon her kennel, take up the puppies, one by one, gravely look at them, and replace them with the utmost gentleness. When tired with his exertions, his usual custom was to retire to a bed of blankets, in a corner of his cage, and there covering himself up, and crossing the arms over the chest, bury the face upon them, and thus settle to sleep.

In 1839, the Zoological Society obtained possession of another specimen (a young male), procured in the Bullom country, the mother having been shot in the capture: it, however, lived only for a short time. An account of its manners and habits, while in the possession of Lieut. Sayers, who brought it to England, is published in the *Proc. Zool. Soc.* 1839, p. 28: to this account is added a notice of the manners of the Chimpanzees in a state of nature, according to the information collected by him in their country. He observes, that trees are ascended (as he is led to conclude) by these animals, only for food or observation: from the natives he learned that "they do not reach their full growth till between nine and ten years of age; which, if true, brings them extremely near to the human species; as the boy or girl of West Africa, at thirteen or fourteen years old, is quite as much a man or woman as at the age of nineteen or twenty in our more northern clime. Their height, when full grown, is said to be between four and five feet: indeed, I was credibly informed that a male Chimpanzee, which had been shot in the neighbourhood, and brought into Free Town, measured four feet five inches in length; and was so heavy as to form a very fair load for two men, who carried him on a pole between them. The natives say that, in

their wild state, their strength is enormous; and that they have seen them snap boughs off the trees with the greatest apparent ease, which the united strength of two men could scarcely bend. The Chimpanzee is, without doubt, to be found in all the countries from the banks of the Gambia, in the north, to the kingdom of Congo, in the south; as the natives of the intermediate parts seem to be perfectly acquainted with them. From my own experience, I can state that the low shores of the Bullom country, situated on the northern border of the River Sierra Leone, are infested by them, in numbers quite equal to those of the commonest species of Monkey. I consider these animals to be gregarious; for, when visiting the rice farms of the chief, Dalla Mohammadoo, on the Bullom shore, their cries plainly indicated the vicinity of a troop, as the noise heard could not have been produced by less than eight or ten of them. The natives also affirmed, that they always travel in strong bodies, armed with sticks, which they use with much dexterity. They are exceedingly watchful; and the first one who discovers the approach of a stranger, utters a protracted cry, much resembling that of a human being in the greatest distress. The first time I heard it, I was much startled: the animal was, apparently, not more than thirty paces distant; but had it been but five, I could not have seen it, from the tangled nature of the jungle; and I certainly conceived that such sounds could only have proceeded from a human being, who hoped to gain assistance, by his cries, from some terrible and instant death. The native who was with me laid his hand upon my shoulder, and, pointing suspiciously to the bush, said, 'Massa, Baboo live there;' and in a few minutes the wood appeared alive with them; their cries resembling the barking of Dogs. My guide informed me that the cry first heard was to inform the troop of my approach, and that they would all immediately leave the trees, or any exalted situation that might expose them to view, and seek the bush: he also shewed evident fear, and entreated me not to proceed any further in that direction. The plantations of bananas, papaws, and plantains, which the natives usually intermix with their rice, constituting the favourite food of the Chimpanzees, accounts for their being so frequent in the neighbourhood of rice-fields. The difficulty of procuring live specimens of this genus arises, principally, I should say, from the superstitions of the natives concerning them, who believe they possess the power of 'witching.'"

GENUS.—PITHECUS.

Pithecus GEOFF. Ann. du Mus. XIX. 1812.

Simia in part ERXL. Syst. Regni Anim. 1777.

Pithecus CUV. Règn. An. 1829.

GENERIC CHARACTERS.—MUZZLE large, elongated, somewhat rounded anteriorly; FOREHEAD sloping backward; SUPERCILIARY RIDGES

slight; MARGIN OF ORBITS prominent; FACIAL ANGLE 30° ; NO CHEEK-POUCHES; LARYNGAL SAC extensive, double; EARS small; TAIL wanting; NO CALLOSITIES; ARMS reaching to ankle-joint; FEET long, narrow; THUMB not extending to the end of the metacarpal bone of the adjoining toe, and often destitute of the ungueal phalanx; CANINES very large, their apices extending beyond the intervals of the opposite teeth; RIBS, twelve pairs; BONES of STERNUM in a double alternate row; INTERMAXILLARY BONES anchylosed to the maxillaries during the second, or permanent dentition; LIGAMENTUM TERES of hip-joint wanting.

COUNTRY.—Borneo, Sumatra.

THE ORANG-OUTAN, OR PONGO.

PITHECUS SATYRUS. (*Pithecus Satyrus*, GEOFF. Ann. du Mus. XIX. 1812.)

- Simia Satyrus* LINNÆUS, 1766, et aliorum.
Simia Agrias SCHREBER, pl. 2. II. B. et II. C. 1775.
Singe de Wurmb AUDEBERT, Singes et Makis, Fam. I. p. 18, fig. 2; et Tab. Anat. fig. 3, cran. 1797.
Papio Wurmbii LATREILLE, Singes, I. p. 196.
Pithecus Satyrus DESMAREST, Mamm. p. 50. 1820.
Simia Wurmbii KHUL, Beitr. 21. 1820.
Orang Pandak of the Malays of Sumatra, RAFFLES, Linn. Trans. xiii. 1822.
Simia Satyrus FISCHER, Syn. Mamm. p. 9. 1829.
Simia Abellii Idem, p. 10.
Simia Wurmbii Idem, p. 32.
Satyrus rufus LESSON, Species des Mamm. p. 40. 1840.

SPECIFIC CHARACTERS.—Head large; body robust; the hinder limbs very short; the arms of great length, reaching to the ankle; the ears small; the fur long, and somewhat rigid; abdomen thinly covered; hairs of the fore-arms reversed; chin bearded; face and forehead naked; cheeks, in the adult male, with callous protuberances; colour varying from rufous to chestnut-black.

LOCALITIES.—Borneo, Sumatra.

DESCRIPTION.—No species of *Simia* has been, till lately, so little understood as this; nor is there any respecting which notions so erroneous have been entertained: and hence, previously to entering into descriptive details, a few observations are imperatively necessary. So different are the characters, dependant upon age, which the Orang assumes, at various periods of its growth, and so much, in many respects, do the males differ from the females, that the errors of naturalists, without opportunities of inspecting either a series of preserved specimens or of skulls, or, indeed, other portions of the skeleton, may be well pardoned. It may be observed, then, at the outset, that three animals are described; namely, the *Simia Satyrus*, of Linnæus; the *Pongo Abellii*, of Clark, or Red Orang of Sumatra; and the *Pongo Wurmbii*, Geoff., or Black Orang of Borneo; which appear, in reality, to be one species, of which the *Simia Satyrus*, Linn., is the young. Leaving out of the question, for the



THE ORANG-OUTAN (YOUNG FEMALE).

(*Pithecus Satyrus*. Geoff.)

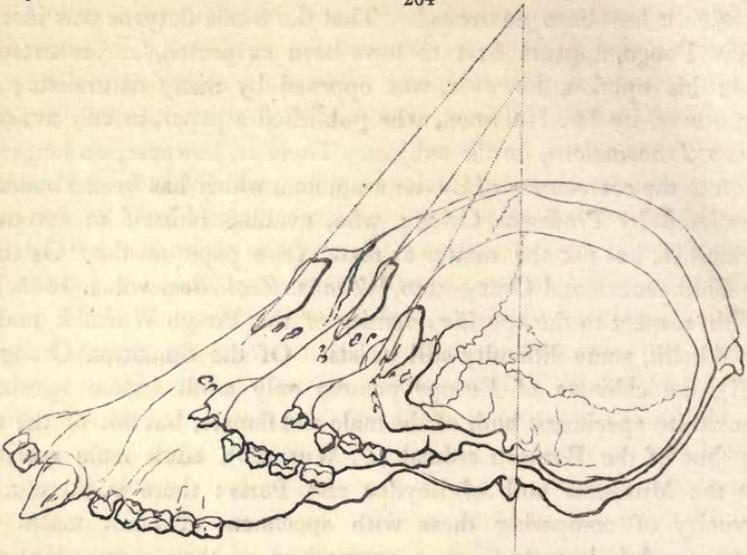
present, the identity or non-identity of the Red Orang, and of the Black Orang, it is necessary to clear up, in a summary manner, the difficulties with which it has been environed. That the *Simia Satyrus* was identical with the Pongo, appears first to have been suspected, and asserted, by Cuvier: his opinion, however, was opposed by many naturalists; and, among others, by Dr. Harwood, who published a paper, in vol. xv. of the *Linnæan Transactions*, on the subject. There is, however, no longer any doubt as to the correctness of Cuvier's opinion, which has been abundantly substantiated by Professor Owen; who, availing himself of favourable opportunities, has set the matter at rest. (See paper on the "Osteology of the Chimpanzee and Orang-utan," *Trans. Zool. Soc.* vol. i. 1835.)

With respect to the specific identity of the Pongo *Wurmbii*, and the Pongo *Abellii*, some difficulty still exists. Of the Sumatran Orang (*P. Abellii*), the cabinets of Europe possess only adult female specimens, and immature specimens both of the male and female, but not of the adult male; but of the Bornean animal (*P. Wurmbii*), adult male specimens enrich the Museums both of Leyden and Paris: there is, therefore, no opportunity of comparing these with specimens of adult males from Sumatra; and it is only from a comparison of their crania that some eminent naturalists have provisionally regarded the two animals as distinct, at the same time admitting that the differences in the character of the skulls in question might depend upon sex or age, or be individual variations; for, as the skulls of the young confessedly differ so materially from those of adults, so may a certain ratio of difference exist between the skulls of the latter at various epochs of their mature condition, or even characterize individuals specifically the same, inhabiting different islands. Thus, according to Professor Owen, the cranium of the Bornean Orang is distinguished by the more oblique plane of the orbits, whence the line from the glabella to the incisor teeth is straight, instead of being concave, as in the Sumatran animals; and the symphysis of the lower jaw is proportionally deeper.

More recently (1838) M. Dumortier has given attention to the present subject at issue; and, having the means of comparing together sixteen skulls, of various ages, has thrown a new light upon it. His unpretending, yet valuable paper, entitled, *Notice sur les Modifications du Crâne de l'Orang-outang*, was published at Brussels, and presents us with a summary of the modifications which the cranium assumes through six successive stages, from infancy to old age. The result of his researches is, that both the presumed species of Orang are one. The extent of this change may be appreciated by reference to the following sketch (fig. 264), of which the original unpublished drawing was obligingly communicated by Professor Owen. This figure represents, at a single view, the variation in the form of the skull, and in the development of the muzzle, which

has taken place during the transition of the animal from adolescence to maturity.

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The skull of the Orang, in three stages, from infancy to maturity, exhibiting the gradual development of the facial outline, and progressive change in the form of the cerebral portion.

The skull of the young Orang has a considerable resemblance to that of the human subject. Not only does the volume of the cranium preponderate over that of the face, but it is dignified with a tolerable forehead. The jaws are comparatively moderate, and the teeth (deciduous) are small. The cranium is smooth, and regularly convex. But, as maturity advances, and during the process of the second dentition, the face becomes developed and protruded, the jaws expand, the lower increasing amazingly in breadth, and the zygomatic arch alters in form, and becomes stouter. The persistent teeth are large and strong, the incisors are enormously thick, and the canines are of vast strength and magnitude, constituting most formidable weapons. This development of the face tends to throw back the forehead,—and the more so, as the cavity of the cranium, instead of enlarging in a commensurate ratio, scarcely increases at all after the acquisition of the first permanent molars; but its walls become thicker, and a bold ridge, commencing at each external angular process of the temporal bone (or at the outside of each orbit), passes obliquely upward, enclosing a smooth triangular portion of the frontal bone: on the posterior margin of the frontal bone these ridges, which, until complete maturity, do not coalesce, but remain separate throughout all their extent, ultimately meet, and form an elevated interparietal crest, as in carnivorous animals, betokening the vast extent and power of the temporal muscles that act on the lower jaw. At

the vertex this crest divides, and forms an occipital ridge, passing on each side posteriorly to the lambdoidal suture, till it reaches the mastoid ridge. The face increases in breadth by the still farther increase of the zygomatic arches, and presents, as Dumortier well observes, "les caractères de l'abrutissement le plus complet." He adds, also, that the nail of the hinder thumb, which, till now, had existed in a rudimentary condition, completely disappears.

The preceding observations apply more exclusively to the male. In the female the vertical ridges never coalesce, and are less elevated than in the male; nor do the zygomatic arches attain to such an enormous degree of magnitude. The female, in short, according to the general laws of sexual development, exhibits, in the skull, the characters of the male on the eve of maturity, but not mature. It may be here remarked that M. Dumortier regards the *Pithecus Morio* of Prof. Owen, as identical with the Great Orang (*P. Satyrus*) in its fourth stage; but he has subsequently conceded this opinion; and admits that it arose from his never having examined the skull from which Prof. Owen derived his details. To this skull there will again be occasion to allude. The latter anatomist, speaking of the cranium of the Orang, states that, in all the peculiarities independent of the changes consequent upon the second dentition, the skulls of the young and mature animals agree: as for example, in the position and number of the various foramina; in the contraction of the inter-orbital space; in the absence of superciliary ridges; the great breadth and height of the rami of the lower jaw; and the depth of the symphysis; together with the totally depressed condition of the nasal bone, which is of an elongated triangular figure, having a ridge along its centre; and the more anterior aspect of the outer boundary of the orbits than in the Chimpanzee. In the contracted forehead, the flattened occiput, the formidable canines, the huge jaws, the strong, expanded, zygomatic arches, and largely developed cranial crests, the skull of the Orang approximates to that of the Mandrill. In the Mandrill, however, the heavy beetling superciliary ridges, which are wanting in the Orang, give a horribly scowling expression to the hollow sockets, which, orbless though they be, seem as though fraught with revolting malignity.

But, setting aside the crania, it may be contended that the great Bornean and Sumatran Orangs differ in other points; that is, in external characters; and that, upon these grounds, a specific distinctiveness may be established. It is presumed to be only in the adult male of the Bornean Orang that the large protuberances of callous flesh occur on the malar bones, which call to mind the *Sus larvatus*, and give so strange an aspect to the countenance. It should, however, be observed, that the adult male Sumatran Orang remains to be examined; at least, an opportunity of comparing the two together, preserved or alive, has not yet occurred. Both

in the Sumatran and the Bornean animals, the ungueal phalanx of the hind thumb is sometimes absent, sometimes present, in both sexes. In a specimen described by Camper, the thumb on one foot was perfect; on the other, destitute of the last joint; and M. Temminck states that he has examined six individuals, of different ages, all shot in their natural state of freedom, without being able to discover the least trace of a nail on the posterior thumbs; a seventh individual, which he had known in captivity, had a nail on the left posterior thumb, but not on the right; and two skeletons of young individuals which died in menageries, and form part of the anatomical collection of the Museum of the Pays Bas, have nails on both the posterior thumbs.

It has been asserted that the Bornean Pongo is furnished with cheek-pouches, as well as with laryngeal sacculi; and the genus *Pongo*, of Lacépède, is thus characterized; but this is a palpable error.

It has farther been stated, that the Sumatran Pongo differs from the Bornean, in being of a much lighter colour, namely, sandy rufous, and also in great superiority of size: the description of specimens examined by the Author of this work will prove how little reliance is to be placed on the former distinction. With regard to the latter, some observations are requisite. Five feet is assigned as the greatest height of the Bornean Orang; the male in the Paris Museum would not exceed four feet, if placed in an upright attitude; and the skeleton of an adult female, in the Royal College of Surgeons, London, is only four feet one inch and a half. According, however, to Dr. Abel, the male Orang killed at Ramboom, on the north-west coast of Sumatra (the account of which is in the *Asiatic Res.* vol. xv. 1826), exceeded seven feet. It is remarkable, however, that the span of the arms and hands of this specimen was only eight feet two inches, and the length of the foot, from the heel to the end of the middle toe, fourteen inches. Now, in the specimen of the Sumatran female, in the museum of the Zoological Society, the span of the arms and hands is about seven feet two inches, and the length of the foot, ten inches and a half; while the height of the animal, when alive, could not have exceeded three feet six inches. In the specimen of a young female Orang, from Sumatra, which the Author had an opportunity of examining (Oct. 1836), the length of which, from the top of the head to the heel, was three feet seven inches and three quarters, the span of the arms, across the chest, was six feet; and the foot, from the heel to the end of the middle toe, nine inches and three-quarters.

In this specimen, the incisors and canines were deciduary; and, of the four molars on each side, the two first were deciduary, the two last, permanent. The hind thumbs were destitute of the ungueal phalanx. The feet, as already stated, measured, in the specimen described by Abel, fourteen inches; but, to shew that the Bornean Orang is as large, it may

be here noticed, that a pair of the hinder hands of an Orang, said to have been brought from Borneo, in 1821, have been found to measure, in length, fifteen inches and a quarter: these parts are described by Dr. Harwood, in the *Linn. Trans.* vol. xv.; and the absence of the nail of the thumbs is particularly alluded to. If, then, the Ramboom Orang, described by Dr. Abel, with hinder hands of fourteen inches, was seven feet high, the individual from which these, measuring fifteen inches and a quarter, were obtained, must have been still larger. It may, however, be concluded, that some mistake respecting the stature of the Ramboom individual must have taken place.* It cannot be denied, however, that the Orang varies in size. Dr. Solomon Muller, after an absence from Europe of fourteen years, spent in India and the islands of Borneo and Sumatra, has lately returned to Germany, bringing home, among other valuable acquisitions, several specimens of Bornean Orangs, none of which at all equal the Sumatran specimen, as described by Dr. Abel; though one, which he procured, also, from Borneo, is of comparatively large admeasurements. M. Temminck, in his Monograph of the genus recently published (*Monog. de Mamm.* p. 119, 1835), says, "Our travellers inform us, by letters from Banjarmasing (in the island of Borneo), that they have recently procured others, of five feet three inches in height," French measure; five feet nine inches, English; whereas the largest described by Temminck (a male), is but four feet, French measure; four feet four inches and three quarters, English. A second male, but smaller, he adds, "has been given to the Museum of Paris;"—it is the same which the Author examined when at Paris, and it stands three feet eight inches. To what these variations in size, among the Orangs confessedly from Borneo, are to be attributed;—at what period of existence they are thoroughly mature;—or whether, as with the human race, a difference of stature be permitted to the species, within certain limits, are points yet to be ascertained. One fact, however, seems clear, namely, that the Bornean and the Sumatran animals attain to a similar magnitude.

The following descriptions were taken from various specimens which the Author has personally examined.

1. Characters of an adult, or nearly adult, male, from Borneo, in the Paris Museum, which has been previously mentioned. The head is large; the forehead naked, retiring, and flat: large fleshy callosities, in the form of elevated and somewhat crescentic ridges, occupy the malar bones,

* The span of the arms was eight feet two inches, and the chest was "broad and expanded;" and the skin, from the top of the shoulder to the part where the ankle was removed, measured, according to Dr. Abel, five feet ten inches. Now, as the fingers of the Orang reach to the ankle, it is evident that the total length of each superior extremity must have measured as much, or nearly so: then, to this, let one foot six inches be added, as the presumed breadth of the chest (an admeasurement too little), and we shall find the span of the arms to be between twelve and thirteen feet, instead of eight feet two inches; so that the very statements given evidently contradict each other, and prove the fallacy of the assertion as to the animal's stature.

extending from the temples, and giving a singular, and even hideous, expression to the physiognomy. The eyes are small, and set closely together; the rims of the orbits are prominent; the nose is depressed; the septum of the nostrils thin, and carried out to blend with the skin of the upper lip; the nostrils are oblique; the ears are small, and lie closely on the head; the lips are thick and fleshy, and the upper one is furnished with scanty moustaches; the chin is furnished with a long and peaked beard; the hair is very long and thick on the back, shoulders, arms, and legs; very scanty on the chest, the abdomen, the inside of the thighs, and the anterior aspect of the humerus; the hair of the fore-arms is reverted to the elbow; the hair of the head is directed forward, from a common centre of radiation on the back of the neck, or, rather, between the shoulders; the contour of the body is heavy, thick, and ill-shapen; the arms, with the hands, reach to the heel; the thumb of the hind feet is nail-less; the general colour is deep chestnut.

	ft. in.
Total height of the animal, standing	3 8
Breadth of face, across tuberosities	0 9

2. The following are the characteristics of a young female Orang, also from Borneo (in the Museum, Paris), and presented, as was the above, by the Royal Museum of Leyden.

The cheek callosities are wanting; the colour is chestnut, paler than in the the adult male; the hind-thumb is furnished with a well-developed nail.

3. Description of adult male, exhibited at one of the scientific meetings of the Zoological Society.

The cheek callosities are large, and elevated in the form of a sub-acute ridge; the hind thumbs are destitute of nail; the hair falls in large masses on the back, and is a foot in length; the arms, also, as well as the lower extremities, are clothed with long hair; the chest is thinly clad; the colour is mahogany brown, darkest on the back, but assuming a redder tint on the arms.

	ft. in.
Length from head to heel of extended specimen	4 6
Ditto of arms from axilla to end of fingers	2 8
Breadth of face across callosities	0 8 $\frac{1}{2}$

4. The following is the description of an adult female from Sumatra, in the museum of the Zoological Society (Collect. Rafflesian.), No. 2, in Catalogue, 1838.

The general contour of the body is thick-set and robust; the face, forehead, and ears are naked; the sagittal crest is moderate; the lambdoidal crest more elevated; the orbital margins are prominent; the laryngeal sacculi, extending to the cheeks, give the appearance of cheek-pouches, but

there is no vestige of cheek callosities; the face is surrounded with long, flowing hair, but no beard depends from the chin; the hind thumbs are destitute of the ungual phalanx; the mammæ are very apparent; the hair of the head is long, and directed forward, from a common centre of radiation, in the nape of the neck, between the shoulders; the hair on the back, sides, and limbs is very full and long, being from eight to ten inches in length, but on the inside of the thighs it is very scanty, and also on the anterior aspect of the humerus (along the biceps muscle), as well as on the chest and abdomen; the colour is bright sandy rufous, with a slight vinous tinge, and inclining to chestnut on the back.

	ft.	in.
Length of head and body	2	6
Ditto thigh	0	10½
Ditto from knee to heel	1	1
Ditto of hand	0	6¾
Ditto foot	0	10½
Reach of arms and hands across chest	7	2
Length of arm and hand	2	11

5. Description of a female (young), presumed to have been brought from Sumatra, lately living in the menagerie, Paris, and now preserved in the Museum there.

In this specimen, the hinder thumbs are perfect, and furnished, each, with a well-formed, neatly-rounded nail: the colour is palish sandy red on the chest, a little deeper on the abdomen; and chestnut red on the head, on the exterior of the arms and of the lower limbs, and also on the back.

	ft.	in.
Length of head and body	2	1½
Ditto from groin to heel	1	0½
Ditto from wrist to axilla	1	5½

It still remains to notice an Orang to which reference has already been made, and which has been announced, by Professor Owen, as a distinct species, under the title of *Simia Morio*, though solely upon characters derived from a unique skull in his possession. (See *Proc. Zool. Soc.* Oct. 25th, 1836; and, also, *Trans. Zool. Soc.*, 1838, c. fig. cran.) This species will stand thus, in the present series of the *Quadrumana*.

THE MORIO ORANG.

PITHECUS MORIO.

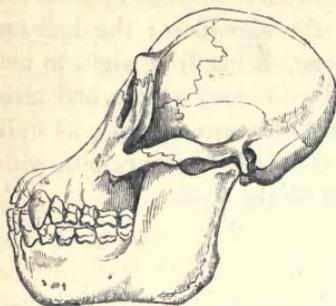
Simia Morio, OWEN, *Proc. Zool. Soc.* 1836, p. 92, and *Trans. Zool. Soc.* 1838, c. figuris cranii.

SPECIFIC CHARACTERS.—External specific characters, unknown; size, much inferior to that of the *P. Satyrus*.

LOCALITY.—Borneo.

The annexed figure (265) is a representation of the skull, on which the distinctiveness of the species is founded; and which, as is proved

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Skull of Morio Orang.

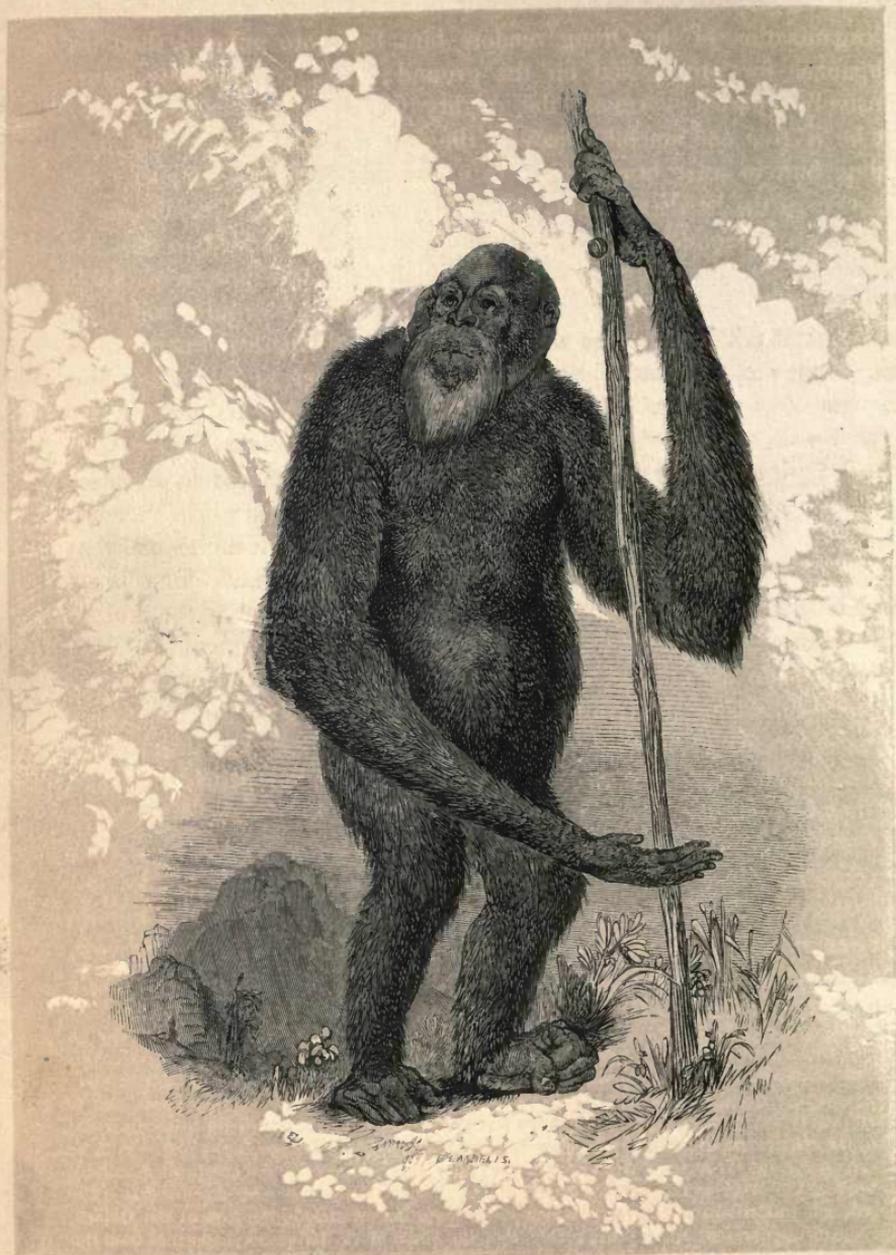
by its state of dentition, belongs to an adult, or, perhaps, aged animal; though, from the condition of its ridges, and from its size and form, it might be inferred that it belonged to an individual of the *Pithecus Satyrus*, in an intermediate state of growth; as, indeed, was, at one time, the opinion of M. Dumortier.

The teeth, however, of the skull in question, all belong to the permanent series,* and are even considerably worn.

The intermaxillary sutures are obliterated; and the great temporal ridges indicate the extent of the temporal muscle, the interval between them, on the crown, being small. The frontal and sagittal crests, so remarkable both in the Bornean and Sumatran Orangs, are here merely indicated; and though the lambdoidal and mastoid ridges are developed, they are less so than in those animals; the situation of the occipital foramen is less posterior than in them, but more so than in the Chimpanzee; the proportion between the volume of the face and the cerebral portion of the skull is more anthropoid than in either of the Great Orangs; the cranium, equal in capacity to that of the Sumatran Orang, rises above the orbits; while the face, instead of projecting to the great extent seen in the other Orangs, when adult, is far less voluminous and prominent, presenting, therefore, a more obtuse angle; and, with this diminished facial development is connected a marked inferiority in the magnitude of the canine teeth.†

* "The teeth in the jaws of a quadrumanous cranium may be known to belong to the permanent series, by the absence of the foramina, which, in an immature cranium, are situated behind the deciduous teeth, and which lead to the cavities containing the crowns of the permanent teeth. This character is very conspicuous on comparing the cranium of *Simia Morio* with that of a young *Simia Satyrus*, in which the deciduous series are present, together with the first permanent molars. The deciduous teeth in the young Orang, besides their smaller size, are more or less protruded from their sockets, and thrust apart from one another by the *vis à tergo* of their huge successors, while the teeth of the *S. Morio* are lodged firmly in the jaws; and, with the exception of the characteristic interval between the canines and incisors, are compactly arranged in close contiguity with each other."—Prof. Owen, *Proc. Zool. Soc.* Oct. 25th, 1836.

† "The main and characteristic difference, then, between the *Simia Morio* and the *Pongo*, whether of Borneo or Sumatra, obtains in the size of the laniary, or canine teeth, to the smaller development of which, in the *S. Morio*, almost all the other differences in the cranium are subordinate or consequent. The laniary teeth, it may be observed, have little relation to the kind of food habitual to the Orangs; had they been so related, they would have been accompanied with a structure of the glenoid cavity fitting them, as in the true Carnivora, to retain a living prey in their gripe, till its life was extinguished, or resistance effectually quelled. But the flattened surfaces on which the condyles of the lower jaw rotate, are in subserviency to the flattened tuberculate molars, shewing the mastication of vegetable substances to be the habitual business of the jaws, and the application of the laniaries to



THE ORANG-OUTAN (ADULT MALE).

(*Pithecus Satyrus*. Geoff.)

GENERAL HISTORY.—As nothing is known of the Pithecus Morio, and but little of the adults of the large Pongo, whether of Borneo or Sumatra, all details must necessarily be general, rather than particular. The organization of the Orang renders him far more unfitted than the Chimpanzee for progression on the ground; and, consequently, more exclusively arboreal. Among the mighty forests of his native climate only, he is free and unembarrassed; the vast reach of his sinewy arms enabling him to seize branches at an apparently hopeless distance; the long grasp of the hands and feet, and their gigantic strength, combining to qualify him pre-eminently for his destined situation. Added to this, the shortness of his thick-set body; and, especially, the still more remarkable abbreviation of the inferior extremities, their inward tournure, and their freedom, tend yet farther to his advantage. The great length and narrowness of the hands and feet render them hook-like in character; while the short



Hand of Orang.

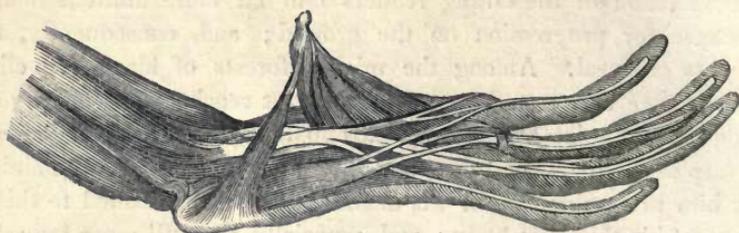
Foot of Orang.

thumbs (see the annexed figures, 266 267) have a backward situation, so as to act as a fulcrum against the pressure of the fingers while grasping the branch to which the animal may be clinging. The ankle-joint is remarkably free; the foot exceeds, in length, the tibia (or leg); and its thumb (sometimes perfect, sometimes destitute of the ungueal phalanx), divaricates from the edge of the sole at a right angle. The power of the adductor muscles of the thumb is extraordinary; but as the fingers, in grasping a branch, are brought round, and only meet its apex, this, though it certainly acts as a firm opponent, or fulcrum, against which they may bear, cannot overlap them, and, in this manner, fortify their grasp, as does the thumb in the human hand: see the following sketch (fig. 268), displaying the muscles and tendons of the soles of the foot. In this figure, the direction and volume of the adductor muscles of the thumb, qualifying it for close and firm application to objects grasped, are very conspicuous; as are also the strength of the tendons, and the magnitude

be occasional and, probably, defensive, in most cases. We perceive the utility of formidable canine teeth to the Orangs, whose stature makes them conspicuous, and of easy detection, to a carnivorous enemy; such weapons, in connexion with the general muscular strength of the Pongos, enable them to offer a successful defence against the Leopard, and may render them formidable opponents even to the Tiger; but in the smaller species, which we have been describing, to which concealment would be easier, the canines are of relatively smaller size, and those of the lower jaw are so placed as to be worn down by the lateral incisors of the upper jaw; they were reduced in the specimen described, to the level of the other teeth; and the points of the upper canines were also much worn. The size, forms, and proportions of the teeth, which relate more immediately to the food of the Orangs, viz., the molars and incisors, shew, indisputably, that the Simia Morio derives its sustenance from the same kind of food as the larger Orangs. The singular thickness, or antero-posterior diameter of the incisors, which are worn down to a flattened surface, like molar teeth, shews that they are put to rough work; and it is probable that their common use is to tear and scrape away the tough fibrous outer covering of the cocoa-nut; and, perhaps, to gnaw through the denser shell."—Professor Owen, in *Proc. Zool. Soc.*, 1836.

of the flexor muscles of the fingers; the whole of the muscular structure, indeed, is such as to render the foot a most vigorous organ of prehension.

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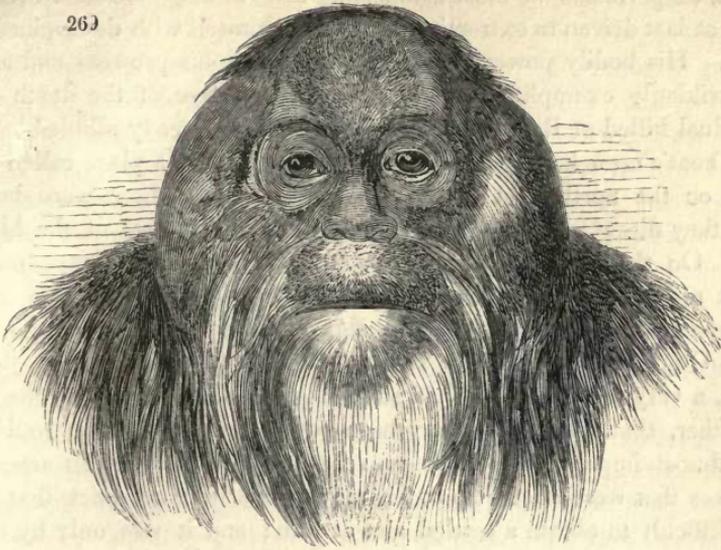


Dissected foot of Orang.

The conditions of the posterior limbs and feet of the Orang, which render the animal so free among the trees, produce the very opposite effect when on the level ground. Here the Orang is awkward, constrained, and vacillating in his movements. Instead of resting fairly on the soles of the feet, as the Chimpanzee does, he treads on their external edge, doubling up the fingers, as if the instinctive impulse to grasp could not be overcome, and the limbs are bowed, like those of a cripple, beneath him; leaning forward upon his knuckles, the arms acting like crutches, he swings the body forward between them, raising the legs for that purpose, and replacing them on the ground again, only in order to advance the arms for the next effort. This, however, is not his exclusive mode of progression. He can walk on the hind limbs alone, touching the ground with his knuckles, first on one side and then on the other, partly to give impulse to his movements, and partly to keep his body balanced. Sometimes, also, he elevates the arms, throwing them back as a counterpoise to the forward inclination of the body, whilst he waddles briskly along. This attitude, however, cannot be long sustained.

The physiognomy of the Orang, of which figure 269 is characteristic, is grave, melancholy, and even apathetic; but, in the adults, not unaccompanied by an expression of ferocity; the huge callous protuberances on the sides of the face adding an air of brutish grossness. The head leans forward on the chest; the neck is short; and loose, folded skin hangs round the throat, except when the extensive laryngeal air-sacks are inflated; this loose skin is then swollen out, like a naked, shining tumour, extending up along the sides of the face, under the small angular ears, filling up the interspace between the chin and chest, and encroaching upon the latter; the lips are wrinkled, and possess extraordinary mobility; the animal can protrude them in the form of a snout, or proboscis, contracting the mouth to a circular orifice, or, on the contrary, draw them back, or turn them in various directions; the breadth of the chest and

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Head of male Orang.

shoulders conveys an idea of great strength; the abdomen is very protuberant; the hair, which falls on the back and shoulders, in loose, long masses, forms a covering to the animal crouching in repose; necessary as a protection, by day, against the burning rays of the sun,—by night, against the heavy dews, and also as a shelter to the body during the rainy seasons: the palms of the hands have the same lines and papillæ as in the human subject. All the naked parts of the body, with the exception of the orbits and lips, are of a silvery grey.

As in the case of the Chimpanzee, our knowledge of the habits of the adult Orang, in a state of nature, is very limited. It tenants the secluded recesses of the forests, which cover the hilly districts in the interior of the islands of Borneo and Sumatra, where it is much dreaded by the native tribes of those unpenetrated regions, with whom we are as little acquainted as with the adult Orang itself. From what can be ascertained, it appears that the Orang is not gregarious, like the Chimpanzee; nor does it build huts; but, in accordance with its arboreal predilections, it constructs arbours among the top branches of the highest trees, with a covering of leaves and twigs, in which it takes up its abode.

Each male is said to appropriate to himself a certain extent of forest territory, and jealously to protect his empire from the encroachments of a rival. Here, in solitary seclusion, he will sit, as is said, for hours together, in listless apathy, in his arbour, his habitual dwelling-place.

Unless when roused, his movements are slow and indolent ; but, when attacked, he performs the most astonishing feats among the forest branches ; and if at last driven to extremity, he defends himself with determined resolution. His bodily powers are prodigious ; and his prowess and activity are strikingly exemplified by Dr. Abel's narrative of the death of the individual killed at Ramboom, to which we have already alluded.

A boat's crew having landed to procure water, at a place called Ramboom, on the north-west coast of Sumatra, where there were but few trees, they discovered, on one of them, a gigantic animal of the Monkey tribe. On their approach, he came to the ground, and when pursued, sought refuge in another tree at some distance, exhibiting, as he moved, the appearance of a tall, man-like figure, covered with shining, brown hair. On being driven to a small clump of trees, he gained, by one spring, a very lofty branch ; and so rapidly did he bound from one bough to another, that, had the country been covered with wood, it would have been almost impossible to have prevented his escape. Even among the few trees that were on the spot, his movements were so quick that it was very difficult to obtain a settled aim at him ; and it was only by cutting down one tree after another, thus confining him within a very limited range, that his pursuers were ultimately enabled to destroy him. Having received five balls, his exertions relaxed, and reclining, apparently exhausted, on one of the branches of a tree, he vomited a considerable quantity of blood. The ammunition of the hunters being by this time expended, they were obliged to fell the tree in order to obtain possession of their victim, and did this in full confidence that his power was so far gone that they could secure him without further trouble ; but they were astonished, as the tree was falling, to see him effect his retreat to another, with apparently undiminished vigour. In fact, they were obliged to cut down all the trees before they could drive him to combat his enemies on the ground, against whom he still exhibited surprising strength and agility ; until, at length, he was overpowered by numbers, and destroyed by the thrusts of spears and the blows of stones and other missiles. When nearly in a dying state he seized a spear, made of a supple wood, which the strongest man could not have broken, and shivered it to pieces. Those who assisted to destroy this fine animal, have stated, that the human-like expression of his countenance, and piteous manner of placing his hands over his wounds, distressed their feelings, and almost made them question the nature of the act they were committing. (See *Asiatic Researches*, vol. xv. p. 489.)

Respecting animals of such high interest, and of which so little is really known, every authentic fact that tends to illustrate any trait of their habits or disposition, is doubly valuable. For this reason, the following account of the destruction of another specimen, in the same locality, is

added, as it beautifully and incontestably proves the strong affection of the species for their offspring. A few years since, Captain Hull repaired to Sumatra, purposely to obtain one of these animals; but, at his outset, he experienced a serious obstacle, in the difficulty of procuring guides to conduct him to their usual haunts: this proceeded from the superstitious fears of the natives, who not only believe that the Orangs, whom they call Mawys, possess a natural dominion over the great forests, but that they are animated by the souls of their own ancestors. Succeeding, at length, in this preliminary part of the undertaking, the Captain soon met with one of the objects of his search, a female, which he describes as having been five feet in height. When first discovered, she was sitting on a branch of one of the highest trees, with a young one in her arms. Upon being wounded, she uttered a piercing cry; and immediately lifting up her little one as high as her long arms would reach, let it go among the topmost branches. While the party approached to fire again, she made no attempt to escape, but kept a steady watch, glancing her eye occasionally toward her offspring, and at last seemed to wave her hand to hasten its departure, which it safely effected. (Brewster's *Edinburgh Journal*, vol. vi. p. 161.)

We are informed, by Le Compte, that in Borneo it is a favourite amusement of the native princes and nobility to hunt these Apes, as Stags are hunted in Europe.

Gemelli Careri* (*Voyage du Tour du Monde, traduit de l'Italien de Gemelli Careri*, par L. M. N., &c. Paris, 1719) says, that he has seen one which would weep like a child, and that it walked on its hind limbs, and carried its mat under its arm to lie down upon and sleep. He adds, that these Apes appear to have more sense, in some respects, than Men; for, when they no longer find fruits on the mountains, they go to the sea-shore, where they catch Crabs, Oysters, and the like. There is a sort of Oyster, called Taclovo, which weighs many pounds, and which often lies open on the beach; but the Ape, fearing to be caught by the hand, when it commences its attack, introduces a piece of stone between the shells, so as to prevent their closing, when it demolishes the Oyster without fear.

D'Obsonville communicated to Buffon an account of a male adult Orang, four feet six inches in height, which he had an opportunity of seeing about two months after its capture: it is described as evincing, in the expression of its countenance, and the sound of its voice, inquietude, listlessness, pain, and impatience. He was informed, by the natives, that these animals pine in confinement, and soon die.

According to M. Relian, a surgeon, resident at Batavia (who informs us that M. Palavicini, in 1759, took two living adult Orangs, a male and

* Careri visited Turkey, Persia, Hindostan, China, the Philippine Islands, &c.

female, on board ship, intending to bring them to Europe), these animals, to judge by the individuals referred to, are very bashful; insomuch that the female, when earnestly gazed at, would throw herself into the arms of the male, and hide her face in his breast. He adverts to their intelligence, so different from instinct, which, together with their actions, has gained for them the name of Wild Men: and he adds, that they are said to be found in the inaccessible mountains of Java, but are most abundant in Borneo.

The Orang, in a very immature condition, has been imported into Europe far more frequently than the Chimpanzee. The first living specimen, of which we have any record, was that which belonged to the Prince of Orange, in 1776. It was brought from Borneo, and was figured and described by Tulpius. (*Obs. Med.* l. iii.) Vosmaer, also, gave an account of it.

It was a female, two and a half Flemish feet in height; gentle, fond of human society, active and intelligent. Its usual mode of walking was on all fours; but it could walk on its hind feet alone. As the winter came on, its hair, which was previously scanty, except on its back and arms, increased in length and thickness; its colour was of a chestnut red. The skin of the face was mouse-coloured, passing into dull flesh about the eyes and mouth. It lived seven months in Holland.

In 1808, a young female Orang was brought to Paris, by M. Decaen, an officer in the French navy. M. F. Cuvier, who described it, and recorded its habits and manners, notices particularly the mobility of its lips; its perpetual use of the sense of smell, as a test by which to judge of the qualities of articles of food with which it was previously unacquainted; the indiscriminate nature of its diet, but its preference for bread, coffee, and oranges; its jealousy toward children, whom it was disposed to strike and bite; its otherwise affectionate and social disposition; its sudden fits of anger, during which it would roll on the ground, uttering loud and harsh yells; and its mode, when on the branches of a tree, of shaking them violently on the attempt of a pursuer to mount after it. He also mentions, as proofs of its intelligence, that, when it could not manage to fill the spoon properly with food, it would hand the instrument to some one, with an expression that well conveyed its meaning. It drank from a glass, holding it in both hands; and, on one occasion, having replaced the glass on the table, but perceiving that it was in danger of being thrown over, the animal put its hand under the glass, so as to prevent it from falling; thus evidently shewing that it was not only aware of the consequence, but, likewise, of the means of preventing it. To this is added an account of the animal's care in adjusting its bed; and in covering itself up warmly, with blankets and other materials, when retiring to rest. Its fondness for two kittens is also

mentioned ; which, notwithstanding the pain of their scratches, it persisted in placing upon its head : the propensity to put things on its head was very marked ; whatever it got hold of, was treated in this manner. On board ship, during its passage to France, the motion of the vessel rendered it timid, or distrustful of its own powers ; and it was not until its owner, to whom it was strongly attached, had set it the example, and induced it to follow, that it would venture to ascend the rigging. On the whole, its docility, gentleness, and intelligence were of a high order ; in which respects it agrees with the individuals which the Author has had opportunities of observing.

In the year 1817, a young male Bornean Orang, procured by Dr. Abel, at Java, was brought to London, and survived his importation from the August of that year to April, 1819 ; during which period he was in the custody of Mr. Cross, at Exeter 'Change. His height, from the crown of the head to the heel, was two feet seven inches ; his hair was of a brownish red ; on the back six inches long, and on the arms five. On his first arrival, the breast and abdomen were nearly naked, but subsequently became covered with hairs ; the face had no hair, except at the sides, somewhat in the manner of whiskers, and a very thin beard ; the head, viewed in front, was pear-shaped, the cranium being much the larger end ; the eyes were close together, oval, and of a dark brown ; the eyelids fringed with lashes ; the nose was confluent with the face, except at the nostrils, which were a little elevated ; nares, narrow and oblique ; lips, narrow ; the chin was less projecting than the mouth ; below it, a pendulous membrane gave the appearance of a double chin, and swelled out when the animal was angry or much pleased ; the prevailing colour of the skin, beneath the hair, was bluish grey ; the eyelids and margin of the mouth, light copper-colour ; the inside of the hands and feet, deeper copper ; and two copper-coloured strips extended from the arm-pits down each side of the body.

His progression on a flat surface was accomplished by placing his bent fists on the ground, and drawing his body between his arms ; thus resembling a person decrepit in the legs, supported on stilts. He was utterly incapable of walking in a perfectly erect posture : he betrayed this in his whole exterior conformation, and never, willingly, attempted to counteract its tendency : his head leaning forward, and forming a considerable angle with the back, threw the centre of gravity so far beyond the perpendicular, that his arms, like the fore-legs of other animals, were required to support the body. So difficult, indeed, was it for him to keep the upright position for a few seconds, under the direction of his keeper, that he was compelled, in the performance of his task, to elevate his arms above his head, and to throw them behind him, to secure his balance.

While resting on a flat surface, the animal turned his legs under him.

When sitting on the branch of a tree, or on a rope, he rested on his heels, with his body leaning forward against his thighs.

The following is the substance of the account given by Dr. Abel, of this animal's habits and manners, while resident in Java, and during the voyage thence to England. (*Narrative of a Journey in the Interior of China, &c.*) He neither practised the grimaces and antics of Monkeys, nor displayed their perpetual proneness to mischief. Gravity, approaching to melancholy, and mildness, were sometimes strongly expressed in his countenance, and appeared to be the characteristics of his disposition. When among strangers, he would sit for hours with his hand upon his head, looking pensively at all around him; and, if much incommoded by their examination, he would hide himself beneath any covering that was at hand. He displayed much forbearance under injuries, but avoided those by whom he had been often teased. To the persons who treated him with kindness he soon became much attached: he was fond of sitting beside them; and, getting as close as possible to their persons, would take their hands between his lips. But, though usually gentle, he was susceptible of being excited to great rage, which he expressed by opening his mouth, displaying his teeth, and seizing and biting those who were near him. On being confined in a bamboo cage, he grasped the rails, and violently endeavoured to break them; finding they did not yield generally, he tried them separately; and, discovering one weaker than the rest, worked at it constantly, until he succeeded in breaking it, and so making his escape. He was always very impatient for food, and became passionate if it were not soon supplied. "Sometimes," says Dr. Abel, "I fastened an orange to the end of a rope, and lowered it to the deck from the mast-head, and, as soon as he attempted to seize it, drew it rapidly up: after being several times foiled in endeavouring to obtain it by direct means, he altered his plan: appearing to care but little about it, he would remove to some distance, and ascend the rigging very leisurely for some time, and then, by a sudden spring, catch the rope which held it. If defeated again, by my suddenly jerking the rope, he would, at first, seem quite in despair, relinquish his effort, and rush about the rigging, screaming violently: but he would always return; and, again seizing the rope, disregard the jerk, and allow it to run through his hand till within reach of the orange; but, if again foiled, would come to my side, and, taking me by the arm, confine it whilst he hauled the orange up." Sometimes he seemed to be almost driven to desperation; and, on two or three occasions, committed an act that, in a human being, might have been denominated a threat of suicide. If repeatedly refused an orange, he would shriek violently, and swing furiously about the rigging; then return, and endeavour once more to obtain the fruit: if again refused, roll for some time, like an angry child, on the deck; and, at length, suddenly starting up,

rush over the side of the ship. When he first did this, it was thought that he had thrown himself into the sea ; but, on search being made, he was found concealed under the chains.

One of his favourite amusements consisted in romping with the boys of the ship. He would entice them to play, by striking them with his hand as they passed, then bound from them, but allow them to overtake him, and engage in a mock scuffle with them, in which he used his hands, feet, and mouth. "If any conjecture could be formed," our author remarks, "from these frolics, of his mode of attacking an adversary, it would appear to be his first object to throw him down, then to secure him with his hands and feet, and then wound him with his teeth."

He took but little notice of some small Monkeys that were on board, while under observation ; but, when such was not the case, there was reason to suspect him of being less indifferent to their society. On one occasion Dr. Abel was called to the top-gallant yard of the mizen mast, to watch him playing with a young male. Lying on his back, and partly beneath a sail, the Orang for some time contemplated, with much gravity, the gambols of the other, while bounding over him ; but, at length, caught the Monkey by the tail, and tried to envelop him in his (the Orang's) own covering. "The Monkey seemed to dislike the confinement, and broke from him ; but again renewed its gambols ; and, although frequently caught, always escaped. The intercourse, however, between them did not seem to be that of equals ; for the Orang-outang never condescended to romp with the Monkey as he did with the boys of the ship." Once, he openly attempted to throw a cage, containing three Monkeys, overboard ; because, probably, it was suggested, he had seen them receive food, of which he had failed to obtain a share.

He displayed great alarm at the sight of some live Turtles : climbing, with all possible speed, to a higher part of the ship than he had ever before reached, he looked down upon them, projecting his long lips into the form of a Hog's snout, uttering at the same time a sound which, our author says, "might be described as between the croaking of a Frog and the grunting of a Pig." After some time he ventured to descend, but with much caution, peeping continually at the Turtles ; but could not be induced to approach within many yards of them. He ran to an equal height, and uttered similar sounds, on seeing some men bathing and splashing in the sea ; and, subsequently to his arrival in England, displayed a degree of fear at the sight of a Tortoise.

His food, while in Java, consisted chiefly of fruit, particularly mangostans, of which he was excessively fond. On board ship his diet was miscellaneous : he sucked eggs, which he often employed himself in seeking, with voracity ; ate readily of all kinds of meat, especially of raw ; and was also very fond of bread ; but always preferred fruit, when he could

obtain it. In Java, his drink was water ; but on board ship it was no less diversified than his food. He was more partial to coffee and tea than any other beverage ; “ but,” says Dr. Abel, “ would readily take wine ; and exemplified his attachment to spirits by stealing the captain’s brandy bottle.” After his arrival in London, he drank wine and other liquors ; but, in preference to them, or anything else, beer and milk. From the boatswain of the *Alceste*, who shared his meals with him, although he sometimes purloined the grog and biscuit of his benefactor, he learned to eat with a spoon ; and might be often seen sitting at his cabin door, enjoying his coffee, quite unembarrassed by those who observed him, and with a grotesque and sober air, that seemed a burlesque on human nature.

He slept, while at Java, in a large tamarind-tree, where he had “ formed a bed, by intertwining the small branches and covering them with leaves.” He retired to rest at sunset, or even earlier if he had been well fed, and rose at sunrise, to visit those from whom he was accustomed to receive food. In the day-time he would lie with his head projecting beyond his nest, watching those who passed below ; and, on perceiving any one with fruit, he would descend, for the purpose of obtaining a share of it. On board ship he commonly slept in a sail, at the mast-head. He took the greatest pains to remove anything that would render the surface on which he intended to repose uneven, then spread out the sail, placed himself on his back upon it, and drew the sides over his body. “ Sometimes,” says Dr. Abel, “ I pre-occupied his bed, and teased him by refusing to give it up : on these occasions he would endeavour to pull the sail from under me, or to force me from it, and would not rest until I had resigned it. If it was large enough for both, he would quietly lie by my side. If all the sails happened to be set, he would hunt about for some other covering, and either steal one of the sailors’ jackets or shirts, that happened to be drying, or empty a hammock of its blankets. Off the Cape of Good Hope he suffered much from a low temperature, especially early in the morning, when he would descend from the mast, shuddering with cold, and, running up to any one of his friends, climb into their arms, and, clasping them closely, derive warmth from their persons, screaming violently at any attempt to remove him.”

His agility and strength were remarkable. At Java, his favourite amusement consisted in passing from tree to tree, swinging from their branches, and climbing over the roofs of houses. On board ship the sailors often chased him about the rigging : at first starting, he would endeavour to outstrip his pursuers by mere speed ; but, when much pressed, he would seize a loose rope, and swing out of their reach. On some occasions he would wait on the shrouds, or at the mast-head, until his pursuers approached almost near enough to touch him, when he would bound along

the mainstays from one mast to another, swinging by his hands, which he moved one above the other; or suddenly lower himself to the deck by any rope that was near him. When playful, he would sometimes swing within arm's length of his pursuer, strike him with his hand, and swing away again. "The men," our author says, "would often shake the ropes by which he clung with so much violence as to make me fear his falling; but I soon found that the power of his muscles could not be easily overcome." He was in the habit of chasing Dr. Abel himself, for the purpose of obtaining from his pockets, when caught, sweetmeats or fruit. "Sometimes," he observes, "I endeavoured to evade him by ascending to the mast-head; but was always overtaken, or intercepted in my progress. When he came up with me on the shrouds, he would secure himself by one foot to the rattling, and confine my legs with the other and one of his hands, whilst he rifled my pockets. If he found it impossible to overtake me, he would climb to a considerable height on the loose rigging, and then drop suddenly upon me; or if, perceiving his intention, I attempted to descend, he would slide down a rope and meet me at the bottom of the shrouds." An attempt having been made, soon after he was brought on board ship, to secure him by means of a chain fastened to a strong staple, he instantly unfastened it and ran away, dragging it behind him, until finding himself embarrassed by its length, he coiled it once or twice, and threw it across his shoulder. "This feat he often repeated; and, when he found that it would not remain on his shoulder, he took it into his mouth."

After his arrival in England he learned to walk upright, or, rather, on his feet, unsupported by his hands; and, also, to kiss his keeper. Dr. Abel states, "I have before remarked with how much difficulty he accomplished the first; and may add, that a well-trained dancing-dog would far surpass him in the imitation of the human posture."

In 1830, a young male Bornean Orang (presented by G. Swinton, Esq.) lived a short time in the menagerie of the Zoological Society, London. Its habits on ship-board were represented as being very similar to those detailed by Dr. Abel. It is of this individual that the anatomy is given in the *Proceedings Zool. Soc.* 1830, p. 28, *et seq.* The prepared skin is in the museum of the Society (No. 3, in Catalogue, 1838). In 1832, a female (alluded to as the companion of the Chimpanzee) was purchased by Mr. Cross, from whom it passed into the possession of Mr. Wombwell. It was brought from China, but its native locality was not decidedly ascertained. The fracture of one of the thighs, occasioned by some accident, put an untimely period to its existence.

In the same year a male Orang was received into the Tower menagerie. This individual was brought direct from Borneo, by Captain Blair, who had shot the mother and captured her offspring, when the latter

was, probably, but a few months old. With the usual quiet, and even melancholy deportment, of his race, he combined a playful spirit, and was affectionate and good-tempered ; but he disliked to be left alone, and was fond of being nursed and caressed. He did not long survive his importation to our island.

In January, 1838, the menagerie of the Zoological Society of London was enriched by the acquisition of a young female Orang ; but whether from Borneo or Sumatra could not be ascertained. On its first arrival, its height was two feet two inches ; but it afterward grew considerably.

The following notes respecting its habits were made by the Author, a few weeks after its introduction to its new domicile. All, who have had opportunities of observing the Orang on the ground, record its slow and vacillating mode of progression—a motion dependant rather on the arms, which, from their length, act as crutches, supporting the body between them, than upon the hinder limbs, which are ill calculated for such service. Thus, when left entirely to itself on the floor, this little inmate of the Zoological Gardens, if incited to walk, supported its weight on its arms, applying the bent knuckles to the ground ; and so long were the arms that it stooped far less, in this attitude, than did the Chimpanzee : indeed, it was very nearly erect ; the hinder limbs were, at the same time, bowed outward ; and the outer side, rather than the sole of the foot, was placed upon the floor. Thus supported, it waddled along, the movements of its hinder limbs resembling those of a rickety child, just able to walk alone : it was plain that the arms had the most to do in this exercise : often, indeed, and that the more especially when it wished to move quickly (as when following its keeper), it fairly swung the body forward between the arms, as if impatient of the hobbling gait to which the structure of its lower limbs restricted it. That its lower limbs, however, with slight assistance, were not incapable of supporting the body, and that it could waddle along very fairly, using these alone, was repeatedly witnessed. For instance, it would walk, at a tolerable pace, comparatively speaking, by the side of a person holding it by the hand ; and in the narrow space between the outside railing and the front bars of the Giraffe's house (the apartment in which it was kept), it walked with great facility, availing itself of the railing on one side, and the edge of the elevated floor on the other, along which it ran its hands by way of steadying itself. In the Giraffe's house it had an inclosure, or large cage of its own, railed off from the rest of the apartment by a fence-work of bamboos. Here were two artificial trees, with numerous branches, among which it might climb at pleasure. Remembering the activity and the merry antics of the Chimpanzee, we expected to see far more liveliness and celerity in the climbing movements of this little Orang than were displayed. It was, it is true, perfectly at its ease,

and confident of its security. Sometimes it would suspend itself by the hand and foot of the same side, the head hanging down, and the disengaged hand playing with various articles within its reach; sometimes it would swing with the body horizontally, and in this attitude the hip-joint of the hinder limb in use was bent at a right angle, laterally, shewing how freely the head of the thigh-bone rotates in its socket. Still, however, though its attitudes were as varied as can be imagined, its actions were slow and deliberate; excepting, indeed, on one or two occasions, when it wished to follow its keeper, who had opened the door of its cage: even then, it did not bound from branch to branch like a Monkey, but, stretching out its arms, and grasping the branches within its reach, it swung itself onward, and so descended to the floor, along which it hobbled awkwardly and unsteadily. One thing, as respects both the hands and feet of this Orang, could not be overlooked; namely, that their mode of application to the branches, during the arboreal evolutions of the animal, was hook-like; and, from the power of the adductor muscles of the thumb, and flexor muscles of the fingers, tenacious and enduring, rather than tight and fixed. This observation is especially applicable to the feet: in these, the shortness of the thumb, though capable in itself of firm and close application, renders it rather a fulcrum, against which the long fingers oppose their stress, than, by folding upon them, an adjunct to them in the act of prehension; and hence, though admirably fitted for the movements of the animal among the trees of the forest, and the kind of hold necessary for freedom and security, the foot of the Orang is, perhaps, less energetic in its grasp than that of the semi-arboreal Chimpanzee, in which the hind thumb is proportionately longer, and the foot broader, than in the Orang. At all events, it was in this manner that the young Orang used both its hands and feet; its fingers forming hooks, suspended by which, it could swing backward and forward with the greatest facility, secure in the unyielding power of their muscles. The observations of M. Fred. Cuvier, respecting the progressive movements of the Orang, as noticed by himself, agree very closely with those which an attention to the habits of the present living animal have suggested. (See *Annales du Muséum*, tom. xvi.)

Though this animal was naturally and habitually dull and inanimate, it had its times of sportiveness, when it readily engaged in play with those to whom it was attached, following them to court their notice, or pursuing them in mimic combat. Perhaps, indeed, there was a latent disposition in it to attack those whom it deemed itself capable of overcoming. A young gentleman pretended to be afraid, and retreated gradually before it, whereon it perseveringly followed him for a considerable period, and gave chase to him completely round the apartment; but, when it found its efforts vain, it waddled to its keeper, whom it evidently regarded as its protector, and to whom it manifested the utmost attachment. The

next moment it suffered him to approach it, and take it by the hand, without the least sign of displeasure. One of its favourite attitudes was to sit "à la Turque," in a low chair, or on the floor before the fire, with a blanket wrapped comfortably around it, and which it arranged without assistance, drawing it over the shoulders and around the body. Thus at ease, it would remain, if its keeper were near, without any change, regardless of all that passed around; for, unlike the lively, inquisitive Chimpanzee, which was interested in all about it, and fond of seizing everything with child-like eagerness, it seemed to take but little interest in the novelties on every side. The sight of the Giraffes, on its first introduction to them, excited neither surprise nor fear. It, however, tried, occasionally, to lay hold of a Giraffe's nose, as it bent its long neck over the rails of the enclosure, and lowered its head toward the Orang, attracted by the food in its hand; but, in general, it took not the slightest notice of them, though, from time to time, their necks were arched above it. Like its unfortunate predecessor, the Chimpanzee, it recognised its name, and obeyed the command of its keeper; and it would frequently wrap itself up in the blanket at his bidding, and seat itself in its chair. If, however, he moved to a distance, it immediately followed. The only instance of curiosity, which it manifested on ordinary occasions, was to examine the pockets of its keeper, in search of bread, or some article of diet; but it seemed to be incited by no spirit of inquisitiveness. A bystander put a cane, or slender walking stick, into its hand; it held the stick listlessly, gently applied its teeth as if to try its texture, and easily relinquished it, neither playing with it, nor appearing disposed to retain it. Fond as it was of its keeper, it received his attentions with less apparent pleasure than the Chimpanzee did under similar circumstances. On purpose to incite it to a game of romps, he frequently played with it as with a child, and tickled it in various places about the side and chest, rousing it into momentary mirth: its face at that time assumed the expression of laughter; it grinned with evident pleasure, its eyes twinkled, and it uttered a half-suppressed, feeble sort of noise, with less, however, of the "chuckle" in it—less decidedly laughter-like—than were the tones uttered by the Chimpanzee under like treatment; and when its keeper ceased, it did not invite him to a renewal of the play, but settled into its habitual state of seeming apathy.

Confinement, which is irksome to all animals, was evidently distressing to this little Orang: it could not bear to be separated by intervening bars from its keeper; and on some attempts to confine it for a short time to its bamboo-latticed enclosure, there being wire between each bamboo, to narrow the interspaces,—it strained the latter apart, with its arms, and readily forced itself through, so that cross-wires were subsequently intertwined with the former, to prevent its egress.

Dressed in its Guernsey jacket and trousers, a sort of clothing which it needed in our climate, its appearance, seated on its chair, or at the table with its keeper, in his private room, was very amusing; nor less so the expression of its countenance, when soliciting a share of the food before it. It looked at its keeper, then at the tempting morsel, and protruded its flexible lips into the form of a conical proboscis: when offered any liquid to drink, in a cup or saucer, it did not, however, dip its lips into the fluid, but, holding the cup in its hand, put the rim between its lips, and so drained up the contents, exactly as a child would, and with all due gravity and decorum. Disappointment is trying to all, and the little Orang is not an exception to the general rule. Mr. G. Bennett (see his *Wanderings*, &c., vol. i. p. 367), speaking of an Orang, which he had the opportunity of seeing, in the possession of Mr. Davies, of Java, observes, that, when a large bamboo cage was constructed, and in which it was attempted to confine him, "he screamed with rage on being placed in it, and, exerting his muscular power, soon demolished it, and was then quiet as before." The same author notices also the rage manifested in a species of Gibbon, which he was endeavouring to bring home, and which, as he says, "when refused or disappointed at anything, would display the freaks of temper of a spoiled child, lie on the deck, and dash everything aside that might be within his reach; walk hurriedly, and repeat the same scene over and over again." Much in the same manner this little Orang displayed its passion, throwing itself about on the floor, and uttering its whining cry, till satisfied, which it would always be before it resumed its ordinary composure. The person who brought it to England intimated that it had exhibited several violent paroxysms of passion while on board; and, occasionally, after its introduction into the Zoological Gardens, it indulged in fits of anger: but, as kind treatment was the uniform course pursued toward it, occasions of such an out-burst but rarely occurred; unless, indeed, when it was confined in its enclosure, and necessarily separated from the person in charge of it. One of these scenes was witnessed: its keeper having fastened the door of its bamboo-latticed enclosure, and gone about his other duties, it gave way at once to a paroxysm of violent passion; it traversed the bamboo frame-work with the utmost celerity, for it was roused to unusual activity, striving to force the rods apart, and escape into the room: screaming with disappointment, it swung itself to the branches of the trees, and, descending thence to the floor, it dragged its chair (a heavy one) to the door, and, using it as a sort of battering-ram, endeavoured, by violent and repeated blows, to force open the unyielding hinges: foiled in its efforts, it again swung itself from branch to branch, and, screaming with passion, traversed the lattice-work, and again tried at the door with its chair. Nothing but the return of its keeper pacified it.

The disgust or fear entertained by the Orang (at least, while young) toward Tortoises is well known; and it will be remembered that the young Chimpanzee recoiled with horror from a large Snake introduced into the room by way of experiment, and that Tortoises, also, were regarded with aversion. The present Orang was not made the subject of a Snake experiment, but was tried with a small Tortoise, at the sight of which, as the animal crawled along, it stood aghast, in an attitude of amazement ludicrously theatrical: nothing could induce it to pass the crawling object of its distrust. It would appear, however, that familiarity with the sight of Tortoises easily removed the apprehensions of the Orang; for, after this had seen a Tortoise a few times, it exhibited less and less annoyance at the creature's presence. Whatever instinctive fear the Orang or Chimpanzee may entertain toward the larger Snakes, or, indeed, Snakes of any size, some of which are to be dreaded for their poison, it cannot be imputed to such an instinct, that the Orang is amazed or alarmed at the presence of a Tortoise, inasmuch as that creature is utterly incapable of inflicting the slightest injury: the amazement of the young Orang must, therefore, be attributed rather to the strange appearance of the animal, so unlike that of any living thing which it had hitherto witnessed,—a creature of suspicious aspect, the qualities of which it had yet to prove,—than to any innate fear implanted as a preservative. It was a fear connected with intelligence, or intellect, rather than with instinct. A child would exhibit the same kind of feeling.

It is not many years since that the character, habits, and form of the Orang, were among the *desiderata* of science. Ignorance and credulity had invested it with faculties and intellects bordering upon those peculiar to the human race: it was accounted but little lower than Man, and, like him, capable of abstract ideas. The earlier travellers and voyagers had filled their pages with descriptions teeming with the marvellous; and men of learning had indulged in the wildest speculations respecting its capabilities of progressive refinement, and its affinity to our race. These puerile fancies have all dispersed before true science; and we now know that, extraordinary as the Orang may be, compared with its fellows of the brute creation, still in no respect does it trench upon the moral or mental province of Man.

To this account may be added, that the hinder thumbs were destitute of the ungueal phalanx; its hair was long and thick, especially over the back, the sides, and the outer aspect of the limbs. The general colour, dark blackish chestnut.

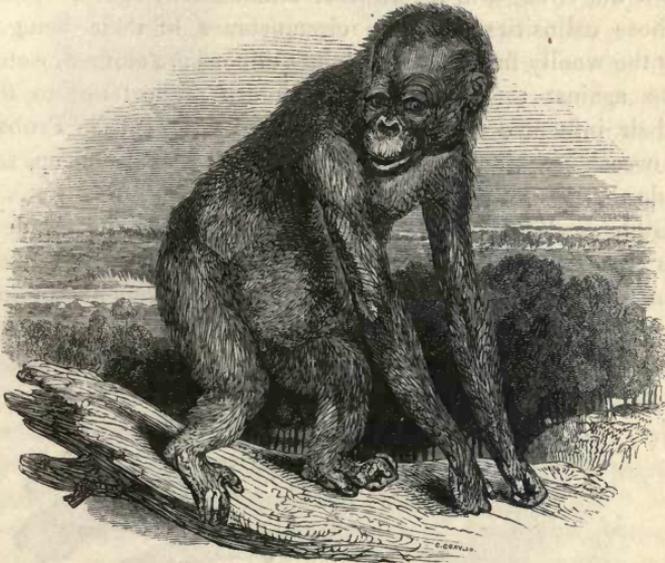
In the summer of 1838, the Zoological Society of London became possessed of a young male, evidently in ill health: it died in the course of a few weeks. In this specimen the hinder thumbs were also nail-less.

A young specimen, at present (1840) living in the Gardens of the

Zoological Society, is also destitute of a nail on the hinder thumbs : the fore-hands are brown above ; the palms tanned flesh colour ; the circle round the eyes, the nostrils, and the lips, are livid yellow ; the upper part of the nose, the forehead, and cheeks, are livid brown. Its habits and manners precisely resemble those of the individual Orang before described.

The annexed figure (270) represents this individual in the act of hobbling along, supported on its arms, and is very characteristic of its attitude.

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Orang-outan (young female).

GENUS.—HYLOBATES.

Hylobates ILLIGER, Prodr. Syst. Mamm. 1811.

Pithecus in part, GEOFFROY, in Ann. du Mus. xix. 1812.

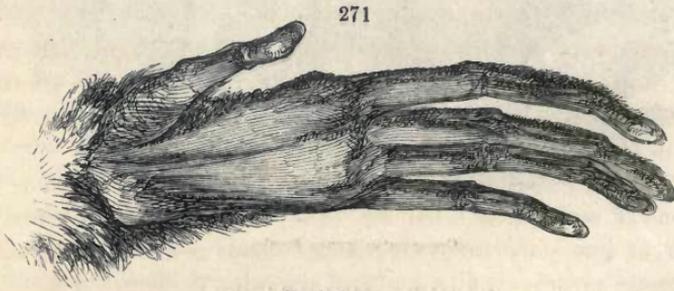
GENERIC CHARACTERS.—MUZZLE depressed; nostrils small; forehead retreating; HEAD small; BODY slender; ARMS extremely long, reaching to the heel; THUMB separated to the wrist from the fingers, and scarcely opposable to the latter; PALM very narrow; POSTERIOR EXTREMITIES bowed, small; FEET long, narrow; index and second toe sometimes united; ISCHIATIC CALLOSITIES present, but small; TAIL wanting; CHEEK-POUCHES wanting; LARYNGAL SACCULI present or absent; FUR deep, full, woolly.

COUNTRY.—Java, Borneo, Sumatra, Malacca, Siam.

The affinities of the Gibbons to the Orangs are too decided to be overlooked or misapprehended. In general form; in the absence of a

tail; in structural adaptation for an arboreal mode of life; in intelligence and docility,—the accordance of the two groups is evident to the most casual observer. The Gibbons, however, have their exclusive distinguishing characters, which draw a clear line of demarcation between them and the preceding Apes, and justify the establishment of the genus *Hylobates*. The presence of small ischiatic tuberosities (the commencement, as it were, of that structural peculiarity which we find carried out to its maximum among the inferior *Simiadaë*), indicates a link of attachment between them and the succeeding groups, and a move of one step, at least, below the Orangs, in the scale of animated being. But the smallness of these callosities, and the circumstance of their being almost hidden by the woolly fur with which the Gibbons are clothed, would seem to militate against the attachment of much importance to them, as regards their influence upon the habits of the animals. Probably the Gibbons occasionally, or even habitually, rest, and also sleep, seated on them, as do the lower *Simiadaë* invariably.*

The Gibbons differ from the thick-set Orang in the slenderness of their form: the chest, indeed, is tolerably broad; but the abdomen is contracted, and the hips are extremely narrow; the arms are of excessive



Hand of Gibbon.

length, reaching, in the erect attitude, to the ankle-joint; and the hands (see fig. 271) are remarkably long and slender; the naked palm is linear, expanding as it proceeds from the wrist; the fingers are covered, down the backs, with fur; the thumb of the fore-hands resembles the fingers in form and direction, and it is scarcely or not at all opposable to them; it seems to rise from the wrist, owing to the almost complete separation of its metacarpal bone from that of the first finger; and the ball formed by its adductor muscles is trifling. The feet are long, and their hinder thumb is so greatly developed (see fig. 272) as to form an equal antagonist to

* Mr. George Bennett, in his description of a Siamang, which he calls *Ungka* (a generic term for the race), observes: "When sleeping, he lies along, either on the side or back, resting the head on the hands. Frequently, when I awoke, I have seen him lying on his back, his long arms stretched out, and with open eyes, appearing as if buried in deep reflection."—*Wanderings in New South Wales, &c.* vol. ii. p. 152. London: 1830.

the other toes conjointly. In some species, the first and second finger (of the foot) are, more or less, united together; this union, in the Siamang, is carried to the last joint. Sir T. S. Raffles, who first pointed

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Foot of Gibbon.

out this peculiarity in the Siamang, conceived it to be restricted to this species, which is certainly not the case. Much less correct, therefore, is the assertion of M. Duvaucel, that it is a sexual difference peculiar to the female, as he remarks more particularly with reference to the Ungka-puti and the Ungka-etam. It appears, however, in the latter animals, to be a variable character, sometimes present, some-

times not to be discerned; and hence, probably, Sir. T. S. Raffles denied its existence in any species, except the Siamang.*

With regard to the lower extremities in the Gibbons, they are very short, and bowed in; and the ankle-joint has that inward tournure so advantageous to an arboreal animal; but the hip-joint is secured by the ligamentum teres.

The Gibbons are clothed with deep, thick fur, softer in some species than in others; on the chest and abdomen it is much thinner than on any other part of the body; that on the fore-arms is mostly reverted to the elbows, where, meeting the hair of the humerus, it forms a peak. In the Ungka-puti, however, the hair of the fore-arms is inclined forward in the ordinary manner; in the white-handed Gibbon it is nearly erect, with an inclination forward, but less decidedly than in the Ungka-puti.

In one species, the brown whiskered Gibbon (*H. Choromandus*), the hair of the head radiates from a centre on the crown; in the rest, it falls back from the forehead, without any radiating point. In the white-handed Gibbon (which has scarcely any whiskers), it is somewhat erect, from its shortness and closeness. The prevailing colours in the animals of the present genus are black, more or less intense, dull grey, and dirty straw yellow: white occurs only in a limited degree.

It is very remarkable that, as far as is known, one species only, the

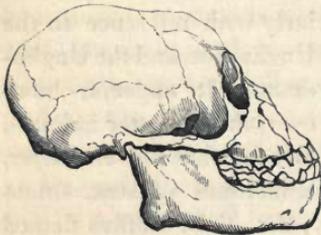
* It is interesting to find a recurrence of this character in the tree-climbing Phalangers of Australia. The syndactylous group of birds (Kingfishers, Todies, &c.) also present an analogous conformation; but in these the outermost or middle of the three anterior toes are thus conjoined.

Siamang, has the larynx furnished with a sacculus. This point, however, must not be insisted on; our acquaintance with the anatomy of these animals being but partial. There are no cheek-pouches.

In all the individuals yet examined (viz., the *H. leuciscus*, by Camper; the *S. Lar*, by Daubenton, see Buffon, xiv., pl. iv. p. 108; and the *H. agilis*, by Mr. Yarrell, see *Zool. Journal*, vol. v. for 1835; the *H. Hoolock*, and *H. concolor*), the vermiform appendix to the cæcum was present.

In their osseous structure the Gibbons resemble the Orang, excepting that the bones are more slender, and the skull is of a different form, comparatively smaller, and of a less solid construction. The cranium (fig. 273) is somewhat of an oval figure; the forehead retreats, almost as in the Chimpanzee, but the supra-orbital ridge is not prominent, as in that animal;

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Skull of Gibbon.

nor does the skull exhibit the elevated crests so remarkable in the Great Pongo. The occipital portion of the cranium is far more voluminous than the frontal, which is both low and narrow. The orbits are very large, with a prominent margin; and the interorbital space is depressed and broad, averaging half an inch, and throwing the orbits apart, so that their outer margin projects very boldly from the cranium. The nasal bone rises gently from its junction with the frontal, exhibiting an attempt at a bridge, in which respect it approaches far more nearly to the human form than it does either in the Chimpanzee or Orang. In one specimen (adult) the Author found the nasal bone partially divided by a longitudinal suture. The osseous aperture of the nares is wide and oval. The upper jaw is not large or prominent, as in the Orang; and the rami of the lower jaw are remarkably narrow, deepening at the symphysis, which is vertical (not retiring), so as to form a tolerable chin, at least, for a Monkey. The superficies of the coronoid process, indeed the whole space for the lodgment of the masseter muscle, is very inconsiderable; the posterior angle is acute, and more or less produced, instead of being rounded; the incisors are small, moderately oblique, and thick; the canines are slender, but long, especially in the males; the molars are small, with the crown broad, and bluntly tuberculate; there is no true fifth tubercle on the last molar below; the humerus is straight, or with a very slight twist; its head is large; the radius and ulna are both very long and slender; the femur is straight; the tibia arched and compressed, with an acutely-elevated anterior ridge; the fibula is very slender; the pelvis is peculiarly long and narrow; and the tuba ischii flat and rough, indicating the presence of the callous pad which covers it; the clavicles are long, and rather simply curved than sigmoid; the scapulæ are long and narrow; the ribs are

slender, and vary in number in different species. In *H. agilis*, *H. leuciscus*, and *H. syndactylus*, they consist of thirteen pairs (seven true, six false); in *H. Lar*, of twelve pairs; in *H. concolor*, of fourteen pairs. The number of vertebræ in the latter are stated, by Dr. Harlan, as follow: cervical, seven; dorsal, fourteen; lumbar, five; sacral, five; coccygeal, five. Daubenton gives the vertebræ of the *H. Lar* as, cervical, seven; dorsal, twelve; lumbar, six; sacral, three; coccygeal, three: he states, also, that the carpus consists of eleven bones,—four in the first rank, four in the second, and three supernumerary.

Though the Greek words, κείπος or κηβος (in Latin, *cebus* or *cephus*), are, undoubtedly, the origin of the modern terms, *Guibon*, or *Gibbon*, we have no reason to believe that they indicated the animals which are now intended.* With respect to the *Choromandæ* and *Scyritæ*, described by Pliny, upon the authority of Tauron and Megasthenes, and which are said to have inhabited India,† we can form but a very superficial judgment: they are called people; and the last, moreover, are a people among the nomadic Indians, “gentem inter nomados Indos.” Other people, also, are noticed; of which the men have their feet a cubit long; while those of the women are so small that they are called sparrow-footed. The *Satyri*, mentioned by Pliny, “as dwelling among the tropical mountains of India,” and which he describes as being “very swift, going indifferently on all fours or upright, having a human countenance, and not to be captured, unless enfeebled by age or sickness, on account of their velocity,” may have reference to some species of *Gibbon*, of which vague reports had travelled westward: but such passages are matters rather of curiosity than of utility: they prove nothing determinately.

Though some of the earlier navigators notice the existence of the *Gibbon*, among whom the first, in point of time, was Marco Polo, a Venetian traveller, of the thirteenth century (see *Travels of Marco Polo*, &c. translated from the Italian, with notes by W. Marsden, F. R. S. London: 1818), it is only lately that we have gained a satisfactory knowledge of the animals to which this term, *Gibbon*, is restricted.

The first accredited account is that by Buffon; the fourteenth volume of whose *Natural History*, in 1766, contains a description of two *Gibbons*; namely, the “*Grand Gibbon*,” and the “*Petit Gibbon*,” accompanied by figures of the animals, and, also, of the skeleton and viscera of the former, which was dissected by Daubenton. This animal, it cannot be doubted, is the *Lar* of Linnæus, and the *Simia longimana* of Schreber. In the fifty-ninth volume of the *Philosophical Transactions*, for 1769, De

* Dalechamp, in his notes on Pliny, says that Strabo (lib. xv.) has designated the *Cephus* by the word κείπος; and adds: “Il me paroit que le *Cebus* des Grecs, et le *Cephus* de Pline, qu'on doit prononcer *Kebus* et *Kephus*, pourroient bien venir originairement de *Koph* ou *Kophin*, qui en Hèbreu et en Chaldéen est le nom du *Singe*.”

† Plinii *Hist. Nat.* lib. vii. cap. ii.

Visme described and figured a Gibbon, regarded by most naturalists as the Hoolock ; but the details are so meagre, and the figures so bad, that it is impossible to identify the species with any degree of certainty. To this brief list the celebrated Camper added the *H. leuciscus*, or Wou-wou, as he terms it ; of which he published an account, both descriptive and anatomical.

Such, then, to the close of the eighteenth century, was the extent of the information possessed regarding these animals. Within the last few years, however, our knowledge of the Gibbons, in consequence of our continued intercourse with Borneo, Sumatra, and Java, has greatly increased. The Siamang, the Ungka-puti, and Ungka-etam (the two latter being varieties of one species, according to Müller) are due to the researches of the late Sir T. S. Raffles : the *H. concolor* rests on the description published by Dr. Harlan, of Philadelphia, who, also, redescribed the Hoolock ; and two species (in 1839 and 1840) have been added to the list by Mr. Ogilby. The Gibbons inhabit, respectively, Malacca and Siam, Assam, and the islands of Borneo, Sumatra and Java ; the species being restricted each to their exclusive province or island. It has not been ascertained that any inhabit continental India within the Ganges. That described by Buffon was, indeed, brought, as is stated, from Pondicherry ; but was, most probably, conveyed there from Malacca, of which the Lar is known to be a native. Mr. Ogilby, however, in his work on "Monkeys, Lemurs, and Opossums," states, that he has been informed, by "an Indian officer of high rank and celebrity, that there is, unquestionably, a real Ape (probably the Lar) in the forests of the Malabar coast : he had often heard the natives speak of it, and not unfrequently heard its cry, woo-woo, in the woods, though he had never actually seen it." If the Lar be, indeed, found in Malabar, its residence, also, on the Coromandel coast, where Pondicherry is situated, will then appear to be very probable ; and, in this case, its range of habitat will be more extensive than that of any other Gibbon.

Pre-eminently qualified for arboreal habits, and displaying among the branches amazing activity, the Gibbons are not so awkward or embarrassed on a level surface as might be imagined : they walk erect, with a waddling or unsteady gait, but at a quick pace ; the equilibrium of the body requiring to be perpetually kept up, either by touching the ground with the knuckles, first on one side, then on the other, or by uplifting the arms, so as thus to poise it. As with the Chimpanzee, the whole of the narrow, long sole of the foot is placed upon the ground at once, and raised at once, without any elasticity of step ; the short legs have the crooked contour noticed both in the Chimpanzee and Orang. It is, however, in the trees that they are seen to the most advantage : there, free and unembarrassed, they appear almost to fly from bough to bough, and assume in their gambols every imaginable attitude : hanging by their long arms, they

swing themselves forward, with admirable facility, seizing, in their rapid launch, the branch at which they aimed; they throw themselves from a higher to a lower perch with consummate address, and again ascend to the loftiest with bird-like rapidity. In all these movements, their long arms are of the utmost advantage; and it is to these, rather than the lower extremities, that they trust, in all their feats of agility, and in all their arboreal evolutions. In their ordinary mode of arboreal progression, they launch themselves from bough to bough, swinging, by the hands, from each in succession, without calling the feet into play, until they choose to rest, when, by a quick, abrupt movement, they draw the body up, seize the branch with their feet, and rest on the callosities. Still, there is much in the economy of these animals which is imperfectly known.

M. Duvaucel (see *Hist. Nat. des Mamm.* by M. Fred. Cuvier) states, that the Siamang is gregarious, and that each troop is conducted by a chief, whom the Malays believe to be invulnerable. They salute the rising and the setting sun with the most terrific cries, which may be heard at the distance of several miles; and which, when near, stun, if they do not frighten. This is the morning call of the mountain Malays; but to the inhabitants of the towns, visiting the country, it is an insupportable annoyance. During the daytime, however, by way of amends, they preserve a profound silence, unless disturbed in their sleep or repose. They are, farthermore, stated, by the same authority, to be extremely vigilant, and to possess a most acute sense of hearing; but to want courage, activity, address, and intelligence. The latter part of this account is somewhat questionable, seeing that it is contradicted by other parts of the statement; which, besides attributing to them habits of vigilance, represents the maternal care and solicitude of the females for their offspring as "so tender and refined, that one would be almost tempted to attribute the sentiment to a rational rather than to an instinctive process." Moreover, Mr. George Bennett (see *Wanderings in New South Wales, &c.* vol. ii. p. 142, *et seq.* London: 1834) describes a Siamang (*H. syndactylus*), which he possessed, as exciting the astonishment and admiration of the crew, by his extraordinary agility. His intelligence was no less remarkable than his activity; and his playfulness and merry antics rendered him the universal favourite of the ship's company.

Sir T. S. Raffles, in his account of the Siamang, states it to be bold and powerful, but docile and affectionate. Gentleness, intelligence, and docility may be regarded, indeed, as characteristic of the Gibbons generally. Most appear to live in troops, or families; the Ungka-puti is said to live in isolated couples; and to be so active as to escape, with the rapidity of a bird upon the wing, from danger; taking leaps, or, rather, swings, of forty feet and upwards among the branches. Excepting the Siamang, which, according to Sir T. S. Raffles, is bold and powerful, the

Gibbons, and especially the Ungka-etam and the Ungka-puti, are timid; but, in captivity, they soon become familiar. All utter discordant, guttural cries, resembling the term, Wou-wou, which is the name given, according to Duvaucel, by the natives of Sumatra to the Ungka-puti (*Hylobates agilis*), but which is rather of general than specific signification. Camper has appropriated it to the *Hylobates leuciscus*. According to Dr. Müller, the Gibbons live in mountain districts, where their range is limited by the forests of fig-trees; beyond which they do not ascend. They are commonly found in little troops, on the brows of the hills; but as soon as they ascertain the presence of Man, they disappear, in a few moments, among the dense woods of the valleys: some appear to inhabit the tops of the trees, never coming down to the ground, but traversing the forest by springing from tree to tree in their passage. Their cry is loud, and may be often heard resounding through the mighty woods, and re-echoed in the grottoes of their wild and solitary territories.

THE SIAMANG GIBBON.

HYLOBATES SYNDACTYLUS. (*Hylobates syndactylus*, F. CUVIER, Dict. Sci. Nat. xxxvi. 287.)

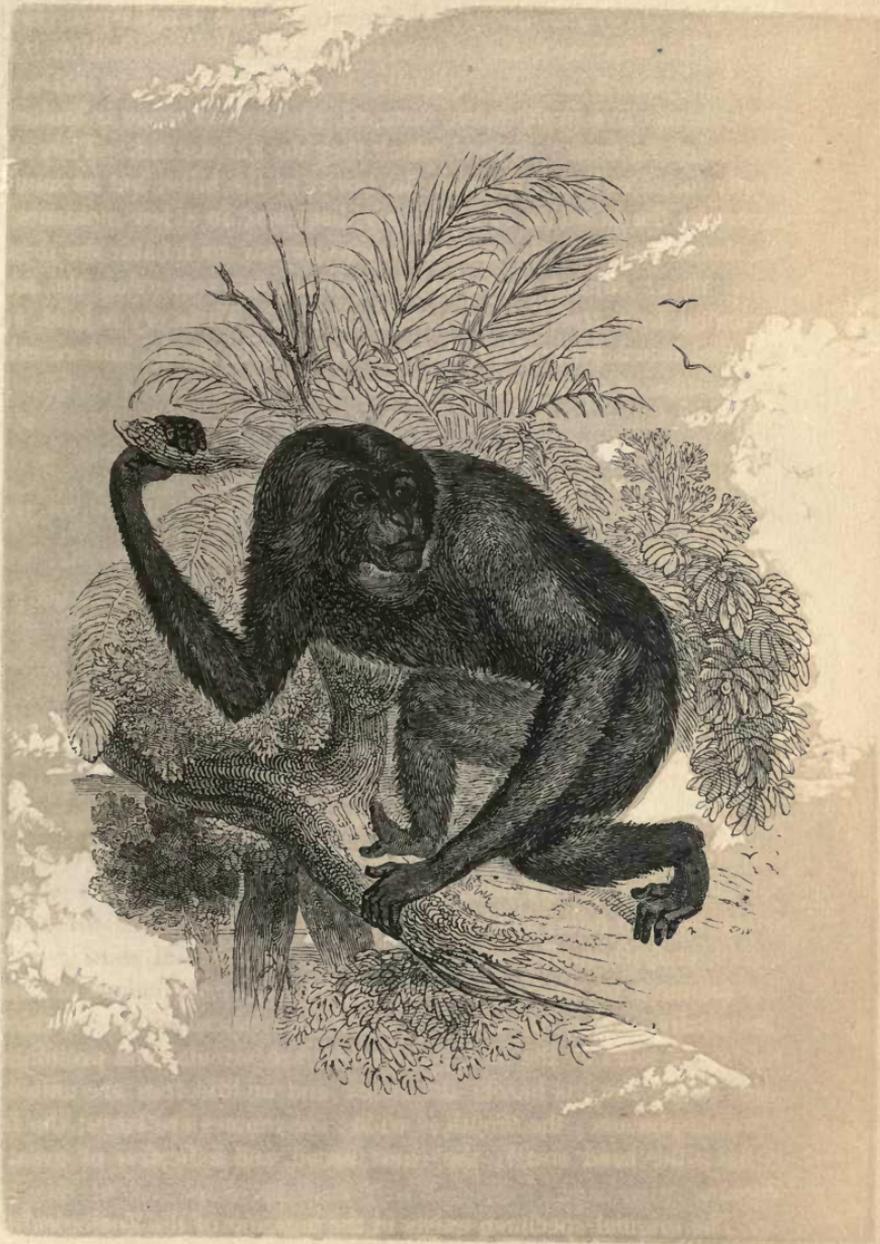
- Hylobates syndactylus* LESSON, Species des Mamm. p. 50. 1820.
Pithecus syndactylus DESMAREST, Mamm. Suppl. 531. 1822.
Simia syndactyla Siamang of Malays, RAFFLES, in Linn. Trans. xiii. p. 241. 1822.
Simia syndactyla HORSEFIELD, Zool. Res. No. 3, fig. 3. 1824.
Simia syndactyla FISCHER, Syn. Mamm. p. 11. 1829.
Hylobates syndactyla Appendix to Life of Sir T. S. RAFFLES. 1830.
Hylobates syndactylus GEOFFROY, Cours d'Hist. Nat.

SPECIFIC CHARACTERS.—Body robust; fur woolly, black; first and second fingers of the feet united together, to the last joint; laryngeal sac.

LOCALITY.—Sumatra.

DESCRIPTION.—The general colour is deep black; the fur is deep, full, and woolly; on the chest and abdomen it is scanty; the face is nearly naked, exhibiting only short, close, thinly scattered hairs, of a white colour, which become fuller and longer on the chin. The huge throat-pouch is naked, and, when distended, the skin is smooth and shining, as if oily; the mammæ of the females naked, and large; the colour of the skin is universally black; the ears are small, and concealed by the thick, deep fur on the sides of the head; the orbits are circular and prominent; the eyes sunk; the iris hazel; the index and middle toes are united to the ultimate phalanx; the mouth is wide; the canines are large; the forehead is flat; the head small; the chest broad, and indicative of great bodily vigour.

The original specimen exists in the museum of the Zoological Society, London; others, from Sir T. S. Raffles, exist in the British Museum, the museum of the East India Company, and in the Musée du Roi, Paris.



THE SIAMANG GIBBON.

(*Hylobates syndactylus*. F. Cuv.)

Sir T. Stamford Raffles describes an individual of this species, in his possession, as having been upwards of three feet in height, robust, and muscular. Dr. Horsfield gives the following as admeasurements of the largest of the three specimens in the collection at the East India Company's museum :

Height	ft. in.
Length of upper extremity	3 2
Ditto lower extremity	2 8½
	1 10

Of an adult male and female, in the Parisian Museum, the female, which was somewhat larger than the male, measures three feet in height; the length of the upper extremity being two feet five inches, of which the hand, from the wrist-joint to the end of the middle finger, measures six inches.

GENERAL HISTORY.—The Siamang is the largest of the Gibbons; it has the index and middle toes the most completely syndactyle; and it approaches the Orang in the possession of a laryngeal pouch, which, though of great volume, is single; whereas it is double in the Orang. Of the use of this apparatus little is definitely known: it has been supposed to influence the intonation of the voice; and Mr. George Bennett (*Wanderings, &c.* vol. ii. p. 151) observes, that when the individual in his possession was irritated, he inflated the pouch, uttering a hollow, barking noise, the lips being at the same time pursed out, and the air driven into the sac, while the lower jaw was also a little protruded. M. Duvaucel most probably alludes to this noise, when he describes the Siamang as rousing occasionally from its lethargy to utter a disagreeable cry, approaching in sound to that of a turkey-cock, and which, as he takes upon himself to say, expresses no sentiment, declares no wants, and, in fact, means nothing. Mr. Bennett noticed that the inflation of the pouch was not confined to an expression of anger; but occurred, also, when the animal was pleased, and when it was yawning; and that, in all instances (except when excited by anger), it would gradually empty the sac, as if it derived a pleasure from the action. When the sac was distended, pressure on it, so as to force the air contained within it into the mouth, produced no sign of annoyance.

The Siamang is exclusively a native of Sumatra, in the forests of which it is very abundant, especially in the neighbourhood of Bencoolen, where it congregates in large troops, which make the woods resound with their loud, discordant yells. Of the intelligence, qualities, and habits of this animal, we have the most contradictory statements. M. Duvaucel, who says that he had frequent opportunities of observing it, both in a wild state and in captivity, asserts (see *Hist. Nat. des Mammif.* by F. Cuvier) that it is slow, inanimate, and destitute of activity and confidence among the trees; and that, when surprised on the ground, it is so overwhelmed by

fear as to be incapable of resistance ; that stupidity, sluggishness, and awkwardness are its prominent characters, unmodified during captivity ; and that even its gentleness and submission are rather the result of extreme apathy than confidence ; that all its senses are dull and imperfect, nothing being regarded with interest ; good or bad treatment being alike received with insensibility ; while gratitude and revenge are both alien to its nature : in short, that its days are passed in lethargic repose, as, seated on its hams, with its long arms twined round it, it buries its head between its legs ; that hunger scarcely rouses it, and its very food is received with indifference. Strangely inconsistent, however, with the foregoing character, is his account of its extreme vigilance and acuteness of hearing ; and of the affection of the mothers for their young :—If a young one be wounded, the mother, who either carries it, or follows it closely, remains with it, utters the most lamentable cries, and rushes upon the enemy with open mouth and extended arms ; but, being unfitted for combat, knows neither how to deal nor shun a blow. It is not only in moments of danger that this affection is displayed. “ It is,” says Duvaucel, “ a curious and interesting spectacle, which a little precaution has sometimes enabled me to witness, to see the females carry their young ones to the water, and there wash their faces, in spite of their childish outcries, bestowing a degree of time and care upon their cleanliness, which, in many cases, the children of our own species might envy.” He also relates, that, according to the Malays, the young are nursed and carried respectively by adults of their own sex ; and, also, that the Siamang frequently becomes the prey of the Tiger, under the influence of that sort of fascination which Snakes are said to exercise over birds, Squirrels, and other small animals.

Sir Thomas Stamford Raffles, who kept several individuals of this species in captivity, describes the Siamang as bold and powerful, but easily domesticated ; gentle, and so confident and sociable, as to be “ never happy but when allowed to be in company with some one.”

The interesting account of an individual, by Mr. George Bennett, to which reference has been previously made, gives us a still more favourable impression of the disposition and intelligence of the animal. The substance of his narrative is as follows. The individual in question, a male, was procured at Singapore, 1830, having been brought to that place by a Malay lad, in a proa, from the Menangkabau country, in the interior of Sumatra. He was young, only two feet four inches in height, and covered with beautiful jet black, coarse hair. The form of the feet and hands gave them great prehensile power ; but he was not able to take up small objects with facility, on account of the disproportion of the size of the thumb to the fingers. The metacarpal bone of the thumb had the mobility of a first joint.* His common position, when at rest, was squatting, with his arms

* It has been already said, that it wants the power of antagonizing with the fingers.

crossed before his breast, his hands placed at the back of his neck, and his head bowed but a little forward: he slept lying at full length, and, indifferently, on his side or back: he walked erect, without effort, but with a waddling gait, sometimes with his arms hanging down, and occasionally assisting his progression with his knuckles; but more frequently with them thrown upward, ready to catch at a rope, or any object, by means of which he might, in a moment, climb out of the reach of fancied danger: in treading, he stretched the thumbs of the hinder hands to a right angle with the soles. The adroitness and rapidity of his movements, the variety of attitudes into which he threw himself, when climbing about the rigging of the vessel in which he was brought from Singapore, and the vigour and prehensile power of his limbs, indicated his adaptation to the branches of the forest: he would pass, for instance, down the backstays of the ship, sometimes hanging by his hands, sometimes walking down them in the erect posture, like a rope-dancer, balancing himself by his long arms; and, at other times, he would spring from one rope to another at a long distance, or drop from a higher to a lower rope, with great address. His disposition was gentle, but lively and animated; and he delighted in playing frolics. With a little Papuan child, on board, he became very intimate: they might be often seen sitting near the capstan, the animal with his long arm round her neck, lovingly eating biscuit together. In his gambols with the child, he would roll on deck with her, as if in mock combat, pushing with his feet (in which action he possessed great muscular power), his long arms entwined round her, and pretend to bite: sometimes, seizing a rope, he would swing toward her, and, when attempts were made to secure him, would elude the grasp by swinging away: he would often, also, drop suddenly on her from the ropes aloft, and then engage in various playful antics. With the Monkeys on board he also seemed desirous of establishing amicable companionship, evidently wishing to join them in their gambols; but, as they avoided his company, probably from fear, he revenged their unsociableness by teasing them, and pulling them by the tail, at every opportunity. He possessed the same gravity of appearance as the rest of the Apes; but was far more active than any of them, though equally deficient in the love of mischief. He soon learned his name, and would, when called by it, readily approach those whom he knew. He was so exceedingly engaging, that he speedily became a general favourite; yet he formed an attachment for three grown persons only on board: to these it was as strong as it had previously been for the Malay boy, from whom he had been purchased. With all his liveliness and engaging qualities, his temper was extremely irritable; and, when refused anything, disappointed, or confined, he would indulge in fits of anger, which he manifested by screams; or he would lie on the deck, roll about, throw his arms and legs in various directions, dash everything aside that might be within his reach, walk hurriedly, repeat the same scene

over and over again, uttering deep, guttural sounds, expressive of his feelings: nor when his rage was over, did he always abandon his purpose; but sometimes had recourse to stratagem, when his violence was of no avail.

Among his modes of amusement, displaying both strength and agility, it is mentioned, that he would frequently hang from a rope by one arm, and, thus suspended, writhe and twist about, with his eyes shut,—so as to represent a person hanging, and in the agonies of death.

The picture thus given delineates anything but apathy or sluggishness. Mr. Bennett expressly notices, as an instance of his curiosity, which novel objects always excited, that when a ship was spoken with at sea, he would invariably mount up the rigging, in order to command a good view of the vessel; and sometimes take up his position on the peak halyards, just under the flag, and there remain, gazing after the departing ship, until she was out of sight; when he would descend to the deck, and resume his accustomed sports.

The following instance of his intelligence is, also, narrated. It would appear, that he had a peculiar inclination for disarranging articles in the cabin; and, among these articles, a piece of soap would especially attract his notice; and that, for the removal of this, he had been once or twice scolded. One morning Mr. Bennett was writing, the Ape being present, in the cabin; when, casting his eyes towards the animal, he observed him taking the soap. "I watched him," adds the narrator, "without his perceiving that I did so: he occasionally would cast a furtive glance toward the place where I sat. I pretended to write; he, seeing me busily occupied, took the soap, and moved away with it in his paw. When he had walked half the length of the cabin, I spoke quietly, without frightening him. The instant he found I saw him, he walked back again, and deposited the soap nearly in the same place from whence he had taken it;" thus betraying, both by his first and last actions, a consciousness of having done wrong.

With respect to food, the individual in question gave preference to a vegetable aliment, as rice, plantains, &c. He was ravenously fond of carrots; on the appearance of which his usual placidity was lost in his eager desire for them. A portion of carrot would attract him from one end of the table to the other; over which he would walk, without disturbing a single article, although the ship was rolling at the time; so admirably could he maintain his balance. He would drink tea, coffee, or chocolate, but neither wine nor spirits. Animal food was not altogether rejected; and of this he preferred fowl. On one occasion, a lizard, which was caught on board, was placed before him, when he seized the reptile instantly in his paw, and greedily devoured it. It is not improbable that reptiles, small birds, &c. may form a portion of the

food of the Siamang in his wild condition. Sweetmeats of all kinds, and also onions, though their acridity caused him to sneeze, and loll out his tongue, were sought after and eaten with great satisfaction. His method of drinking was awkward and wasteful: he first applied his lips to the liquid, and then threw his head up; which action, Mr. Bennett considers, may be occasioned by the prominence of the lower jaw; but if the vessel were shallow, he only dipped in his hand, and held it over his mouth, for the liquid to drop between his lips. When tea or coffee was given to him, the tongue was carefully protruded, for the purpose of ascertaining its temperature.

This interesting individual died on nearing our shores, from the effects of disease induced by cold east winds, to the regret of all the crew. In comparing the account of the habits of this animal, as detailed, on the one part, by Sir T. S. Raffles, and, more particularly, by Mr. G. Bennett, with that, on the other, given by M. Duvaucel, there is some difficulty in reconciling their direct opposition. There is, indeed, reason for suspecting that the latter naturalist has done the Siamang some wrong, as his own details are contradictory in themselves.

THE AGILE GIBBON.

HYLOBATES AGILIS. (*Hylobates agilis*, F. CUVIER, Mamm. lith. liv. 32. c. fig. male and female. Sept. 1821.)

- Ungka-puti* RAFFLES, Linn. Trans. vol. xiii. p. 242. 1822.
Ungka-etam RAFFLES, Linn. Trans. vol. xiii. p. 242. 1822.
Pithecus agilis DESMAREST, Mamm. Supp. p. 523. 1822.
Oungka, Hylobates Lar F. CUVIER, Mamm. lith. June, 1824.
Simia Lar VIGORS and HORSEFIELD, Zool. Journal, vol. iv. p. 106. 1828.
Hylobates Rafflesii GEOFFROY, Cours d'Hist. Nat. Lect. 7. 1828.
Hylobates variegatus MULLER, Over der Zoogdieren van den Indischen Archipel. 1840.

SPECIFIC CHARACTERS.—Fur full and soft, varying in colour from black or grey-black to pale flaxen brown; the loins and lower part of the back always paler than the rest; the chest and abdomen dark; superciliary stripe white or whitish; whiskers and beard sometimes white, or of a flaxen colour.

LOCALITY.—Sumatra.

The confusion in which the present species has been involved, renders the following observations absolutely unavoidable.

Sir T. S. Raffles brought, among other Simiæ, to Europe, from Sumatra, what he regarded as two species of Gibbon, respectively called Ungka-puti, or *Hylobates agilis*, and Ungka-etam; which latter was referred, by himself, and also by Messrs. Vigors and Horsefield, to the *Simia Lar* of Gmelin, as well as by Fred. Cuvier:* subsequently, its

* Lesson, in his *Manuel de Mammalogie*, 1827, observes, that the *Hylobates agilis* of Fred. Cuvier is the *Simia Lar* of Sir T. S. Raffles,—an assertion utterly unfounded: for Sir T. S. Raffles accurately distinguishes between this animal, his Ungka-puti, and that termed Ungka-etam; which latter, and not the Ungka-puti, this accomplished naturalist regarded as the *Simia Lar*,—a point in which he was, undoubtedly, mistaken. Geoffroy St. Hilaire, in his *Cours d'Histoire Nat. des Mammifères*,

distinctness was pointed out by M. Geoffroy, who, in compliment to Sir T. S. Raffles, termed it *H. Rafflesii*; and under this title it appears in the *Natural History of Monkeys, Lemurs, and Opossums*, by Mr. Ogilby; part i. p. 172. More recent observations, however, tend to prove that this title cannot be sustained, and that the Ungka-etam is only a dark variety of the Ungka-puti.

M. Müller, whose opportunities of investigating the characters of the Gibbons, in their native regions, were almost unlimited, and whose judgment is entitled to our confidence, distinctly and positively asserts their identity; though he gives to them the specific title of *Hylobates variegatus*, under the impression (also entertained by other naturalists) that they are both referable to the Petit Gibbon of Buffon (*Hist. Nat.* xiv.), which is the *Hylobates variegatus* of Kuhl. The *H. variegatus*, however, as will be more fully stated (see *H. Lar.*), is really a young and pale variety of the *H. Lar.* "Of the five distinct species," observes Müller, "known at this moment, four inhabit the occidental regions of the Indian Archipelago, where each species is limited to its exclusive island: thus, we have only found *H. syndactylus* and *H. variegatus* (*H. agilis*) in Sumatra; but, if it be possible to believe what is said by other authors, the *H. variegatus* inhabits also Malacca: but that requires confirmation. The *H. leuciscus* is found only in Java; and *H. concolor*, in Borneo." His observation, "the *H. variegatus* should be found in Malacca," shews, at once, that he confounded his species with one totally distinct. This, then, on reading the following valuable note, must be borne in mind: "The *H. agilis* of F. Cuvier, and *H. Rafflesii* of Geoffroy, are, undoubtedly, synonyms of *H. variegatus* of Kuhl; and most of the descriptions lately given of *H. Lar.* have relation to the black variety of this species; being the Oengko-itam of the Malays, which Sir. T. S. Raffles has erroneously taken for the *Lar* of Gmelin. The proper *Lar*, or Great Gibbon, of Buffon (*S. longimana*, Schreber), has been, on the other hand, described by Messrs. Vigors and Horsfield under a new name, *S. albimana*. The last-named species (*S. longimana*) is only observed on the continent of India, in the neighbourhood of Malacca and Siam, where it appears to be common."

In reference to the colour of the agile Gibbon, the author already quoted states, that it is curious to observe its numerous variations. "Two

regards the Ungka-puti as identical with the Petit Gibbon of Buffon, the *H. variegatus* of Desmarest. This is certainly not the case. Whether the Petit Gibbon, or *Hylobates*, be separable or not from the *H. Lar.*, is another question: at all events, it is distinct from *H. agilis*.

The term, Wou-wou, which is of general rather than specific import, has been given by Camper, in a restricted sense, to a Gibbon described by himself, the *H. leuciscus*; but F. Cuvier has applied the same term to the present species (*H. agilis*), on the authority of M. Duvaucel, as being its native name; considering it identical with the animal described by Camper. With regard to the term, Wou-wou, it would be better to drop it altogether: it is a word of common, and not specific, import.

individuals are never precisely the same; and we were disposed, therefore, to conclude, during the early part of our stay at Sumatra, that there were really different species of what, as it proved, is but one, *Hylobates*; for it was only after the examination of individuals of different colours, and after we had killed many of both sexes, and various ages, that we came to the conclusion, that the *Oengko-itam*, or black *Oengko*, and the *Oengko-poetih*, or white *Oengko*, of the Malaysans, were the same species. Of the great number of skins which we collected, fifteen have been displayed in the Museum of Leyden, all differing, more or less, in colour: for example, this beautiful series, containing individuals of different ages and sexes, includes some of a yellowish white colour, others of a brownish yellow, and others quite black: and it is from this variation that some naturalists of Europe have been induced to assign to them the rank of distinct species, thereby producing much confusion."

"In all the individuals, whether of light or dark colour, that we examined, we invariably found the following characters; viz., a white stripe across the forehead, or brow: many of the males, likewise, having the sides of the face and the throat white: in black subjects, the lumbar region and crupper are always of a paler colour than the other parts of the body, and are usually of a rusty or pale yellowish brown: in the pale individuals, which have a yellowish, or brownish-yellow colour, the throat, the chest, and the abdomen are of a darker brown, as are, sometimes, the hands also. It is interesting to find that the yellowish females frequently produce black young; and the black, as often, young of a pale colour."

To this account, by M. Müller, it may be added, that a beautiful straw-white specimen (7. c in Catalogue, 1838) is preserved in the museum of the Zoological Society, London.

Having thus pointed out the specific identity between the *Ungka-puti* and the *Ungka-etam*, it remains to fill up the account by a description of the characters, which a few individuals of each variety present, drawn from an examination of specimens in different museums.

VARIETY: UNGKA-PUTI.—The orbits are prominent, the eyes sunk; the index and middle toes are united together at the base; the fur is soft, deep, and woolly, being of a finer texture than that of the *Siamang*; the hair of the head is inclined back from the forehead; that of the fore-arm is directed forward, not reverted; the general colour of the head, back, and outer aspect of the extremities, is flaxen, somewhat tinted with brown, and passing into a pale yellowish white on the crupper; the chest, the abdomen, and the axillæ are of a dark umber brown; as are also the arms and thighs internally, and the hands and feet, though less intensely; an indefinite superciliary line, and the whiskers, which are full in the male, are white; the hairs of the eyebrows are black; a few reddish hairs are scattered around the ischiatic callosities.

A fine male specimen, in the museum of the Zoological Society, London, measures two feet ten inches in total length; the length of the arm and hand is two feet five inches.

In a beautiful adult female specimen of *H. agilis*, examined January 7th, 1839, at the museum of the Zoological Society, the toes were not at all united. The fur of this specimen was glossy, and of a silky texture; its colour was pale golden yellow, like raw silk, deeper at the roots; a straw-white superciliary stripe passed across the forehead; the chest, abdomen, inside of the humerus and of the thighs, were pale amber brown; the back of the thighs was of a deep golden hue; length, from vertex to heel, two feet five inches.

In the Museum of Paris is a specimen of a female Gibbon, which appears to be of the variety *Ungka-puti*. Above the eyebrows, which are long and black, are perceptible indications of a pale superciliary line, and the full hair round the face is decidedly paler than that of the body; the general colour, straw-white, with a dusky brownish hue, the straw-white being purer on the back, especially at its lower part; on the throat and chest the hairs are washed with brown; the face is black, with scattered black hairs; head and body, seventeen inches and a half; hind limbs, to heel, thirteen inches; arms and hands, twenty-four inches.

According to Sir T. S. Raffles (*Linn. Trans.* xiii. p. 243), the *Ungka-puti* is from two to three feet in height, of a slender and delicate figure; covered with soft hair, somewhat woolly, and of a dull yellowish white, darkening to brown on the under and inner surfaces; the shades, however, varying much in different individuals;* the face and hands, naked and black. Messrs. Diard and Duvaucel state the face of the male to be bluish black; that of the female, to have a slight tint of brown.

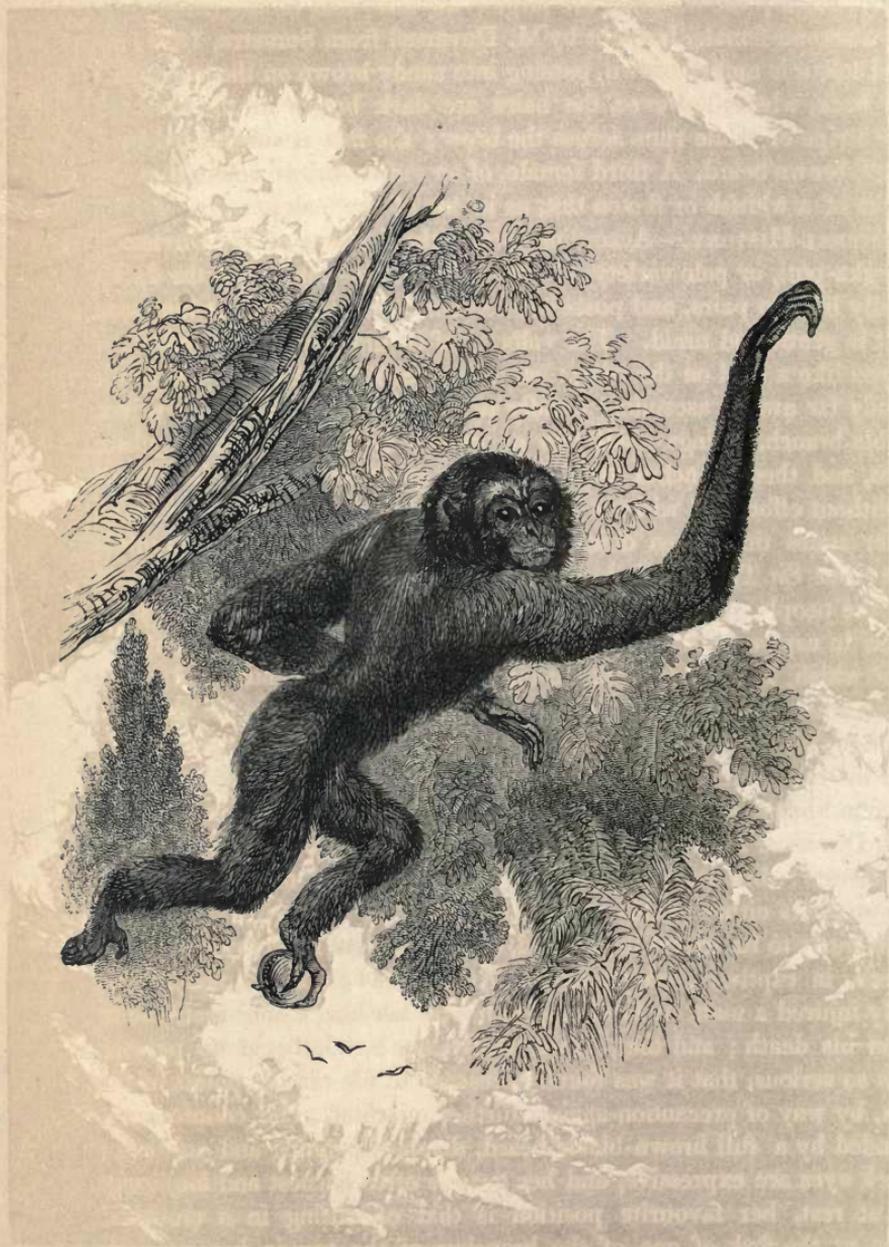
VARIETY: *UNGKA-ETAM*.—The following is the description of an adult male specimen in the Paris Museum (de Sumatra, par M. Duvaucel, 1821):—

The fur is deep, soft, close, and woolly; the general colour is black, tinged with brown, passing into a chocolate-brown on the loins (in another specimen, the loins and lower part of the back are still paler); the hands and feet are black; a superciliary band, and the whiskers, which are full and bushy, are white; the eyebrows consist of black, stiff hairs; the total length, from the head to the heel, is about two feet nine inches; the length of the arm and hand is nearly twenty-four inches.

In another male specimen, the beard is grey, with a flaxen tint.

A female specimen, in the same museum, presents the following characters: the general colour is brownish black, the brown prevailing

* "The uncertain colouring of this Ape, and the want of precise terms of expression for the various tints, prevent the possibility of giving a precise idea of it to those who have not seen the animal."—Fred. Cuv. *Mamm.*



THE AGILE GIBBON.

(*Hylobates agilis*. F. Cuv.)

on the lower half of the back ; a narrow white line, almost obsolete over the nose, runs across the brow ; the hands are gradually, and the feet abruptly, black ; the mammæ are large ; the size, that of the male.

In a second female, brought by M. Duvaucel from Sumatra, 1821, the general colour is umber brown, passing into sandy brown on the lower part of the back, where, however, the hairs are dark brown at the roots ; a narrow stripe of white runs across the brow ; the face is surrounded by a full, soft, brown beard. A third female, of an umber-brown colour, has the whiskers of a whitish or flaxen tint, as in one of the males.

GENERAL HISTORY.—According to the observations of M. Duvaucel, the Ungka-puti, or pale variety, of this species, is far rarer than the dark : it usually lives in pairs, and possesses extraordinary activity ; at the same time, it is gentle and timid. The velocity of its movements is wonderful ; it escapes like a bird on the wing : scarcely does it perceive danger, but it is already far away : ascending rapidly to the top of a tree, it there seizes a flexible branch, swings itself two or three times, to gain the requisite impetus, and then launches itself forward, repeatedly clearing, in succession, without effort and without fatigue, spaces of forty feet. The same traveller states that, when domesticated, it does not display much intelligence : but Sir T. S. Raffles informs us, “ that it is a general belief, among the people of the country where it resides, that it will die of grief, if, when in captivity, it sees the preference given to another : in confirmation of which, I may add, that the one in my possession sickened under these circumstances, and did not recover until relieved from the cause of vexation, by his rival, the Siamang, being removed into another apartment.”

An interesting female of this species, now exhibiting (August, 1840) in London, displays such agility, power, and address, as to confirm all that M. Duvaucel has remarked respecting the activity of the animal in its native forests : but its intelligence is of a far higher order than he is willing attribute either to this or any Gibbon.

Previously to its arrival in England, this animal had lived for four years, at Macao, in captivity, where, as the Author was informed, she had so severely injured a man, by lacerating him with her long canine teeth, as to occasion his death ; and that, subsequently, she has inflicted on persons wounds so serious, that it was found necessary to file off the points of the canines, by way of precaution against further mischief. Her countenance, surrounded by a full brown-black beard, displays cunning and mistrust ; her dark eyes are expressive, and her gaze is often earnest and inquiring. When at rest, her favourite position is that of sitting in a crouched attitude, at the fork of one of the branches of the tree in her spacious apartment, so as almost to shroud herself from view ; and from this post she watches intently everything that passes around, or the motions of any person endeavouring to gain a sight of her. It is not without impatience

that she submits to discipline: she has often turned upon her keeper with every demonstration of anger, and engaged with him in a struggle for the mastery. It is almost impossible to convey in words an idea of the quickness and graceful address of her movements: they may, indeed, be termed *aërial*, as she seems merely to touch, in her progress, the branches among which she exhibits her evolutions. In these feats her hands and arms are the sole organs of locomotion; her body hanging, as if suspended by a rope, sustained by one hand (the right, for example), she launches herself, by an energetic movement, to a distant branch, which she catches with the left hand: but her hold is less than momentary; the impulse for the next launch is acquired: the branch then aimed at is attained by the right hand again, and quitted instantaneously, and so on, in alternate succession. In this manner, spaces of twelve and eighteen feet are cleared with the greatest ease, and uninterruptedly, for hours together, without the slightest appearance of fatigue being manifested: and it is evident, that if more space could be allowed, distances very greatly exceeding eighteen feet would be as easily cleared; so that Duvaucel's assertion, that he has seen these animals launch themselves from one branch to another, forty feet asunder, startling as it is, may be well credited. Sometimes, on seizing a branch in her progress, she will throw herself, by the power of one arm only, completely round it, making a revolution with such rapidity as almost to deceive the eye, and continue her progress with undiminished velocity. It is singular to observe how suddenly this Gibbon can stop, when the impetus, given by the rapidity and distance of her swinging leaps, would seem to require a gradual abatement of her movements. In the very midst of her flight a branch is seized, the body raised, and she is seen, as if by magic, quietly seated on it, grasping it with her feet. As suddenly she again throws herself into action.

The following facts will convey some notion of her dexterity and quickness. A live bird was let loose in her apartment; she marked its flight, made a long swing to a distant branch, caught the bird with one hand in her passage, and attained the branch with her other hand; her aim, both at the bird and the branch, being as successful as if one object only had engaged her attention. It may be added, that she instantly bit off the head of the bird, picked its feathers, and then threw it down, without attempting to eat it.

On another occasion, this animal swung herself from a perch, across a passage, at least twelve feet wide, against a window, which it was thought would be immediately broken; but not so: to the surprise of all, she caught the narrow frame-work between two panes with her hand, in an instant attained the proper impetus, and sprang back again to the cage she left—a feat requiring, not only great strength, but the nicest precision. She is fond of fruit, and often displays her dexterity in

catching apples or plums, purposely thrown at her : however quickly they may be propelled by a vigorous arm, and although pretended throws may be made, to deceive or balk her, she never fails to catch the fruit, and that almost without an effort.

Toward men, this animal is reserved ; and it is only by degrees that she becomes familiar with them : she is much less distrustful towards females, and seems greatly to prefer their presence. It is not unlikely that circumstances subsequent to her capture may have caused this peculiarity of disposition. This aversion to men has not been observed in any of the Gibbons living in the menagerie of the Zoological Society of London ; and, in this instance, it is undoubtedly the effect of severe treatment by those who, at some period, have had the care of her.

The voice of this Gibbon is extraordinary, not only for its power and volume, but for the succession of graduated tones in which its cry is uttered. In a room, it is overpowering and deafening : it consists of a repetition of the syllables oo-ah, oo-ah, at first distinctly repeated, and ascending in the scale, but at last ending in a shake, consisting of a quick vibratory series of descending notes, during which the whole of the animal's frame quivers with the effort to produce them : after this, she appears to be greatly excited, and violently shakes the netting or the branch to which she may be clinging ; which action being finished, she again traverses her cage, uttering the preliminary syllables oo-ah, oo-ah, till the shake again concludes the series. It is principally in the morning that the animal thus exerts this modulated cry, which is, probably, its natural call to its mate, and which, from its strength, is well calculated for resounding through the vast forests. The following observations on the voice of this animal were obligingly presented to the Author, by Mr. Waterhouse :—

“ I should endeavour to give an idea of the whooping of the Gibbon (as far as the music is concerned, but not as regards the quality of sound), by comparing it to the tuning of a harp ; first beginning with an E string, and repeating it at short intervals ; then being altogether silent for a little time, and then beginning again ; next, two strings, as it were, are struck, E and E sharp (or F natural) : the second string is then screwed up, by half-notes, until it reaches the octave ; the E and F natural, E and F sharp, E and G natural, &c., being struck nearly together. It must be observed, that, before the upper note arrives at the octave, the animal amuses herself by occasionally descending a few semitones, then ascending again, and so on. But when the octave is once gained, and has been sounded a few times, we may imagine the upper string to be very rapidly let down by semitones ; the lower note remaining the same as at first, and the two strings being always struck together.* The rapidity of the

* It appears, all through this rapid chromatic passage, as if the animal emitted two notes at a time, as in the music ; but this is the effect of the rapid transition from the lower note to the upper.

descending passage is equal to that of an extremely brilliant shake. The animal then remains quiet for a short time; after which follow two barks, each composed of the low and high E, sounded nearly together.

“It appeared to me that, in ascending and descending the scale, the intervals were always exactly half-tones; and I am sure that the highest note was the exact octave to the lowest. In this passage the lips were engaged, and rapidly vibrated during its execution.

“The quality of the notes is very musical; and I do not doubt that a good violinist would be able to give a correct idea of the Gibbon’s composition, excepting as regards its loudness. The Gibbon’s voice is, certainly, much more powerful than that of any singer I ever heard.

“One more fact I noticed, viz., that the Gibbon is usually a long time before she comes to the rapidly-descending passage; but when she has given it once, she soon runs through the preliminary part of her composition, and again comes to the descending passage.”

Allegretto. Accelerando. Crescendo.

Prestissimo.

The image shows two staves of musical notation. The first staff is a treble clef with a key signature of one sharp (F#). It begins with a series of eighth notes ascending a scale, marked 'Allegretto'. This is followed by a series of eighth notes descending a scale, marked 'Accelerando' and 'Crescendo'. The second staff continues the descending scale, marked 'Prestissimo', with many notes beamed together. The piece ends with a double bar line.

With regard to the intelligence of this Gibbon, it is, certainly, far superior to that of the lower Monkeys; though, perhaps, not so high as that of the Chimpanzee. She disengages, with judgment, the loops of a rope or chain, which, by being entangled, would impede her progress; and she ascertains the direction of each coil before attempting to untwine it, performing the task with great precision. In the apartment where she is now confined, she is not secured by a rope or chain; but a small chain hangs from a collar round her neck: as this would swing about, in her movements, and thus incommode her, she holds it with her foot, while performing her feats of agility, so as to prevent it from being agitated; and, when she rests, she throws it over a branch, or otherwise disposes it, that she may not be troubled by it. She is observant of everything: she notices the actions of those about her, and will often watch them with an appearance of interest. Slight as is the contour of this animal, her strength is very great: the muscles of the shoulders are very voluminous, and indicate the ease with which long-continued dependence from the branches is maintained. The reach of the extended arms is said to be six feet. The colour of this individual differs somewhat from



THE WHITE-HANDED GIBBON.

(Hylobates Lar.)

that of other specimens which have been noticed. The face is black; the arms, hands, and feet, together with the lower part of the back, and a line between the shoulders to the occiput, are of a greyish hue; an obscure greyish-white stripe runs over the eyes; the ears are hidden by the full whiskers, which, together with the chest, abdomen, and inner parts of the limbs, are brownish black; the toes of the feet were carefully examined, and found to be all free.

Fruits of various kinds, bread, lettuces, and eggs, compose the diet upon which the animal is fed: she is said to be partial to blades of grass also, which she will pick and eat with avidity.

THE WHITE-HANDED GIBBON.

HYLOBATES LAR.

<i>Grand Gibbon</i>	BUFFON, xiv. p. 92, c. fig. fem. t. i. 1766.
<i>Homo Lar</i>	LINNÆUS, Mantiss. Plant. Append. p. 521 1771.
<i>Simia longimana</i>	SCHREBER, Saugth. p. 66, pl. 2. fig. 1. 1775-9.
<i>Simia longimana, Grand et Petit Gibbon,</i>	ERXLEBEN, Regn. An. p. 10. 1777.
<i>Simia Lar</i>	LINNÆUS, Syst. Ed. Gmelin. 1788.
<i>Le Gibbon</i>	AUDEBERT, Fam. 1. 2. fig. 3. 1797.
<i>Pithecus Lar</i>	GEOFFROY, in Ann. du Mus. xix. 1812.
<i>Pithecus Lar</i>	DESMAREST, Mamm. 1820.
<i>Simia albimana</i>	VIGORS and HORSEFIELD, Zool. Journal, iv. p. 107. 1828.
<i>Simia Lar</i>	FISCHER, Syn. Mamm. 1829.
<i>Hylobates Lar</i>	LESSON, Species des Mamm. 1840.
<i>Petit Gibbon</i>	BUFFON, xiv. c. fig. 3. 1766.
<i>Simia Lar, β</i>	LINNÆUS, Syst. Ed. Gmelin. 1788.
<i>Pithecus variegatus</i>	GEOFFROY, Ann. du Mus. xix. p. 88. 1812.
<i>Pithecus variegatus</i>	KUHL, Beitr. 1820.
<i>Pithecus variegatus</i>	DESMAREST, Mamm. 1820.

SPECIFIC CHARACTERS.—Fur soft and woolly; colour brown, or black brown; superciliary stripe; circle round face; hands and feet white, or yellowish white; the first and second finger of foot sometimes united at the base.

LOCALITIES.—Malacca, Siam.

DESCRIPTION.—Description of an adult female, in the Musée du Roi, Paris, brought from Java by M. Diard. Hair of hands and feet close and stiff; the hands, to just above the wrist-joint, and the feet, including the ankle-joint, are abruptly white; a decided white superciliary line; the circle round the eyes is naked and brown; the rest of the face and the nose are sparingly covered with white hairs, which increase in length and thickness along the sides of the face, forming whiskers, so that, looking in front, the whole face appears encircled by a white border; the fur of the head, body, and limbs, is full, long, soft, and of a deep umber, or blackish brown, paler on the back; soles and palms black.

	ft.	in.
Length from vertex to callosities	1	5
Ditto hip-joint to heel	1	1½
Ditto top of shoulder to wrist	1	6

A second specimen, in the same Museum, is similar to the preceding.

Description of 'a specimen (female) in the possession of Mr. Gould. General colour deep uniform brown, shaded into black on the top of the head; a white line, about half an inch wide, runs over the forehead, passes down the sides of the face, and joins the whiskers and beard, which are also white; this colour extends back to the throat and sub-auricular region, where it is intermixed with pale brown hairs; eyebrows black; hands and feet yellowish white, this colour being extended on to the wrist and ankle; fur long, soft, thick, and woolly; palms and soles black; index and second toe not joined.

Total height	. . . . .	ft. in.
Length of foot	. . . . .	2 4
Ditto hand	. . . . .	0 5
		0 5½

A male specimen of *H. Lar*, adult, examined at the museum of the Zoological Society, London (January 7th, 1839), agreed with the above description, both as to colour and the disunion of the toes.

Description of a young female from Sumatra, in the Rafflesian collection of the museum of the Zoological Society, London (No. 4, in Catalogue, Mamm. &c. 1838). General colour black, assuming a brownish tinge on the crupper, chest, and abdomen; a band of white across the forehead passes round the face, extending over the chin to the throat; hands and feet white above the wrist and ankle-joints; the fur is firm, woolly, and rather short on the head; the eyebrows consist of long black hairs; ears, palms, and soles black; index and second toe united, by a broad web, to the end of the first phalanx; slight webs appearing also between the rest. Total height about two feet one inch.

Description of a young female specimen in the Musée du Roi, Paris, brought from Java by M. Diard, 1826. Face surrounded with white, which extends as far back as the ears, along the angle of the lower jaw, and over the throat. The white of the hands and feet is neither abrupt nor pure (as in the adult specimens). The general tint of the fur is dark brown, paler on the crupper, and passing into a dusky straw colour around the ischiatic callosities, where the hair is of a firm texture, and glossy. Height, twenty-eight inches.

The Author has been thus particular in the description of *Hylobates Lar*, because a pale variety (as Daubenton, Linnæus, and others conceived it to be) is now regarded, by several eminent naturalists, as distinct from it, and has been characterized under the title of *Hylobates variegatus*; the degree to which the union between the index and middle toes is respectively carried, and a difference in the intensity of general colouring, being assumed as the evidences of distinction. Now, with respect to the union of the toes in question, which is asserted to be as complete and close in *H. variegatus* as in the Siamang, it is to be observed, that, unless this character have been traced, without deviation, through a numerous series

of examples, much stress cannot be laid upon it. In *H. Lar*, the index and middle toes are said to be united by a broad web, but not carried quite throughout the whole of the first phalanx: and such is the case in the specimen in the museum of the Zoological Society, London. Out of six specimens, however, examined with particular care by Mr. Waterhouse (and which formed part of a collection sent to London for sale), one only, and that a female, had the toes united: in another female, and in four male specimens, this peculiarity was absent. Hence we are led¹ to conclude, that in *H. Lar*, at least, the union varies in degree; and its being rather more decided in the only specimen of *H. variegatus*, in which it has been observed, than in a specimen of *H. Lar*, is no proof that, therefore, the two are specifically distinct.

With regard to colour, the *H. Lar* is said to be of a deep black; the *H. variegatus* of a dirty light brown, passing on the abdomen, loins, and crupper, into dirty yellowish white (the facial circle, hands, and feet, being white in both). The "Grand Gibbon" of Buffon (brought, as he states, from Pondicherry), is, indeed, described as being black; and such may be said to be the colour of the young specimen in the Rafflesian collection of the museum of the Zoological Society (No. 4, in Catalogue, 1838); but in no other specimens which the Author has examined has this been the general colour. Of the six specimens (already referred to), examined by Mr. Waterhouse, viz., four males and two females, one was of a dirty, yellowish white colour, the hands and feet being white: in other respects it agreed with the rest, which were brown-black, with dirty-white feet and hands; but, in one male, the lower part of the back was of a very pale brown, like white-brown paper.

The specimens in the Museum at Paris are of a deep umber-brown, becoming paler on the crupper. Mr. Gould's specimen was deep brown, shaded into black only on the top of the head. In the specimen of *H. variegatus*, in the Rafflesian collection of the museum of the Zoological Society (No. 9, in Catalogue, 1838), though the tints are all lighter, their character is the same. The general hue is pale brown, becoming still paler on the crupper, but deepening, on the top of the head, into blackish brown; the arms and inferior extremities being almost as intense. The Petit Gibbon of Buffon (from Malacca), is described as having been grey, mingled with brown, and with a grey crupper. As, then, we find among acknowledged specimens of *H. Lar*, a variation in colour, from black to umber-brown, those of the latter colour having the top of the head darker, and the loins and lower part of the back paler than the general hue, it is not assuming too much, to consider specimens differing only in being of a still lighter tint, and that rather in parts than generally, to be nothing more than varieties.*

* Since writing the above, the Author has had an opportunity of examining a specimen of the *H. variegatus* (*H. Lar* var.): it was a young female. The general colour was brown, darkest on the top

The preceding views have been recently confirmed by Dr. Müller, who notices a variation in the colouring of the *H. longimanus* (*H. Lar*), similar to that which prevails in the Ungka-puti, or *H. agilis*. "The proper *Lar* or Great Gibbon of Buffon," he states, "has been described by Messrs. Vigers and Horsefield, under a new name—that of *S. albimana*. This species is only observed on the Continent of India, in the neighbourhood of Malacca and Siam, where it appears to be common. It is rather larger than the Oengko of Sumatra, and is distinguished by a more slender figure, and by longer arms. Of this species, also, individuals are found, both of a dark and of a paler hue; but those of the darker colour seem to be most common. Generally, the yellowish-white individuals, less abundant than the dark, prove to be females of this species (the true *S. longimana*, Schreber). The adult male is commonly of a dark brownish black colour, with the exception of a circle round the face; and of the hands, which are of a pale yellow-ochre tint. Generally, the aged female is coloured in the same manner; but the tint of the body is a little paler, and approaches a yellowish brown."

GENERAL HISTORY.—Of the habits and manners of the white-handed Gibbon, or *Lar*, no details have been received: it may, however, be safely presumed, that they resemble those of the agile Gibbon, and other species.

SILVERY GIBBON, OR WOU-WOU OF CAMPER.

HYLOBATES LEUCISCUS. (*Hylobates leuciscus*, KUHL, Beitr. p. 6. 1820).

<i>Wou-wou</i>	CAMPER, in Allgemeine, vaterland'sche Letteroefeningen, i. p. 18.
<i>Simia leucisca</i>	SCHREBER, Saugth. tab. iii. b. 1775.
<i>Moloch Audebert</i>	Fam. I. sec. i. fig. 2. 1797.
<i>Pithecus leuciscus</i>	GEOFFROY, in Ann. du Mus. xix. for 1812.
<i>Pithecus leuciscus</i>	DESMAREST, Mamm. p. 51. 1823.
<i>Simia leucisca</i>	FISCHER, Synops. Mamm. p. 12. 1829.

SPECIFIC CHARACTERS.—Fur long, soft, woolly; colour grey, paler on the loins; vertex dusky; a frontal stripe more or less conspicuous; and the hairs round the face whitish, or paler than the fur of the body.

LOCALITY.—Java.

DESCRIPTION.—The fur is fine, long, close, and woolly. The general colour is ashy grey, sometimes slightly tinged with brown, paler on the lower part of the back; the top of the head, and the backs of the hands

of the head, where it was nearly black, and whence it extended, a little paler, over the shoulders and upper part of the back, thence gradually fading to pale brown on the haunches and rump; the legs and arms were pale brown; the abdomen was brownish grey; a white frontal band, extended over the whiskers, at the sides of the face, and over the beard beneath the chin, but with a tinge of yellow; the hands, including the wrist and the feet, were yellowish white; the short hairs on the face were dirty white; under the chin the beard was full, but at the sides of the face rather shorter; the chin itself was only scantily clad with hair; the long superciliary hairs were black; the fur was generally paler at the base. On the top of the head the fur was rather short, wavy, or wool-like, and directed backward from the forehead. The index and second toe, but partially united, at the base of the first phalanx.

and feet are brown; the sides of the face are white, or whitish; the eyebrows, black; a superciliary stripe of white is sometimes distinguishable, as in three specimens in the Museum at Paris; one of which has the whiskers and beard white, so that the face is encircled by this colour. The soles and palms are black; all the hind toes free. An adult female, in the Paris Museum, has the top of the head washed with black; the superciliary mark is dusky white; the full whiskers round the face are whitish grey; the general colour is ashy grey, passing into a blackish brown on the chest, around the mammæ; the face is thinly covered with black hairs; on the chest the hair is thin and straight; on the rest of the body wavy, soft, full, and deep. Müller, who met with this species in Java, where he states that it is called Oa-oa, describes it as being sometimes of a darker, sometimes of a paler grey; sometimes of a yellowish, rarely of a brownish grey, with a circle of white, or light grey, round the face: in aged animals, he adds, the chest becomes of a blackish colour.

GENERAL HISTORY.—The recognition of the Silvery Gibbon, or Wou-wou, as a distinct species, is due to the celebrated anatomist, Camper; the specimen dissected by him, was brought from one of the Moluccas: in these islands it is said to haunt the tall cane jungles, among which it displays extraordinary activity.

Two specimens in the museum of the Zoological Society of London (Nos. 8 and 8 *a*), are stated, in the Catalogue of Mammalia for 1838, to have been obtained in Java. Three specimens in the Museum of Paris are said to have been brought from Sumatra by M. Diard; but they were, most probably, brought to that island from Java. It would appear that two, if not three, living individuals have, at different times, existed in England: the first of these is described by Pennant; it belonged to Lord Clive; and was lively, good-tempered, and frolicsome. In 1828, a young male existed in the menagerie of the Zoological Society of London, where, however, it soon died a victim to the influence of our uncongenial climate. The following notes respecting it have been obtained.

“The shoulders of this animal were broad, but the rest of the body was slender and short; he seemed melancholy, and very timid, generally squatting down by the fire, with his long arms and hands resting on his knees: in this position, on account of his small stature when sitting, and his dusky colour, he was frequently overlooked. He never appeared to walk erect without support: before he arose, he would stretch out his hand, and grasp some neighbouring object; and, even with such assistance, he leaned forward very much, and was obliged to stride, bend his knees, and spread out the extremities of his hinder limbs, particularly the thumbs, in order to gain a secure footing. Although usually gentle, he was rather uncertain in temper, and would, occasionally, attempt to bite a stranger. To those whom he knew, he was very affectionate, and

would cling round them for warmth and protection. The expression of his countenance was melancholy. He ate almost any vegetable substance; but apples and oranges seemed to be his favourite food. The vivacity and playfulness of the Monkeys appeared to annoy him exceedingly. When irritated by the caresses of his next neighbour, a green Monkey, he would give it a short, quick snap with his teeth, and retreat instantly to his corner. His usual cry was pensive; and, whilst uttering it, he would often turn up his large eyes towards the face of a bystander, in a most expressive manner, apparently indicative of pain, or, at least, of great uneasiness. He had two other kinds of voice:—one may be described as a sort of indistinct muttering; and the other, which he used when angry, as a quick chattering.”

THE HOOLOCK.

HYLOBATES HOOLOCK.

- Féfé of the Chinese Frontier* (?), *RECUEIL des Voyages, &c.* Rouen, vol. iii. p. 168. 1716.
Golock DE VISME, *Phil. Trans.* vol. lix. p. 72, 1769, communicated Jan. 7, 1768.
Simia Hoolock HARLAN, *Trans. of Amer. Phil. Soc.* iv. New Series, p. 52, 1830, and in *Phys. Res.* 1830.
Hylobates Scyritus OGILBY, *Proceed. Zool. Soc.* 1837, and in *Monkeys, &c.* pt. i. p. 170. 1838.
Hoolock M^CLELLAND, *Cat. of Assam Animals, Proceed. Zool. Soc.* 1839.
Hylobates Houloch LESSON, *Species des Mamm.* 1840.

SPECIFIC CHARACTERS.—Fur crisp; glossy black, with a white superciliary stripe.

LOCALITY.—Assam.

DESCRIPTION.—Description of a specimen (young female) in the museum of the Zoological Society, London (No. 5, in Catalogue of Mammalia, 1838).—Fur rigid, frizzly, shining, and of a black colour, with somewhat of a vinous tinge; a narrow band of white crosses the forehead, scarcely extending beyond the eyes, leaving the whiskers of the same black colour as the rest of the body. The hair of the fore-arms is reverted to the elbows; the hind-toes are free; the face is dusky plumbeous; the height is about two feet six inches. It was presented to the Zoological Society by the late Major-General Hardwicke, who received it from India,—probably from the Malay Peninsula.

In the intensity of the colouring of this species, at least during its immaturity, there is, probably, some degree of variation, as is the case with some of the other species, even when they have attained maturity. Dr. Harlan, to whom is owing the first distinct and accurate description (with figures of the adult, of the young, and of the cranium), observes that, in the young, the frontal band is broader than in the adults; that the general colour of the fur is blackish brown; the middle of the breast and the buttocks, greyish; and the beard, or tuft on the chin, grey; and that the backs of the hands and feet are spotted with this colour also. Three

of these animals, two of them adult males, the third a young female, all captured on the Garrow Hills, in the vicinity of the town of Goalpara, Assam, between lat. 25° and 27° north, died in the possession of Dr. Burrough, whose description of them is replete with interest. The skull of one male, the skin of the other, and that of the young female (from which Dr. Harlan's figures are taken), were deposited in the Museum of Philadelphia. The following are the admeasurements of the adult male, as given by Dr. Harlan. Total length two feet six inches.

Length of humerus	in.
Ditto radius	8 $\frac{9}{10}$
Ditto inferior extremity	9
Ditto foot	13
	6

GENERAL HISTORY.—Previously to Dr. Burrough, Col. Gordon transmitted to Professor Allamand a description of the habits of this species, which appeared in Latreille's *Buffon*, vol. xxxv. p. 140. Professor Allamand, in his additions to the Dutch translation of *Buffon*, says: "Mr. Gordon has sent me the drawing of an Orang, which the King of Assam presented to Mr. Harewood, whose brother brought it to the Cape, where it died, and Mr. Gordon made a drawing of it." The information Mr. Gordon acquired is, in substance, as follows. The animal is called Voulock in its native country: the individual in question, a female, was mild and gentle, disliked small Monkeys, walked always in the upright attitude, and could even run very fast; when walking on a table, or among China ware, she was careful not to break anything; when climbing, she used only her hands; her knees were simliar to those of Man; her cry was sharp and deafening, resembling the syllables Yaa-hoo, Yaa-hoo, with the emphasis on the last syllable. A low guttural sound expressed her feelings of content or satisfaction. Her food consisted of vegetables and milk; she refused animal food of every kind, to which she manifested great repugnance; when thirsty, she plunged her fingers into water and then licked them. She could not endure to be dressed in clothes, but, to keep herself warm, would cover herself with pieces of sail-cloth, or other materials.

Dr. Burrough, in his description, remarks, that Hoolock is the Assamese name of this Gibbon, and that a full-grown one lived in his possession from January to May. "They inhabit, more particularly, the lower hills, not being able to endure the cold of those ranges of the Garrows of more than 400 or 500 feet elevation. Their food consists, for the most part, of fruits common only to the jungle in this district of country; and they are particularly fond of the seeds and fruits of that sacred tree of India, called the peepul-tree, and which, on the Garrow hills, attains a very large size. They likewise partake of some species of grass; and also the tender twigs and leaves of the peepul and other

trees, which they chew, swallow the juice, and reject the indigestible part. They are easily tamed ; and, when first taken, shew no disposition to bite, unless provoked to anger, and, even then, manifest a reluctance to defend themselves, preferring to retreat to some corner rather than to attack their enemy: they walk erect ; and, when placed upon a floor, or in an open field, balance themselves very prettily, by raising their hand over their head, and slightly bending the arm at the wrist and elbow, and then run tolerably fast, rocking from side to side ; and, if urged to greater speed, they let fall their hands to the ground, and assist themselves forward, rather jumping than running ; still keeping the body, however, nearly erect. If they succeed in making their way to a grove of trees, they then swing, with such astonishing rapidity, from branch to branch, and from tree to tree, that they are soon lost in the jungle, or forest.

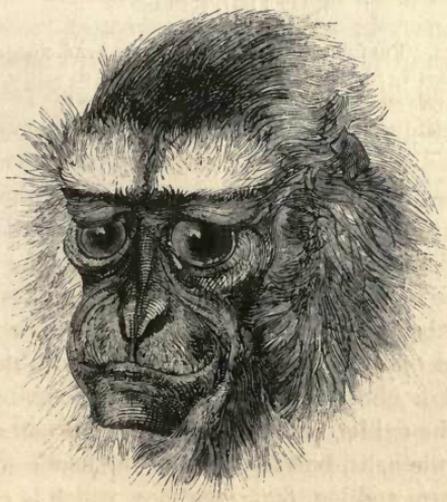
“ The individual in question (an adult male, with long canine teeth) became so tame and manageable, in less than a month, that he would take hold of my hand and walk with me, helping himself along, at the same time, with the other hand applied to the ground, as described above. He would come at my call, and seat himself in a chair by my side, at the breakfast table, and help himself to an egg, or the wing of a chicken, from my plate, without endangering any of my table furniture. He would partake of coffee, chocolate, milk, tea, &c. ; and, although his usual mode of taking liquids was by dipping his knuckles into the cup, and licking his fingers ; still, when apparently more thirsty, he would take up the vessel, from which I fed him, with both hands, and drink, like a man, from a spring. His principal food consisted of boiled rice, boiled bread and milk, with sugar, plantains, bananas, oranges,—all of which he ate, but seemed best pleased with bananas : he was fond of insects, and would search in the crevices of my house for Spiders ; and if a Fly chanced to come within his reach, he would dexterously catch him in one hand, generally using his right hand. Like many of the different religious castes of this country (India), he seemed to entertain an antipathy to an indiscriminate use of animal food, and would not eat of either the flesh of the Cow or Hog, but would sometimes taste a little piece of beef, but never eat of it. I have seen him take fried fish, which he seemed to relish better than almost any other description of animal food, with the exception of chicken ; and even this he would eat but very sparingly of, preferring his common diet. In temper he was remarkably pacific, and seemed, as I thought, often glad to have an opportunity of testifying his affection and attachment for me. When I visited him in the morning, he would commence a loud and shrill whoo-whooh, whoo-whooh, which he would often keep up from five to ten minutes, with an occasional intermission, for the purpose of taking a full respiration ; until, finally, apparently quite exhausted, he would lie down, and allow me to comb his head, and brush the long hair

on his arms ; and seemed delighted with the tickling sensation produced by the brush on his stomach and legs. He would turn from side to side ; first hold out one arm and then the other ; and, when I attempted to go away, he would catch hold of my arm, or coat-tail, and pull me back again, to renew my little attention to him, daily bestowed. If I called to him from a distance, and he could recognise my voice, he would at once set up his usual cry, which he sometimes gradually brought down to a kind of moan, but, generally, assumed his louder tone when I approached him."

It is not improbable that the Gibbon, termed Féfé in the frontiers of China, may be identical with the Hoolock, notwithstanding the difference between the two names. "In the kingdom of Gaunaure, frontier of China, there exists an animal very rare, which they call Féfé. It has almost the human form : the arms are very long ; the body black and hairy : it walks lightly, and very fast."—*Recueil de Voy. &c.* : tom. iii. p. 168. Rouen : 1716.

Two specimens of this Gibbon have recently (1840) died in the menagerie of the Zoological Society, London ; and are now preserved in the museum. In one individual (both were young), the hairs around the face had a brownish tinge ; on the top of the head, the hairs lay flat and close, and were directed backward ; around the face they formed full whiskers. The following figure (274) is a characteristic portrait of one of these animals.

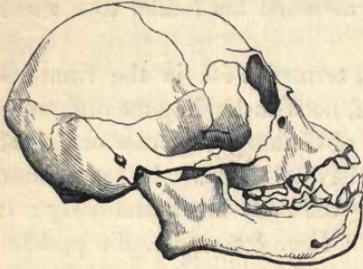
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Head of Hoolock.

Their activity and address, while alive, was astonishing: they launched themselves, by means of their long arms, from branch to branch, in their spacious compartment, with the greatest ease, and with an air of nonchalance, as if the most apparently difficult feats were merely trifles. They were extremely gentle, and rather timid; it was only occasionally that they exerted their voice, which was a loud, dissonant, monosyllabic cry, continued for some time without intermission.

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Skull of Hoolock.

The annexed figure (275) represents the skull of one of these individuals, preserved in the cabinet of osteology in the museum of the Zoological Society.

According to Mr. McClelland (see *Proceedings Zool. Soc.* p. 148, 1839), the Hoolock inhabits the Cossiah mountains and valley of Assam: its colour is uniformly black, except the eyebrows, which are white. Some individuals are greyish yellow. "It is possessed of the most wonderful activity, making use of its arms in swinging from tree to tree; nor is the female in any way restrained in her movements by the young, which she carries suspended to her body."

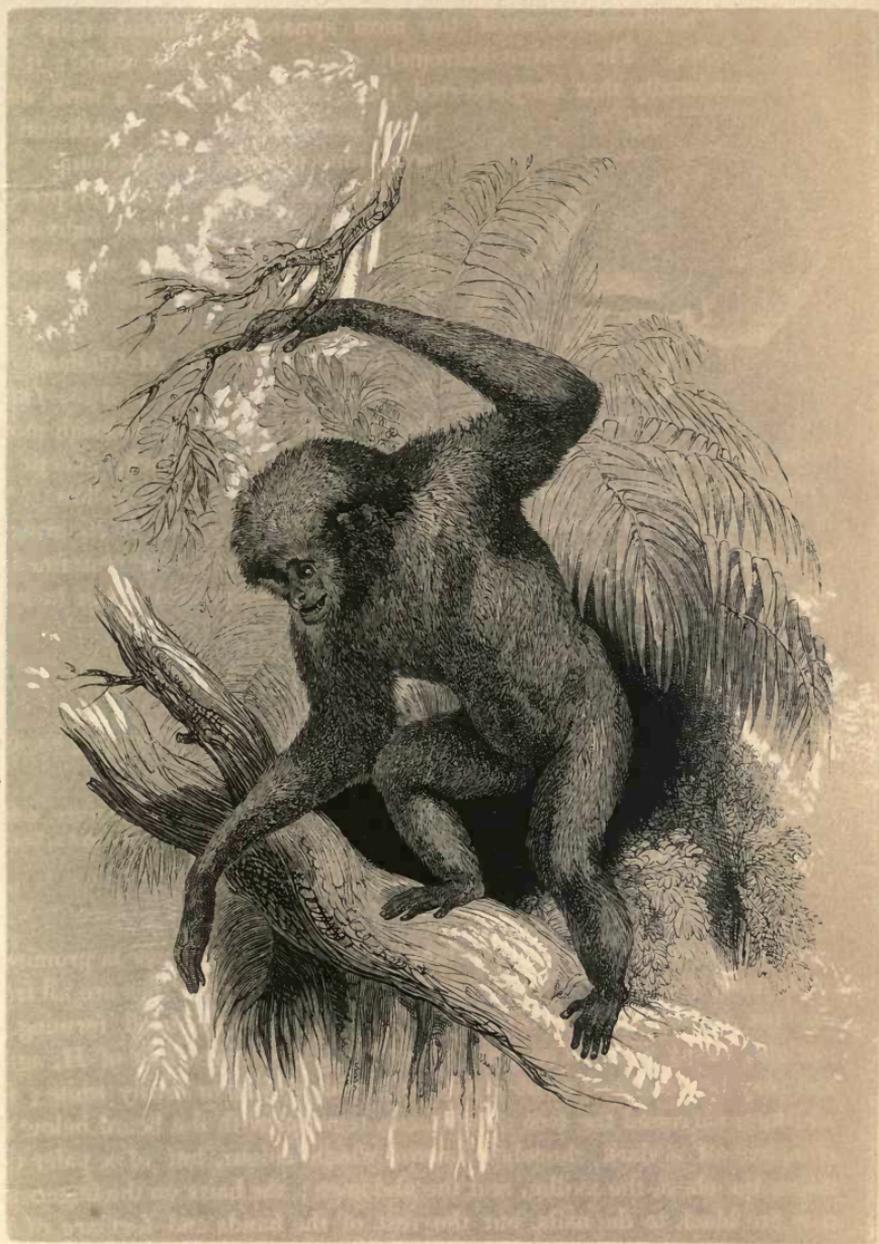
THE CHOROMANDUS GIBBON.

HYLOBATES CHOROMANDUS. (*Hylobates Choromandus*, OGILBY, in *Proceed. Zool. Soc. Lond.* for 1837, p. 68.)

SPECIFIC CHARACTERS.—Fur full and woolly; that on the head elongated and erect; colour, pale yellowish brown; beard full; this, with the chest, axillæ, and abdomen, brown; nose elevated; face covered with short, yellowish grey hairs.

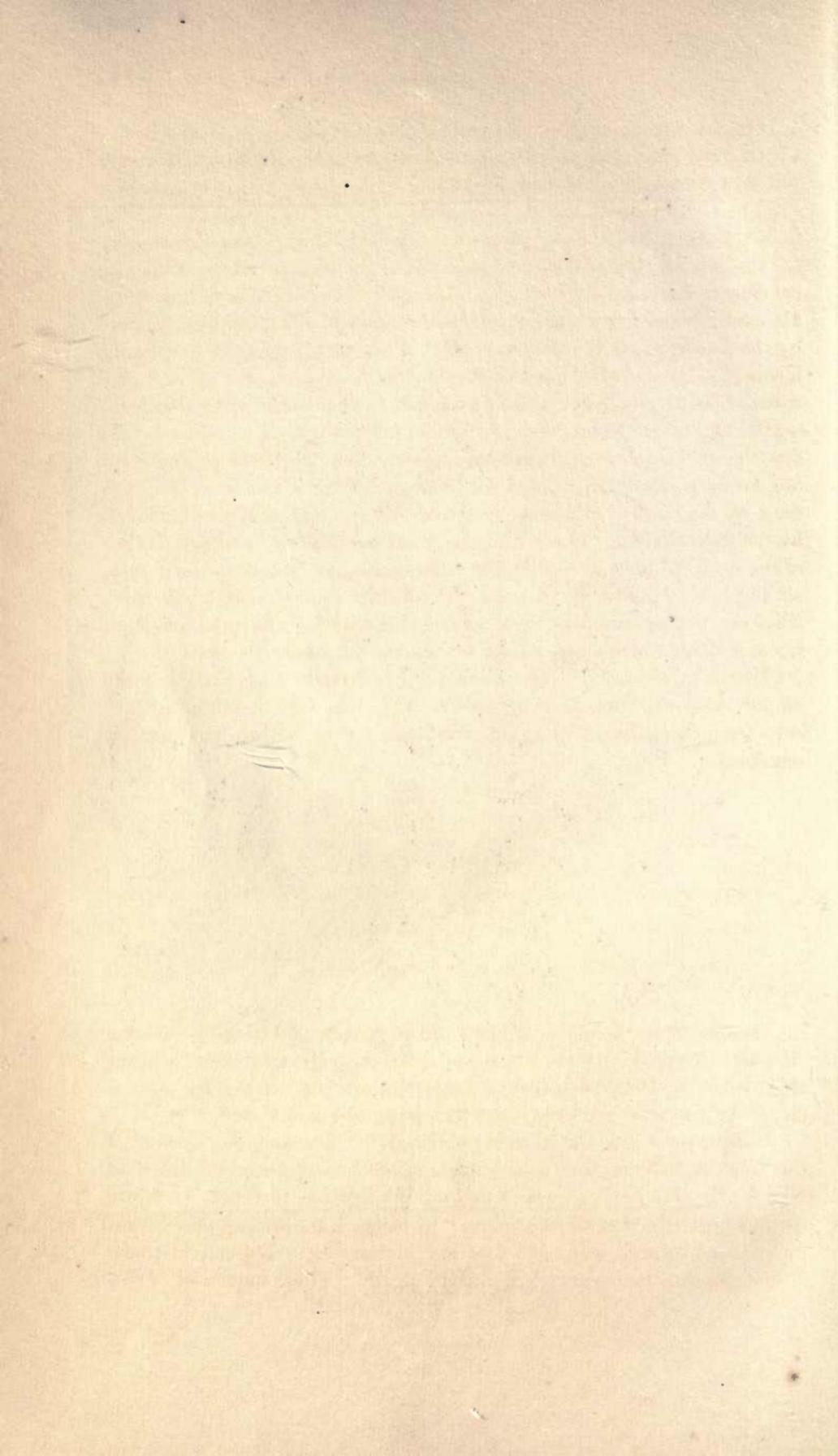
LOCALITY.—Continental India, probably the Malay Peninsula.

DESCRIPTION.—The head is large and rounded; the nose is prominent at the end, with broad septum between the nostrils; the toes are all free; the fur is full, deep, woolly, and glossy, that on the head forming an upright, bushy wig. The general colouring resembles that of *H. agilis*, and may be described as of a pale yellowish brown, or tawny white; full whiskers surround the face; and these, together with the beard below the chin, are of a dark chocolate brown, which colour, but of a paler tint, tinges the chest, the axillæ, and the abdomen; the hairs on the fingers and toes are black to the nails, but the rest of the hands and feet are of the same hue as the arm and leg, &c.; the face, which is covered with close, minute hairs, particularly about the nose, is of a pale greyish brown, instead of being naked and black, as in *H. agilis*.



THE CHOROMANDUS GIBBON.

(*Hylobates Choromandus*. Ogilb.)



Height, when erect, two feet eight inches and a half.

Original specimen (female), in the museum of the Zoological Society, No. 6 of Catalogue of Mamm. for 1838.

The recognition of the *H. Choromandus*, as a distinct species, is due to Mr. Ogilby, whose observations on it will be found in the *Proceedings of the Zool. Soc. of London*, for 1837, p. 68; the museum of which society contains the only known example. This, together with a specimen of the Hoolock, obtained from the same locality, was presented, many years since, by the late General Hardwicke; and both were regarded as specifically identical,—the one (*H. Choromandus*) as the female, and the other as the male. The identity, however, of the *H. Choromandus*, and of the Hoolock, as Mr. Ogilby well observes, is “sufficiently disproved, not only by the fact, that both specimens in question are of the same sex (females), and from our being perfectly acquainted with both sexes of the Hoolock, but, likewise, by the marked difference of colour and external structure exhibited by the two animals. The greater height of the forehead, and prominence of the nose, in the new species, are alone sufficient to distinguish it from all the other Gibbons; while its ashy brown colour, and large, black whiskers, render it impossible to confound it with the Hoolock, which has fur of a shining black, and a pure white band across the forehead.”

GENERAL HISTORY.—The circumstances attendant upon the capture of the specimen from which the description is taken, and all details respecting the habits of the animal in its native region, are alike utterly unknown.

HARLAN'S GIBBON.

HYLOBATES CONCOLOR.

Simia concolor HARLAN, in Journ. of the Acad. of Nat. Sciences of Philadelphia, vol. v. p. 229. Oct. 1826.

Hylobates Harlani LESSON, in Bull. des Sciences Nat. tom. xiii. p. 111.

SPECIFIC CHARACTERS.—Fur full, crisp, and universally black.

LOCALITY.—Borneo.

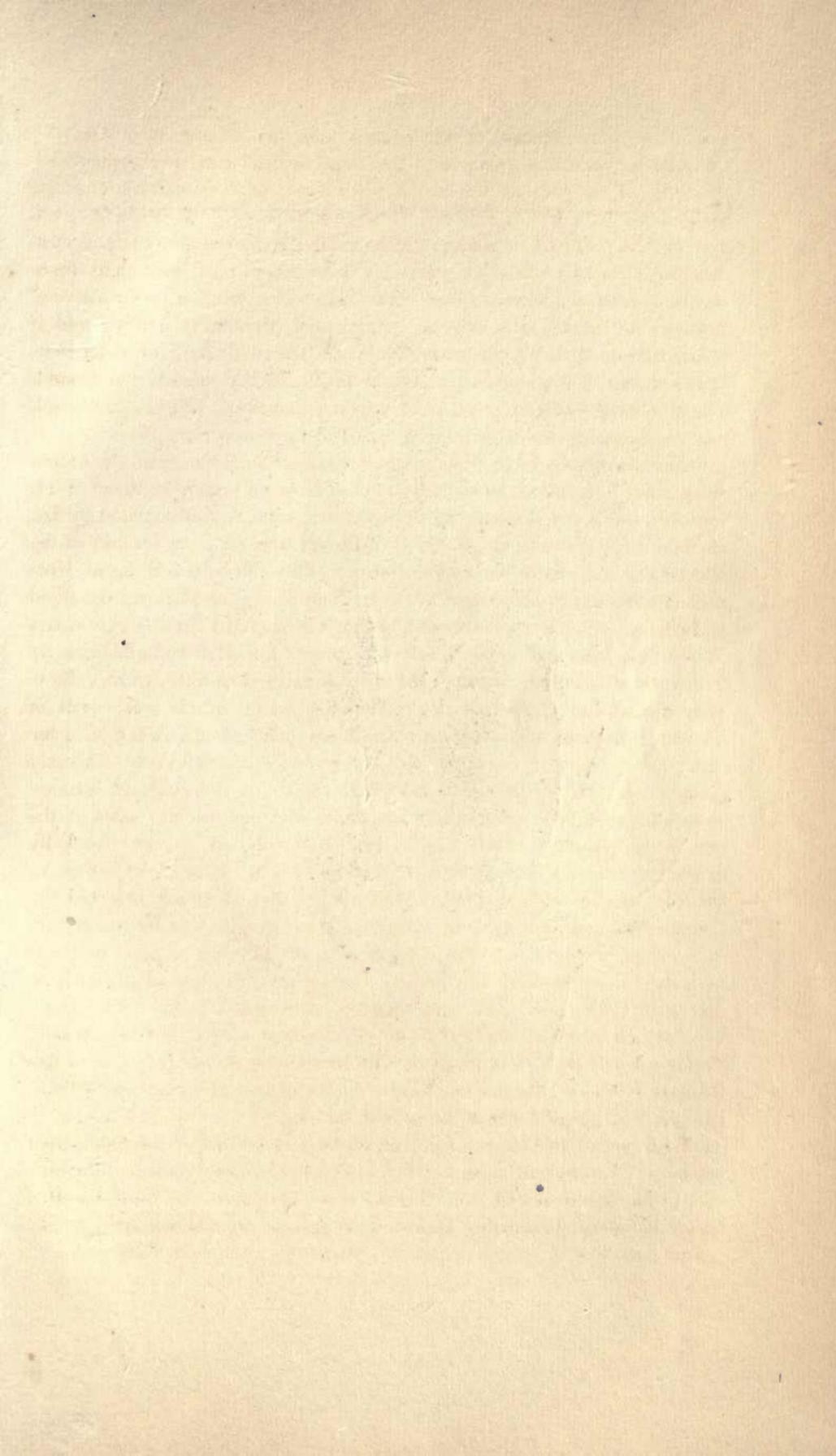
DESCRIPTION.—The hair is black, thick, woolly, and frizzled, covering all parts except the palms, the soles, the face, and ears; these, and the skin generally, being also black; the orbits are prominent; the nose is elevated; the arms are very long; the guttural sac is wanting.

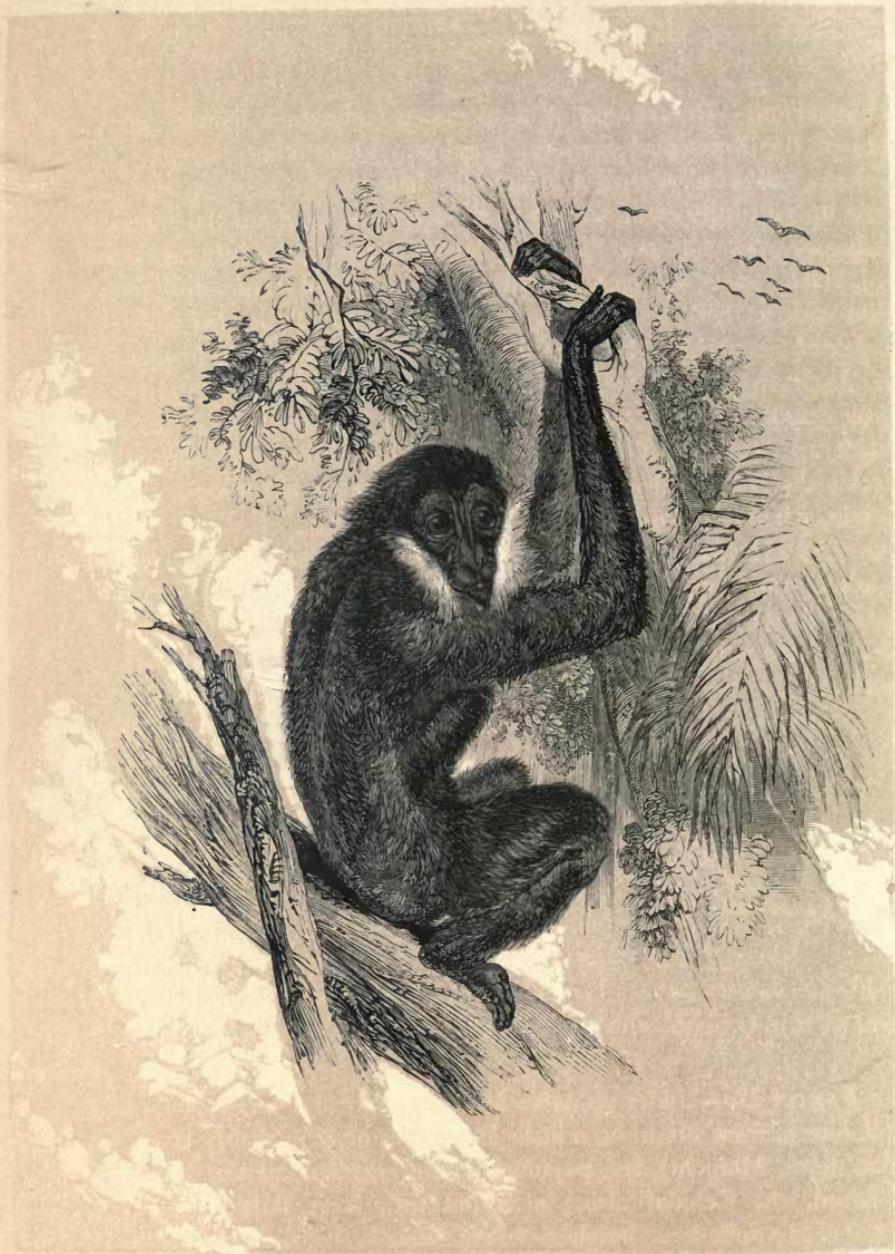
In the year 1826, Dr. Harlan published the first and only account of this singular Gibbon, from a specimen which had then recently died at New York, after having lived in that city four or five months. In figure it resembled the rest of the genus; in height it measured two feet two inches; and its arms were one foot six inches long. It was said to be rather less than two years of age at its death. The countenance of this

animal was more human in appearance than that of any other Ape (the Chimpanzee, perhaps, excepted), the nose having a greater prominence than that of the Orang; the orbits, also, were more projecting, and the facial angle of a higher degree. The rudiments only of callosities were perceptible. The example in question was an hermaphrodite; the species, therefore, cannot be held as positively determined, until specimens more regularly formed shall have been examined. This Gibbon was a native of Borneo: its habits, in a state of confinement, were very gentle; and it manifested much intelligence and docility. It was fond of fruits, particularly grapes. When standing erect, the fingers nearly touched the ground. The ribs were fourteen pairs; the cervical vertebræ, seven; the dorsal, fourteen; the lumbar, five; the sacral, five; the coccygeal, five.

GENERAL HISTORY.—Müller, in his work on the *Zoology of the Indian Archipelago*, describes a Gibbon found in Borneo, under the name of *H. concolor*, but which does not agree with the species thus designated by Dr. Harlan. He informs us that it is called Kalawet by the Dayaks of the interior and meridional parts of Borneo, and Oea-oea by the Malays. Notwithstanding great differences between them, it is, he says, nearly allied to *H. leuciscus*, the ground colour being the same in both. This varies from a pale to a dark yellowish-brown colour; the chest and abdomen are frequently of a lighter tint than the other parts, and of a brownish yellow. This description applies to the individuals found on the west coast of Borneo; for those inhabiting the meridional parts of that island have the hands and forepart of the body of a black brown, or sometimes of a rusty black colour. Both the males and females have, on the forehead, a transverse stripe of yellowish white; but the woolly hair on the sides of the face never becomes of this pale colour. It is impossible to say decidedly to what species the Gibbon thus characterized is referable; or whether, or not, two species are indicated. Had not Müller expressly asserted the Ungka-puti, and its variety the Ungka-etam (*H. agilis*), to be found only in Sumatra, it might be taken for that animal. In some respects it agrees with the *Choromandus*; but, besides having no pale superciliary stripes, this latter Gibbon is from some part of continental India. The Hoolock, which is black, with a white superciliary stripe, is from Assam. Perhaps it will be best, until farther information be obtained, to give to this Bornean Gibbon the provisional name of *Hylobates Mülleri*; but without admitting it into the list of accredited species.

With regard to Harlan's Gibbon, nothing is known of its habits and manners. Lesson, on what authority does not appear, considers the animal to be identical with the Ungka-etam (*Hylobates Rafflesii*, Geoff.), which he terms *Hylobates Unko*. (See *Species des Mammifères*, p. 53, 1840.)





THE WHITE-CHEEKED GIBBON.

(*Hylobates Leucogenys*. Ogilb.)

THE WHITE-CHEEKED GIBBON.

HYLOBATES LEUCOGENYS. (*Hylobates Leucogenys*, OGILBY, in Proceed. Zool. Soc. Feb. 1840.)

SPECIFIC CHARACTERS.—Fur full and black; face black, surrounded by white whiskers, and a white beard; hair of the head erect.

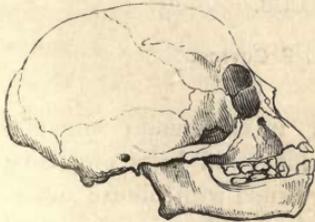
LOCALITY.—(?)

DESCRIPTION.—Description of a specimen (immature female) in the museum of the Zoological Society, London. Form very slender; fur thick, deep, and woolly, with a gloss; the hair on the head is straight, and rises up vertically erect, adding to the apparent height of the cranium, and giving an oval contour to the face, viewed in front; the general colour is deep black, as is the face, including the chin and ears; this colour contrasts with a frill-like border of long white hairs, forming whiskers and a beard, encircling the face; the whiskers consist of long hairs running back from the face, met by others advancing from the neck, and thus standing out in the frill-like manner described; the hairs on the throat are white, and directed upward to the whiskers; the palms are black; the index and second finger of the foot are not united.

Height, when erect, about two feet four inches.

GENERAL HISTORY.—The specimen from which the foregoing description is taken, was living, for some time, in company with the two Hoolocks previously mentioned, in the gardens of the Zoological Society. It displayed the same activity and gentleness as its companions, with whom it was perfectly familiar, gamboling with the utmost freedom. Its mode of

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Skull of White-cheeked Gibbon.

progression was by a series of swinging leaps, or, rather, launches, from branch to branch, from which it hung suspended by its arms, except when reposing, or during sleep. No information respecting its habits in a state of freedom has been collected; nor has the precise locality, where it was captured, been ascertained.

The annexed figure (276) represents the skull of this Gibbon, which is remarkable for its vertical elevation.

SUB-FAMILY II.—Under the term Monkey (a word derived, according to Dr. Johnson, from Monikin, a little Man; but most probably from the Egyptian term, Monichi), are popularly comprehended all the Simiadæ (and, indeed, the Cebidæ also,) provided with long tails; the term, Baboon, being applied to the short-tailed Simiadæ, as a distinctive title. The application of a term, sanctioned by long usage, to things having certain characters in common, though always loose, and often leading to erro-

neous ideas, cannot be altered; and it is worse than useless to attempt its restriction. In the present instance, it is incumbent on the naturalist to guard against the mistake, into which many have fallen, of conceiving that all the Old World Simiadæ with long tails, that is, Monkeys, constitute a group *per se*, separate from the Baboons, on the one side, and from the tail-less Apes on the other. The fact is, that two genera, from among the Monkeys alone, form a distinct group, founded upon characters of the utmost importance, and influencing alike the nature of their regimen, their habits, and manners; while the rest of the genera pass by so gradual a transition into that of the Baboons, that it is impossible to point out a line of demarcation between them. All have the stomach and teeth of the same structural type; the tail, ever variable, is long in some, moderate in others, and in several very short; the muzzle varies in its degree of elongation, and its form, from the Cercopithecus, through the Macaques, to the rib-nosed Baboon. In these points, however, we behold only variations of degree, connected, no doubt, with certain modifications of habits and manners, though not important structural changes, necessarily influencing the whole economy.

The present group, or sub-family, consists of Monkeys having a complex, highly sacculated stomach, with a long intestinal canal, a slender form of body, and elongated extremities. Two genera exhibit these characters; viz., *Semnopithecus*, peculiar to India and its islands; and, as we have every reason to believe, *Colobus*, peculiar to Africa.

GENUS.—SEMNOPIITHECUS.

Semnopithecus F. CUVIER.

GENERIC CHARACTERS.—MUZZLE depressed; HEAD round; SUPERCILIARY RIDGE prominent, and with a row of long, stiff hairs projecting forward, and slightly upward; MOLARS crowned with obtuse tubercles; the last molar of the lower jaw with a fifth tubercle, seated posteriorly; CHEEK-POUCHES wanting; LARYNGAL SAC large; ISCHIATIC TUBEROSITIES moderate; BODY slender; LIMBS long; the thumb of the hand small, and short; STOMACH large, and highly sacculated; INTESTINES long; TAIL slender and elongated; FUR soft, flowing, and often glossy.

COUNTRY.—India and its islands, and the Malay Peninsula.

When Fred. Cuvier established the genus *Semnopithecus*, he was not aware of the complex structure of the stomach, but he drew his distinguishing characters from external form alone: anatomy has confirmed the justice of his views; and if the data, upon which the genus now rests,

are more definite and satisfactory, his discrimination merits not the less praise.

Notwithstanding the presence of a long, slender, but muscular tail, which serves as a guide and balancer in their movements, the Semnopithecii have that, in their general form, which cannot fail to remind us of the Gibbons. As is the case in these latter animals, the contour of their body is spare and slender, the head is small and round, and the face depressed; the callosities are small, when compared with those of the Cercopithecii and Baboons; and the limbs are thin and elongated, as are also the hands and feet. In the Gibbons, however, the arms only are greatly elongated; and these far exceed, in length, the posterior extremities: in the Semnopithecus, on the contrary, the posterior limbs are well developed; the length of the femur being more than equal to that of the humerus, and the length of the tibia fully equalling that of the radius; so that the posterior extremities, reversely to those of the Orangs and Gibbons, exceed the anterior.

The hands in the Semnopithecii are remarkable for their elongation and narrowness, and for the almost rudimentary condition of the thumb, which cannot be brought into action as an antagonist to the fingers. The feet, also, are narrow and elongated; but the thumb is stout and well developed, its metatarsal bone equalling that of the first toe in length, and far exceeding it in thickness; while the whole thumb of the hand scarcely passes beyond the basal joint of the first finger.

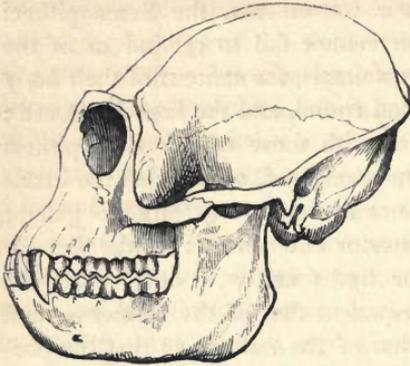
The Semnopithecii are destitute of cheek-pouches; but they have a large laryngal sacculus, extending over the whole throat, and advancing even below the clavicles: this sac communicates with the larynx, by means of a single large aperture, capable of being closed by the broad body of the os hyoides, drawn over it by means of a muscle extending from the anterior apex of the os hyoides, down the central aspect of the trachea, to the sternum: when drawn down, the os hyoides presses upon the thyroid cartilage.

The approach, in the form of the head of the Semnopithecii, to that of the Gibbons has been noticed. The skull (fig. 277), varying in minor details in each species (while, between the young and adult of the same species the difference is even more decided), may be characterized, in general terms, as round; the orbits are large and squared, with an abruptly prominent superciliary ridge, and with boldly projecting margins; the interorbital space is broad, and the face depressed: the lower jaw, however, is very deep, and the space for the masseter muscle considerable; while the chin recedes obliquely.

The teeth, especially the molars, possess peculiar characters, as might be expected from the structure of the stomach. The incisors are small, but stout; the canines are very large, broad, and compressed; the posterior

edge of those above being very acute. The molars are bluntly tuberculate, instead of being crowned with sharp mammillary points, as in the Cercopithecus and the Macaci: at an early age they begin to wear down, in consequence of the subrotatory action (partly a forward, and partly a lateral movement) of the lower jaw, the mode, apparently, in which the food is triturated: in this condition, the worn surface shews the enamel very distinct and deeply indented; or re-entering, in folds, into their substance, reminding one of the teeth of the ruminant. The characters thus presented by the molar teeth are in accordance

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Skull of Semnopithecus.

with the sacculate structure of the stomach. This remarkable structure was first properly described by M. Otto, in the *Nova Acta Academiae Cæsareæ*, vol. xii. 1825; but had previously been noticed by Wurmb, in an account of the anatomy of the Kahau, or Proboscis Monkey, published in the *Memoirs of the Society of Batavia*, and quoted by Audebert, in his *Histoire des Singes*. He, however, merely observes, that "the stomach is extraordinarily large, and of an irregular form," without entering into particulars. To M. Otto, therefore, belongs the real merit of the discovery. The species, in which he detected the structure in question, was the *Semnopithecus leucoprymnus* (regarded by him as a *Cercopithecus*); but its value, as a generic character, was not established until Professor Owen demonstrated its existence in the *S. Entellus*, and the *S. fascicularis*, Raffl. (*Proceedings Zool. Soc. Lond.* for 1833, p. 74); and, also, in the *S. Maurus* (*Proceedings Zool. Soc. Lond.* for 1834, p. 6); see, also, the *Transact. Zool. Soc. Lond.* vol. i. p. 65, c. fig.) The same structure obtains in the Douc, and in the *S. cucullatus* (see *Magazin de Zoologie*, 1836), and in the Kahau, *S. Nasalis* (see *Proceedings Zool. Soc. Lond.* for 1837, p. 70).

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Stomach of Semnopithecus.

The stomach of the Semnopithecus (see the annexed figure, 278) consists of three divisions: first, of a cardiac pouch, with smooth and simple parietes; secondly, of a middle portion, of considerable amplitude, and sacculated; and, thirdly, of a narrow, elongated pyloric canal, sacculated at its commencement, and for the greater part of its length, but becoming of a simple structure toward its termination. It is in

this latter division that the process of digestion appears to be carried on: it is not only more vascular than the other divisions, but is more abundantly supplied with nerves, from the eighth pair: the cardiac and sacculated portions are, in all probability, preparatory receptacles, or reservoirs.

The left, or cardiac compartment, into which the œsophagus enters, is separated* from the middle sacculated portion, by a septum, or decided constriction, produced by circular fibres, which, when the stomach is not distended, may be so contracted as completely to intervene between these two divisions, and thus render the cardiac pouch a distinct cavity; for, even when the stomach is distended, the orifice of communication is found not to exceed two inches in diameter. From the entrance of the œsophagus, a muscular band is continued round the cardiac compartment, so as, in some instances, to pucker, or corrugate it into slight sacculi, as in the Kahau; in others, to produce a somewhat bifid termination of its apex, as in the Entellus, the stomach of which animal, as Professor Owen has observed, reminds us, in this respect, of that of the Kangaroo, which is, also, complicated. The second, or lower, division of the stomach consists of a double series of sacculi (varying in depth and distinctness in different species), puckered upon a band of muscular fibres, continued from the œsophagus to the division-band, and parted from each other by internal septa, of a semilunar form, and of different degrees of depth: in the Entellus, the septa average half an inch, or more.

The pyloric portion of the stomach is a long canal, commencing from the cardiac pouch, to the right of the œsophagus, and becoming gradually narrower. It is corrugated into sacculi by three longitudinal muscular bands, of which one is continued from the cardiac band. The sacculi thus formed are, however, much smaller and shallower than those of the middle compartments, and become less and less distinct, till, at the distance of about five inches from the pylorus, they cease entirely. Thus formed, the pyloric portion of the stomach sweeps round the cardiac pouch, its smooth termination making an abrupt and complete turn upon itself, as seen in the sketch (fig. 278.)

The three divisions of the stomach in the Semnopithecæ, though distinct from each other, are not characterized by any essential differences of structure; and, in this respect, are not to be compared to those in the stomachs of the Ruminantia or Cetacea. In the Semnopithecæ the stomach is simply complicated,† and of great size; and, from the latter

* The tendency of the cardiac portion, in stomachs of the simplest structure, to form, by means of a central contraction, a compartment more or less distinct from the pyloric, has already been noticed; this tendency exists in Man, and in the Carnivora generally.

† The Sloths exhibit a parallel conformation of stomach; but, as Professor Owen observes, the Sloths, in the complication of this viscus, approach more nearly to the ruminants; nevertheless, "the chambers into which the stomach of the Sloth is divided, are not characterized by the difference of

circumstance, some peculiarities occur in the arrangement of the abdominal viscera. The small intestines are, it may be observed, longer, in proportion to the body, than in either the Cercopithecii or Macaci; the ratio being, in the Semnopithecii, on the average, as eight to one; in the Cercopithecii, six and a half to one; in the Macaci, four to one. In a specimen of Semnopithecus Entellus, measuring, from the nose to the root of the tail, one foot eight inches, the length of the small intestines was thirteen feet six inches; of the large, two feet ten inches; of the cæcum, four inches: the stomach, along the greater curvature, beginning at the left extremity, measured two feet seven inches; along the lesser curvature, one foot: the length of the pyloric division was one foot six inches.

In an adult female Proboscis Monkey, measuring, from the top of the head to the root of the tail, one foot nine inches, the admeasurements were as follow:—

	ft. in.
First compartment of stomach, round the greater curve	1 6
Second compartment, measured in same way	1 8½
From the entrance of the œsophagus, round the second compartment, to the division-band	1 1
The same measurement round the first compartment	0 8½
Length of pyloric portion	2 1
Circumference of ditto, at base	0 9½
Ditto just above pylorus	0 5½
Length of small intestines	18 0
Ditto large intestines	6 2
Ditto cæcum	0 5
Circumference of ditto, at base	0 5½

With respect to the purposes to be served by the complicated structure of the stomach in the genus Semnopithecus, we are not able to offer a positive opinion. The specimens of the Entellus which have been seen alive in our country have never been observed to ruminate; it is well known, however, that the food of these animals, in their native regions, consists exclusively of vegetable aliment (such as fruits, grain, leaves and buds); and it is probable that, wanting cheek-pouches, the cardiac

texture of the lining membrane which exists in the ruminants; they present only a difference in the degree of vascularity and villosity; and, in that respect, are analogous to the complicated stomach of the quadrumanous genus."

In the Pteropine group of Bats, a similar modification of the stomach again presents itself. These Bats are fruit-eaters. The author just quoted says, that, in a species of this group (*Pteropus rubricollis*, Geoff.), he "found the cardiac moiety divided into two dilated compartments, of which the left is again subdivided and plicated within, while the pyloric moiety is extended in an elongated, tortuous form, proportionately exceeding, in length, that of the Semnopithecus Entellus. It is to a Pteropus, doubtless, and not to a Vampyrus, that is to be attributed a similarly complicated stomach, described and figured by Sir Everard Home, as belonging to the Vampyre Bat, and from which he draws the rather hasty conclusion, that 'the Vampyre Bat lives on the sweetest of vegetables; and all the stories, related with so much confidence, of its living on blood, and coming in the night to destroy people, while asleep, are entirely fabulous.' I suspect that the stomach of the true Vampyre Bat will be found to accord with the blood-thirsty habits so repeatedly ascribed to it."

and middle sacculi serve as receptacles for a great mass of aliment (quantity making up for relative deficiency of nutriment) taken in at once, and so carried off to be digested at leisure; in order to which, being a soft mass, it would be gradually transmitted into the true digestive portion, there to be elaborated. It is possible, indeed, that, under some circumstances, regurgitation* and rumination may take place, as is occasionally observed in the Kangaroo.

It has been long known that bezoar stones have been obtained from the stomachs of Monkeys; but it is in the stomachs of the Semnopithecus only (especially of the Douc) that these concretions are found; a point of interest, as we meet with them again in the stomachs of the Ruminantia. In Deer, Goats, Antelopes, &c., bezoar stones are far from being uncommon; and it is in complicated stomachs alone that we have reason to suppose their formation. The coincidence, in this point, between the Semnopithecus and the Ruminantia, seeing that there is an analogy between them, in the complicated form of the stomach, is very interesting. The bezoar stones obtained from Monkeys are deemed more valuable in the East than those of any of the ruminants; and are believed to possess peculiar medicinal properties.

As regards the absence of cheek-pouches throughout the Semnopithecus, it may be here observed that Geoffroy St. Hilaire, among the characters laid down by him, of the genus *Nasalis*, for the reception of the Proboscis Monkey (a Semnopithecus), enumerates these organs as present. (See his *Tableau des Quadrumanes*, in *Annales du Mus. d'Hist. Nat.* 1812).

It does not appear on what authority he founded his opinion; unless, indeed, on the observations of Wurmb, that "there is beneath the skin a sac which extends from the lower jaw to the clavicles;" evidently meaning the laryngeal sac; but to this Geoffroy makes no allusion, and of the true nature of the structure alluded to by Wurmb, from his silence respecting it, he was evidently unaware. That there are neither cheek-pouches, nor traces of them, in the Proboscis Monkey, the Author's dissection of the animal has enabled him to affirm. In his *Cours de l'Histoire Naturelle*, published in 1828, Geoffroy consents to merge his genus *Nasalis* into Semnopithecus, observing, "Cependant, il ne nous paraît encore démontré que le singe nasique soit une véritable Semnopitheque, et il est fort possible que

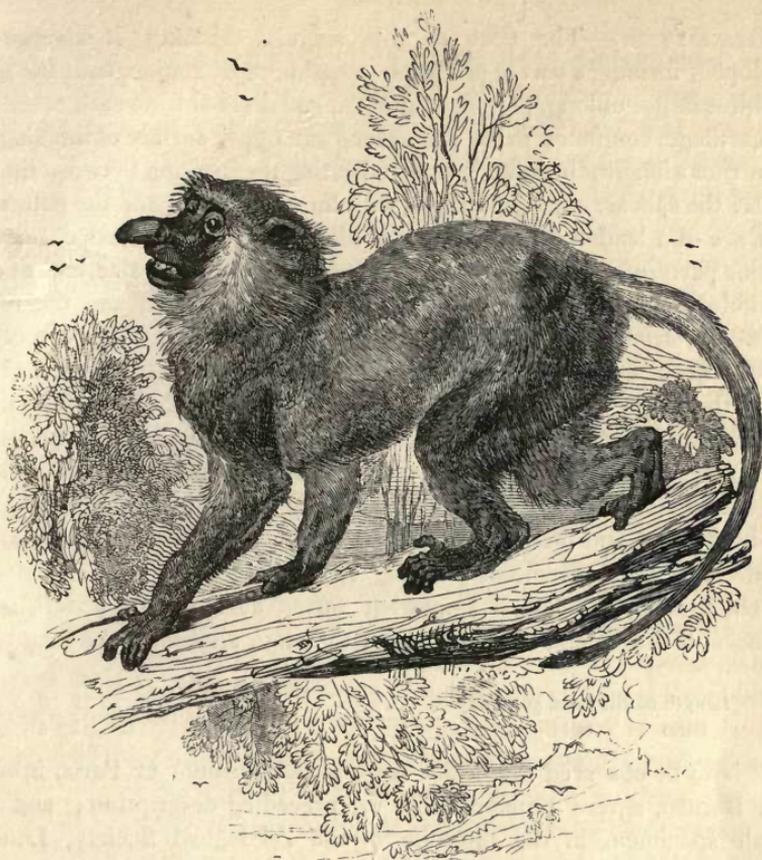
* Such an action, observes Professor Owen, is "likely to take place, occasionally at least, in animals which possess the complicated stomach here described; and there is a provision in these stomachs, for the passage of ruminated food, or of such as is of a fluid, or easily digestible nature, directly into the second, or sacculated division. A ridge is continued along the pyloric side of the cardiac orifice, obliquely, to the fold in the middle division, which is situated next beyond the constriction; a second ridge is continued from the right side of the cardiac, into the lower part of the septum that separates the cardiac from the middle compartment, and, consequently, between these ridges a shallow canal is continued, from the œsophagus to the middle division of the stomach. Supposing the circular fibres, which form the two ridges, to contract simultaneously with those forming the constriction above, then the communication between the œsophagus and middle division of the stomach would be cut off; but, on the other hand, if these fibres were relaxed, the food, and especially liquid food, would pass along the oblique canal directly into the middle compartment."

lorsque l'espèce sera moins imparfaitement connue, on soit obligé de rétablir le genre *Nasalis*, dans lequel on l'isolait autrefois, mais que n'est pas été admis par la plupart des auteurs modernes."

While adverting to the genera which have merged into *Semnopithecus*, notice of the genus termed *Pygathrix* by Geoffroy, and *Lasiopyga*, by Illiger, cannot be omitted. The apparent want of callosities in the Douc Monkey, induced both Geoffroy and Illiger respectively to found a genus for its reception: but it happened, unfortunately, that the specimen from which both took their characters, was mutilated; the callosities having been cut away. Perfect skins, of which several now exist in the Paris Museum, and others in England (one in the museum of the Zoological Society, London, No. 12, Catalogue, 1838), have enabled naturalists to correct the error thus occasioned, and the genus *Pygathrix*, or *Lasiopyga*, becomes annihilated. The genus *Presbytis* of Eschscholtz, of which the only species (*Presbytis mitrata*) appears to be the Croo, has, also, no foundation; whether it was for the Croo, or an allied species, that the genus was proposed, is of little import; there is no hesitation in merging it into *Semnopithecus*.

F. Cuvier calls the *Semnopithec*i, Slow Monkeys; but it is only to a certain extent that they merit the title. The length and slenderness of the limbs and body, detract, if not from their agility, at least from the energetic abruptness of their movements, which have a more sweeping character than we see in any of the *Cercopithec*i. Nevertheless, they leap and bound among the branches of their native forests with great ease, and to vast distances, their long tail acting as a director, or balancer, in their motions. Less lively, less petulant, and, at the same time, less inquisitive, than the *Cercopithec*i, they appear, at times, as if even oppressed with melancholy, and sit in listless apathy. While young, they are very gentle; but when adult, they are sullen, morose, and vindictive; and their long canines render them truly formidable. In their native regions they associate in troops; several species, but more particularly the *Entellus*, are held in veneration by the worshippers of Brama, and are not only tolerated, but protected as sacred. This blind superstition is not, however, universal.

Many species attain to considerable dimensions; most, if not all, are distinguished by the length, softness, and glossiness of their fur; and some by the richness and beauty of their colouring. In all, the eyebrows are well marked, consisting of long, stiff hairs, directed nearly forward, and giving a peculiar and distinguishing character to their physiognomy.



THE KAHAU, OR PROBOSCIS MONKEY.

SEMNOPIITHECUS LARVATUS.

- Cercopithecus larvatus* WURMB, Verhand, Batav. Genootsch.iii. 145.
Simia nasica SCHREBER, Saugth. 46, c. fig. 1775.
Guenon à longue nez BUFFON, Hist. Nat. Supp. vii. c. fig. tab. xi. xii. 1789.
Proboscis Monkey PENNANT, Quad. ii. 232, c. fig. Buff. 1793.
Kahau AUDEBERT, Hist. des Singes, &c. fig. 1797.
Proboscis Monkey SHAW, Gen. Zool. i. 55, c. fig. Buff. 1800.
Nasalis larvatus GEOFFROY, Ann. du Mus. xix. 1812.
Cercopithecus larvatus KUHLE, Beitr. Zool. 12. 1820.
Cercopithecus nasicus DESMAREST, Nouv. Dict. et Mamm. 1820.
Semnopithecus nasicus GEOFFROY, Cours d'Hist. Nat. lect. vii. 1828.
Nasalis recurvus (young?) . . . VIGORS and HORSEFIELD, in Zool. Journal, iv. p. 109, c. fig. faciei. 1828-9.
Simia larvata FISCHER, Synops. Mamm. p. 16. 1829.
Nasalis larvatus LESSON, Species des Mamm. p. 66. 1840.

SPECIFIC CHARACTERS.—Tail shorter than the head and body; nose produced into a sort of proboscis, with large nostrils opening downward, and separated from each other by a thin septum; head, and upper parts of back, chestnut, the rest ochre-yellow; the crupper, tail, fore-arms, and legs, greyish yellow; chin, bearded; face, ears, and palms, dusky leaden coloured.

LOCALITY.—Borneo.

DESCRIPTION.—The nose of this singular Monkey is enormously developed, forming a sort of proboscis, capable of dilatation, with the nasal apertures large, oblong, placed as in Man, and divided from each other by a thin cartilage, continued to the end; along the upper surface of this singular organ runs a longitudinal depression, indicating the division between the two canals; the ears are small, and these, with the naked face, and the palms and soles, are of a leaden colour, or dusky black, with a slight wash observable in some parts, of reddish yellow; the eyes are of tolerable size, and at considerable distance from each other; the neck is short, and the throat goitre-like, from the magnitude of the laryngeal sac; on the sides of the face, the neck, and shoulders, the hair is long, compared with that of the rest of the body, which is rather short, or moderate; the top of the head, the occiput, and the scapular portion of the back, are of a rich chestnut brown; the sides of the face, and a stripe over the shoulders, are yellow; the general colour of the body is a fine sandy red; the rump, the tail, the fore-arms, legs, and feet, are cinereous; the under parts of the body are of a pale yellow (individuals varying in the intensity and richness of the colouring); the tail is somewhat tufted at the tip; a full beard advances forward, and curls up under the chin, almost to the long nose.

	ft. in.
Length of the head and body	2 0
Ditto tail	2 4

It is to be observed that a fine male in the museum of Paris, brought from Borneo, agrees precisely with the preceding description; and that a male specimen, in the museum of the Zoological Society, London, is, in all respects, similar, excepting that its colours are less bright, and that the chin is destitute of a beard. It was obtained in Borneo; and forms part of the Rafflesian collection (No. 23, in Catalogue, Mamm., 1838).

In the museum of the Zoological Society of London is a specimen (No. 24, in Catalogue, 1838), forming part of the Rafflesian collection, and stated to have been procured in Borneo, through the medium of a collector acting under the late Sir T. Stamford Raffles, which Messrs. Vigers and Horsefield have regarded as constituting a species distinct from the *S. larvatus*, and which they have described in the fourth volume of the *Zool. Journal* (p. 109, cum figurâ faciei), under the title of *Nasalis recurvus*, assigning to it, as distinctive characters, the possession of a beard, or tuft, under the chin, and a recurved form of nose; whence the title, *recurvus*.

Now, respecting this specimen, it is to be observed that it is a young female, as is proved by the condition of the bones of the phalanges; in the Paris Museum, a specimen exists exactly agreeing with the one

already referred to, excepting that its colours are brighter; it was sent from Borneo, by M. Diard, in 1802, and is also a young female, measuring eighteen inches in the length of the head and body; the tail being seventeen inches. That the adult female has the nose of the same form, and relative proportions, as the adult male, has been verified by an examination of the specimen dissected, in which this organ was elongated and recumbent. Nevertheless, reasoning from what is known of the changes which take place, not only in the skull, but in the fleshy parts of the face in the Simiadæ generally (as for example the acquisition of callous protuberances on the cheeks of the adult male Orang, and the development of ribs and deep furrows on the sides of the muzzle in the adult Mandrill), we are justified in regarding the comparative shortness and upturned contour of the nose in these specimens, as the indications of immaturity, and in concluding that, in process of time, the organ in question undergoes that not very great degree of modification requisite to its agreement, in all respects, with what we see in the specimens of acknowledged adults. Perhaps, indeed, it is rather in the immature female, than in the immature male that the difference is most marked; in very young individuals, however, of both sexes, its development is said to be but little more than in ordinary Semnopithecæ. As to the absence, in the Kahau, of a beard, which, in the *Nalis recurvus*, is very distinct, a circumstance on which Messrs. Vigors and Horsfield lay some stress, the fact is, that, in the Kahau, a beard not only exists, but it is long, and curls upward; and the mistake on this point arose from their having taken the specimen in the museum of the Zoological Society as their standard of comparison, which specimen is, in this respect, imperfect, and otherwise not in first-rate condition.

In the specimen at Paris, referred to, and in that in the museum of the Zoological Society, the naked skin of the face is of a pale orange, or yellowish colour; whilst, in the adult male Kahau, as well as in the adult female, it is of a dark or leaden blue, not, however, without partial clouds of brown, and traces of orange. The leaden, or blackish tint, most probably, does not spread over the face until the age of maturity.

The following is a description of the specimen in the Paris Museum: face nearly naked, and of an orange colour; beard distinct; top of the head, occiput, and shoulders, of a deep rich chestnut; the hairs of the head radiating from a centre; the general colour very bright foxy red, deepening to chestnut along the sides of the face, down the back of the humerus and the outside of the thighs, and fading, on the abdomen, into yellow; the fore-arms, inside of the limbs, the ankles, hands, and feet, of a dirty straw white; the rump and tail of a pale ashy brown. Length of head and body, eighteen inches; of the tail, seventeen. Note on the stand—"De l'envoi fait par M. Diard, 1802."

The following figures (280 and 281) are given, in order to shew the difference in the development of the nose, in which the distinction, supposed by some writers specific, mainly consists.

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Head of adult Proboscis Monkey.

281



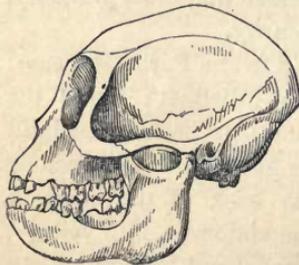
Head of young Proboscis Monkey.

For the details of the anatomy of the Kahau we refer to the *Proceedings of the Zool. Soc.* 1837, p. 70, *et seq.* The number of ribs in this species is twelve on each side; cervical vertebræ, seven; dorsal, twelve; lumbar, seven; sacral, three; caudal, twenty-three: the bones of the arms and legs are slender (in the specimen dissected); the humerus measured six inches and a half; the radius six inches and a half; the femur, from the top of the trochanter to the condyles of the knee, seven inches and a quarter; the tibia, six inches and a half.

M. Geoffroy remarks that the cerebral capacity, and the development of the forehead, beyond what obtains in other Semnopithici, betoken a superior degree of intelligence. Neither the cerebral capacity, nor the development of the forehead, are comparatively greater in the specimen existing in the museum of the Zoological Society of London, than in others of the same genus (see fig. 282).

GENERAL HISTORY.—It would appear that Wurmb, to whom we owe our knowledge of the habits of the Kahau, and who described it in the

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Skull of Proboscis Monkey.

Memoirs of the Society of Batavia, from specimens which he shot in Borneo, is not the first describer; for the great anatomist, Daubenton, had previously read a memoir respecting it, before the Academy of Sciences at Paris; but this paper was never published: there is no allusion to it in the *Supplement to Buffon's Nat. Hist.* vii., where the animal is figured and described under the title of "Guenon à longue nez;" and whether the memoir on the "Nasique," by

Daubenton, be still in existence, and, if so, what may be the details and statements it contains, we have no means of ascertaining. It is, however,

by no means improbable, that both M. Geoffroy and Desmarest have consulted it.

The male Kahau is remarkable for size and strength; and, from the magnitude of his canines, he must be a formidable animal. The female, however, is considerably smaller, a difference in size to which Wurmb expressly alludes, in the following description, which comprises all we really know respecting the habits of this species—a description which appeared in the *Memoirs of the Society of Batavia*, and is quoted by Audebert in his *Histoire des Singes et Makis*. These Apes, he informs us, “associate in large troops; their cry, which is deep-toned, distinctly resembles the word, Kahau; and it is, without doubt, by changing the letter π into ν , that some Europeans name them, Kabou. The natives of Ponteaná give to this Ape the name of Bantanjan, in consequence of the peculiar form of its nose. These animals assemble, morning and evening, at the rising and setting of the sun, along the border of rivers; they are to be seen on the branches of lofty trees, where they offer an agreeable spectacle, darting, with great rapidity, from one tree to another, at the distance of fifteen or twenty feet. I have not observed that they hold their nose while leaping, as the natives affirm; but I have seen that they then stretch out their paws in an extraordinary manner. Their food is unknown; whence it is impossible to preserve them alive. They are of different sizes; some, indeed, are seen which are not above a foot in height, but which, nevertheless, have young.”

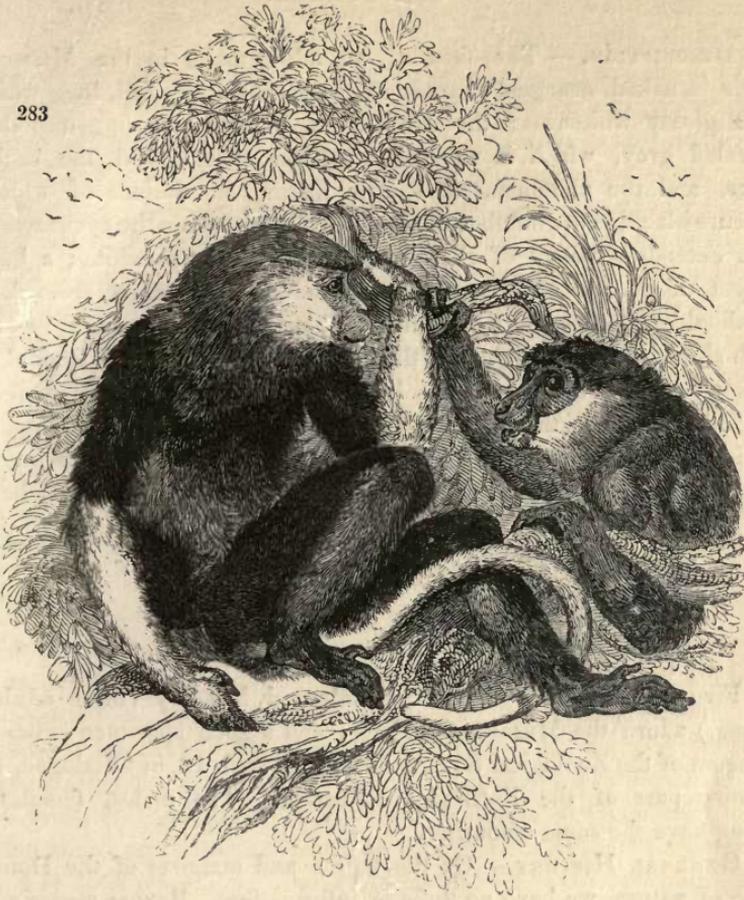
With regard to the inferiority in size of the females, it is to be observed, that an aged female, dissected by the Author, measured one foot nine inches from the vertex to the callosities; and was a slender, meagre animal, very unlike, in this respect, all the preserved specimens which he has examined; and in which robustness forms a principal characteristic. The nose of this female exactly resembled that of the male; the teeth were greatly worn down.

The purposes to be fulfilled in the economy of the Kahau, by the development of the nose, in a mode paralleled by none of the Simiadæ besides, are altogether problematical. It may be connected with an increase in the function of smelling, on the acuteness of which the animal may depend, as a means of obtaining some particular kind of food; but this is a mere supposition; and until an opportunity is afforded of observing the Kahau in confinement, which appears never to have occurred, even in its native country, many conjectures may be formed, all wide of the truth. It would appear that the development of this organ only takes place upon the approach of maturity; and Wurmb asserts that the animal has the power of distending or inflating its capacious nostrils with air, to the extent of full an inch, or more; but whether this distention be a sign of anger, fear, or pleasure, we are not informed. Desmarest states that the

Kahau is of a violent and savage disposition, defending itself with courage and ferocity. His authority for this statement is not given ; but, as ferocity is the character of all the Semnopithecii when adult, there is no reason to believe that this, one of the largest and strongest of the genus, yields to any, in those moral traits which are common to the race.

Notice may here be taken of the shortness of the tail in the present species, compared with what it is in the Semnopithecii generally, in which it usually much exceeds the length of the body. In the specimen measured by the Author, at Paris, the tail was two inches longer than the body ; but the latter might be somewhat shortened in the process of preserving. Desmarest, however, gives one foot eleven inches nine lines (Fr.) as the length of the head and body ; and two feet one inch nine lines, as that of the tail. Mr. Ogilby assigns the length of two feet six inches to the body, and of two feet three inches to the tail. That the tail should only equal the body, or exceed it by a mere trifle, is contrary to the general rule among the animals of this genus.

The Kahau, as far as known with certainty, is only an inhabitant of Borneo. Geoffroy St. Hilaire, however, states it to be a native, also, of the Malay Peninsula ; but we are not aware that it has ever been seen there, or that specimens have been brought from that quarter of the East ; nevertheless, it is not unlikely that it is found in that region ; and that M. Geoffroy obtained his information from an authentic source. Indeed, this might be admitted at once, had he not, by implication, added the western parts of the Peninsula of India to the range of its habitat ; for he informs us that the ambassadors sent by Tippoo Saib to France, on their visit to the Museum, recognised the Kahau, and pointed it out as a native of their country, describing it as an animal of high moral and intellectual qualities. That the ambassadors might have seen it, or heard of it, is not denied ; and by "their country" they might allude to the East generally ; but it is certainly not found wild in the Peninsula of India. Mr. Ogilby informs us that a specimen, in the Leyden Museum, is said to have been brought from Sumatra ; but that all the other specimens of this animal in that collection were obtained from Borneo. This latter island is, in fact, at present, its only authenticated habitat.



THE DOUC MONKEY.

SEMNOPIITHECUS NEMÆUS. (*Semnopithecus Nemæus*, F. CUVIER, Mamm. lith. fig. 1825.)

- Simia Némæus* LINNÆUS, Mantiss. Plant. Append. 1771.
Cercopithecus Nemæus ERXLEBEN, Syst. Regn. An. 1777.
Simia Nemæus LINNÆUS, Syst. Nat. ed. Gmelin. 1788.
Douc BUFFON, Hist. Nat. xiv. c. fig. pl. 41, 1766; et Supp. vii. fig. pl. 23. 1789.
Cochin-China Monkey PENNANT, Quad. 1793.
Douc AUDEBERT, Singes, Fam. iv. sect. i. fig. 1. 1797.
Lasiopyga Nemæus LLIGER, Prodrum. Syst. Mamm. 1811.
Pygathrix Nemæus GEOFFROY, Ann. du Mus. xix. 1812.
Cercopithecus Nemæus KÜHL, Beitr. 1820.
Cercopithecus Nemæus DESMAREST, Mamm. p. 54. 1820.
Simia Nemæus FISCHER, Synops. Mamm. p. 13. 1829.
Semnopithecus Nemæus LESSON, Species des Mamm. p. 55. 1840.

SPECIFIC CHARACTERS.—General colour delicate grey; throat white; a transverse chestnut-coloured mark on the upper part of the chest, and, below this, a black stripe extending to the shoulders; fore-arms, crupper, and tail, snow-white; the knees, legs, and insteps, of a chestnut colour; the thighs and toes black; the face and palms of an orange colour.

LOCALITY.—Cochin-China.

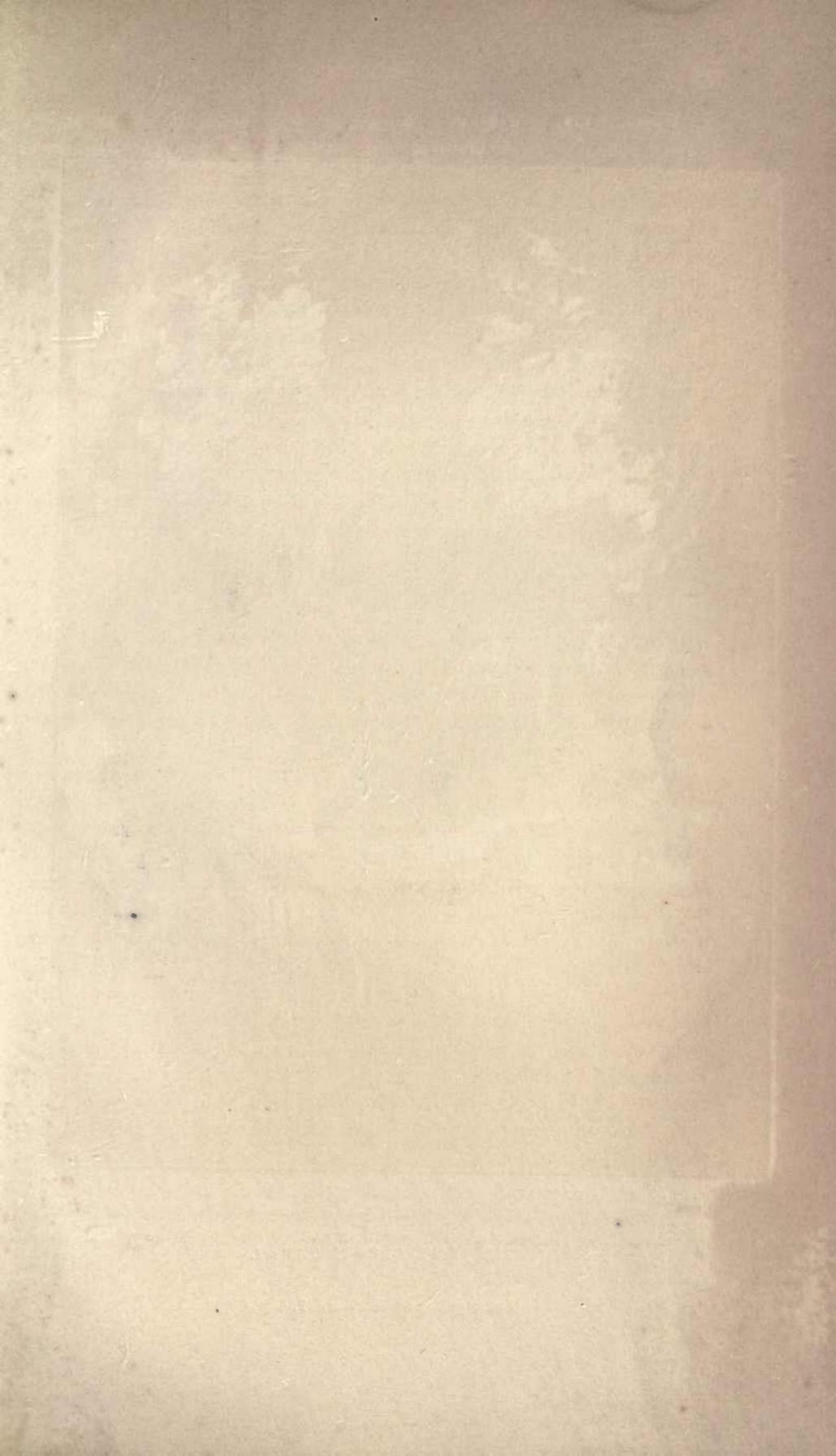
DESCRIPTION.—The face of an adult male, in the Museum of Paris is naked, orange-coloured, and surrounded by full, long whiskers, of a glossy whiteness; the forehead is blackish, passing into delicate grizzled grey, which is the colour of the whole head, the back, the sides, and the abdomen, each hair having annulations of white and obscure black, to the number of eleven or twelve; from the eyebrows to the ears extends a pencil of chestnut-red; the throat is white; a band, or gorget, of chestnut-red extends across the top of the chest, from shoulder to shoulder, succeeded by a band of black, spreading over the top of each shoulder; the fore-arms, the tail, and a square sacral patch, are of a snowy white; the knees, the legs, and the tarsal portion of the feet, are of a rich chestnut; the fingers, toes, and thighs, are black; the groin and space round the callosities are white; the callosities and the naked skin of the palms are yellow; the fur is full, and very delicate.

	ft. in.
Length of head and body	2 1
Ditto tail (imperfect)	
Ditto arm and hand	2 0
Ditto hind limb to heel	1 6

Five specimens of this richly-coloured Monkey (three adult, two young,) adorn the Museum at Paris; and a good specimen exists in the museum of the Zoological Society of London (No. 12, in Catalogue, 1838), forming part of the Rafflesian collection. The males, females, and young have the same colouring.

GENERAL HISTORY.—Of the habits and manners of the Douc, in a state of nature, we have no definite information. Bezoar stones are said to be frequently found in its stomach. The Douc has never been brought alive to Europe. In the *Magazin de Zoologie* (“Voyage autour du Monde de la Corvette la Favorite,”) class i. p. 345, 1836, it is stated that these animals “live in troops, more or less numerous, in the vast woods which cover the country along the shore; and their manners are certainly far from being wild, as has been supposed. They are, indeed, little troubled by the presence of Man, and often come very near to the habitations of the Cochin-Chinese, who appear to offer them but little molestation, and do not attempt to draw from the beautiful fur of the Doucs all the advantages which might be obtained from such a source. However, the incursions of the sailors of the Corvette la Favorite, in a very short time, inspired these animals with terror; and so rapid was their flight, that, numerous as they were, they were not procured without difficulty.”

Though Buffon, on the authority of M. de Poivre, gave the name of Douc to this species, as its native appellation, nevertheless, it would seem that such is not the term by which it is known in Cochin-China.





THE ENTELLUS MONKEY.

(*Semnopithecus Entellus*. F. Cuv.)

According to M. Rey, the captain of a French merchantman, who visited that country in 1819-20, these animals are there called Venam, which signifies Men of the Woods. It does not appear that M. Rey had any difficulty in killing numbers of them, though he experienced much in obtaining living specimens. So numerous were they, that, on one occasion, in the course of a few hours, a hundred were slaughtered. Desirous, however, of procuring living specimens of this animal with the intention of taking them to France, it was with great difficulty that he succeeded; and, in the attempt, many of them fell; and still as more were wounded, more collected around the dead and dying, endeavouring to carry them off into the woods. Three young ones were ultimately captured, which held so fast round the bodies of their dams, that it required no small effort to detach them. M. Rey remarks, that this species of Monkey greatly resembles the Orang-outan in stature and inoffensive manners, inhabiting the mountains and the tops of the loftiest trees, and living on fruit. The similarity, he adds, of this creature to Man is strikingly mortifying. Its fur, he describes as being exceedingly fine: with regard to colouring, he says, the hands and feet are black; the shoulders and legs, deep red; the belly, white; and the back, grey; the face is flat, and of a white colour; the cheeks, red; and the eyes large and black. Some of the males measured, when standing upright, above four feet four inches in height.

THE ENTELLUS MONKEY, OR HOONUMAN.

SEMNOPITHECUS ENTELLUS. (*Semnopithecus Entellus*, F. CUVIER, Mamm. lith. fig. Juv. et adult. 1820, 1825.)

- Rollewai* WOLF, Residence at Ceylon. edit. Berlin. 1782 (?)
Rollewai and *Wanderoo* THUNBERG, Travels. edit. Upsal. 1793.
Simia Entellus DUFRESNE, Mag. Encyclop. tom. iv. 1797; et Bull. Soc. Philom. 1797.
Simia Entellus AUDEBERT, Singes. Fam. iv. Sect. ii. pl. 2. 1797.
Cercopithecus Entellus GEOFFROY, Ann. du Mus. xix. 1812.
Cercopithecus Entellus KUHL, Beitr. 1820.
Cercopithecus Entellus DESMAREST, Mamm. p. 59. 1820.
Simia Entellus FISCHER, Synops. Mamm. p. 15. 1829.
Semnopithecus Entellus LESSON, Species des Mamm. p. 56. 1840. ¶

SPECIFIC CHARACTERS.—General colour, straw yellow, more or less inclined to ashy grey; superciliary hairs black; hands and feet washed with black.

LOCALITIES.—India and the adjacent islands.

DESCRIPTION.—The fur is moderate in length, soft, but not very full; the hair of the head radiates from a centre, and the superciliary bristles which project forward, are thickly set, long, and black; the general colour is ashy grey, with a tinge of straw-yellow, passing into dull yellowish on the whiskers, occupying the sides of the face; the under parts of the body are of a dingy white, with more or less of a straw tint. In young individuals, the hands and feet are washed with

dusky black, but this is not always the case in adults, which have a paler colouring altogether than the young, often verging upon dingy white, tinted with straw colour; the face is black, with a slight violet hue.

	ft. in.
Length of adult male, from head to root of tail	2 2
Ditto tail to end of hairs (which run into a sort of pencil, but do not form a tuft)	3 1

Although Thunberg described this species, in his *Travels in Europe, Asia, and Africa* (Upsal, 1793), as a native of Ceylon, under the country appellation of Rollewai, confounding it, at least as regards the name, with the Wanderoo; still, our first real knowledge of the animal is due to M. Dufresne, who published a description of it from a skin in his possession, under the title of *Simia Entellus*; which skin was the original of Audebert's figure, in the *Hist. des Singes et des Makis*. From the time in which M. Dufresne's description appeared (in *Bull. Soc. Philom.* 1797), till the year 1820, nothing farther was added to our information. The arrival of a young male at Paris, in that year, enabled Fred. Cuvier to give an original figure of it from the life; subsequently (1825), the drawing of an adult, sent home by M. Duvaucel, served as the copy of an additional, and very characteristic representation.

GENERAL HISTORY.—In England, the first living example on record was that which existed in the year 1829, in the gardens of the Zoological Society of London, and from which the excellent portrait was taken, which heads the description of the *Entellus* in the *Gardens and Menagerie delineated*. Since that period, several individuals have, from time to time, enriched the menagerie of the Zoological Society; none, however, have long survived their arrival; the humidity and changes of our atmosphere speedily inducing disease, or hastening its career. It was from the dissection of one which died in 1833, that Professor Owen ascertained the condition of the stomach in this species, as already intimated; and, subsequently, the Author of this work has dissected others. Till within the last few years, the museums of England and Continental Europe could scarcely muster, among them, more than two or three specimens; indeed, the only preserved specimen in the British Islands, till the year 1829, was one of a young individual in the museum of the Zoological Society. At present there are four excellent specimens in this museum (Nos. 11, 11 *a*, 11 *b*, 11 *c*, of Catalogue, 1838), besides others not exhibited. Specimens are, also, in the British Museum, and in that of the East India Company. Four specimens, also, are exhibited in the Museum at Paris.

In a catalogue of the Mammalia of Dukhun, by Colonel Sykes, published in the *Proceedings Zool. Soc.* for 1831, p. 99, the *Entellus* is stated

to occur in large troops in the woods of the western Ghauts ; but it is not venerated by the Mahratta people ; nor do they object to its being killed. Its Mahratta name is Makur. In other parts of India, however, the Entellus is regarded with profound veneration, and is often to be met with tame, in the houses of the natives, into which, even wild ones, assured by experience, sometimes enter in search of food ; while gardens and fields are frequently devastated by troops of them with impunity.

M. Duvaucel, in a communication to Fred. Cuvier, says : “ This species is much venerated by the Hindoos, who have deified it, and who give it one of the first places among their thirty millions of deities. Its appearance in Lower Bengal takes place principally towards the latter end of winter ;* but I have not been able to procure one ; for, zealously as I devote myself to my researches and pursuits, they have always been of no avail, in consequence of the assiduous care, with which the Bengalese have prevented my killing so revered an animal, the destruction of which is followed within the year by the death of the party. The natives drove away the Monkeys as soon as they saw my gun ; and, for more than a month, during which seven or eight individuals dwelt at Chandernagore, and which came even into the houses to seize the offerings of the sons of Brama, my garden was surrounded by a guard of pious Brahmins, who played on the tom-tom (a sort of gong, or drum) to drive away the deity when he came to eat my fruits. The most that I know about this species is its mythological history ; but, as this will be too long to relate here, I will only say that the Houlman (for such is its Bengal name) was a hero celebrated for strength, spirit, and activity, in the voluminous collection of the mysteries of the Hindoo people. They owe to it, here, one of the most valued fruits, the mango, which it stole in the gardens of a famous giant established at Ceylon : as the punishment of this theft, it was condemned to be burnt, and it was in extinguishing the fire that it singed its face and hands, which have ever remained black since that time. At Gouptipara (a sacred place on the Hoogly, inhabited by Brahmins, and covered with pagodas, in one of which is preserved the hair of the goddess Dourga) I saw the trees covered with long-tailed Houlmans, which took to flight, uttering frightful cries. The Hindoos, on seeing my gun, guessed the cause of my visit, as well as the Monkeys, and twelve of the former approached me in order to apprise me of the danger I incurred by firing on creatures which were nothing less than metamorphosed princes. I had no great fancy to listen to these charitable advocates ; nevertheless, pretending to be half convinced, I was going forward, when I met on my road a princess, so seductive, that I could not resist the desire to contemplate her more nearly. I fired, and I then beheld a scene truly touching ; the poor animal, which carried a young one on her back, was shot near the heart ;

* It appears to migrate from the upper to the lower provinces of this part of India.

she felt herself mortally wounded, and, collecting all her strength, she seized her young one, suspended it on a branch, and fell dead at my feet. An act so maternal made more impression on me than all the discourses of the Brahmins; and the pleasure of possessing a fine specimen, could not, for once, take away the regret I felt at having killed a creature which seemed to have a claim upon life, by sentiments and feelings which most strongly excite our esteem.”—F. Cuv. *Mamm.*

Mr. Ogilby informs us that the name, Houlman, by which the animal, according to Duvaucel, is known to the Hindoos, is misspelt, the real orthography being Hoonuman; and that by Gouptipara is meant the city of Goalpara. According to Colonel Sykes, “Makur” is its name among the Mahrattas of the western Ghauts; and, according to Mr. Ogilby, it is called “Lungar” by the hill tribes.

The history of the Entellus is interwoven with the mythology of the Hindoos; this wonderful Monkey is a god among their gods; and Hoonuman, king of the Monkeys, figures as one of the heroes in the wild epic poem of the *Ramayan*, the Iliad of the East; next to Rama (the Achilles in courage, the Menelaus in circumstances), he was the greatest of the warriors, performing, in combats with demons, prodigies of valour. The poem may, perhaps, be regarded as an allegory; but the introduction of Hoonuman into it as a hero, is sufficient to prove the veneration paid to these animals from the remotest periods. The Entellus, moreover, is one of the sacred animals, into which the souls of their departed friends are believed, by the faithful Hindoos, to pass. Considering these circumstances, the details of European residents in India, respecting the conduct of the Hindoos towards this animal, are the less surprising. Not only are their ravages and mischief tolerated, but, in the excess of religious zeal, the Hindoos erect temples to their honour, build hospitals for the sick or maimed, bequeath large fortunes for their support, and denounce the punishment of death upon the impious wretch who dares to kill one of so divine a race. Emboldened by indulgence, these Monkeys become daring and troublesome, and resent, in a body, the slightest injury inflicted on one of their companions. Forbes, in his *Oriental Memoirs*, gives us the following account of the Monkeys at Dhuboy; an account, equally applicable, as far as these animals are concerned, to a thousand other places. The durbar, or governor’s mansion, where he resided, with its courts and gardens, occupied, as he states, seven acres; it was almost surrounded by the lake, except near the principal gate, communicating with the town; a pavement of large flat stones admirably united, formed a dry walk at all seasons, above the steps of the tank, shaded, in most parts, by lofty trees, and adorned with fragrant shrubs, through which only a few houses and towers on the walls were visible; so that, from the windows of the durbar, overlooking the lake, everything

had more the appearance of a rural village than a fortified city. Near the durbar was a small woody island, affording a nightly roost for Cranes, Kites, and Crows; and shelter for a number of those immense Bats, not improperly called flying Foxes. To finish this picturesque scene, a ruined Hindoo temple, nearly covered with moss and clematis, in great variety, terminated the terrace-walk in the garden, where the animal creation had hitherto been so unmolested that the orange and lime trees were filled with Peacocks, Doves, and Bulbuls; Monkeys and Squirrels feasted on the pomegranates and custard-apples; while Pelicans, Spoon-bills, and other aquatic birds occupied the lake. "The intrusion of the Monkeys," adds the narrator, "I could have dispensed with; their numbers were often formidable, and their depredations serious. I believe there were as many Monkeys as human inhabitants in Dhuboy; the roofs and upper parts of the houses seemed entirely appropriated to their accommodation. While the durbar was repairing, on my first arrival, I resided a short time in one of the public streets: the back of the house was separated by a narrow court from that of a principal Hindoo. This being the shady side, I generally retired during the heat of the afternoon, to a veranda, and reposed on a sofa with my book; small pieces of mortar and tiles frequently fell about me, to which, supposing them to be occasioned by an eddy of wind, I paid no attention; until one day, when I was much annoyed by their repetition, accompanied by an uncommon noise, and a blow from a larger piece of tile than usual, I arose to discover the cause; and, to my astonishment, saw the opposite roof covered with Monkeys, employed in assaulting the white stranger who had unwittingly offended, by intruding upon their domain. Although my new situation invested me with considerable power, and made me the first man in the city, yet, as I knew I could neither make reprisals, nor expect quarter from the enemy, I judged it most prudent to abandon my lodging, and secure a retreat. I do not imagine the inhabitants of Dhuboy protect the Monkeys from any other motive than that of humanity to the brute creation, and their general belief in the metempsychosis; but, in Malabar, and several other parts of India, Dr. Fryer's assertion is very true that, to kill one of these Apes, the natives hold "piacular," calling them half-men, and saying that they once were men, but, for their laziness, had tails given them, and hair to cover them. Toward Ceylon they are deified, and at the Straits of Balagat they pay them tribute." In Dhuboy, according to the same author, if a man wish to revenge himself on his neighbour, for any insult or injury, he takes the opportunity, just before the periodical rains (about the middle of June) set in, and when the tiles have been adjusted to meet that season, of repairing to his neighbour's roof, and scattering over it a quantity of rice, or other grain: this is soon discovered by the Monkeys, who not only devour it,

but pull up all the tiles in search of what has fallen through the crevices. At this critical juncture the rain commences; no one can be found to reset the tiles; the house is deluged, the furniture ruined, and the depositories of grain, generally formed of unbaked earth rubbed over with cow-dung, soaked through, by the falling torrent.

The celebrated banian tree, called Cubbeer-bur (from the name of a saint), which grows on the banks of the Nerbuddah, and is supposed to be the largest specimen of that tree in India, measuring round the principal stems 2,000 feet in circumference, is tenanted, among other animals, by hosts of Monkeys, and myriads of Snakes. The overhanging branches of this extraordinary tree cover an astonishing space, like a vast canopy, under which grow custard-apple, and other fruit trees; and as it is constantly sending forth hanging branches to the ground, to form other trunks, it is continually increasing. It has not only sheltered the native chiefs, with their magnificent tents, arranged as saloons, dining and drawing-rooms, baths, chambers, kitchens, &c., together with their carriages, horses, camels, guards and attendants, but has even received an army of 7,000 men beneath its pavilion.

In this strange wood, the Monkeys, says Mr. Forbes, often diverted him with their antic tricks, and especially with the displays of their parental affection for their young offspring, in teaching them to select food, to exert themselves in jumping from bough to bough, and then in taking more extensive leaps from tree to tree; at the same time encouraging them by caresses when timorous, and menacing, and even beating them, when refractory. Knowing, by instinct, the malignity of the Snakes, these Monkeys are most vigilant in their destruction; they seize the reptiles, when asleep, by the neck, and, running to the nearest flat stone, grind down the head by a strong friction on the surface, frequently looking at it, and grinning at their progress. When convinced that the venomous fangs are destroyed, they toss the writhing Snake to their young ones to play with, and seem to rejoice in the destruction of the common enemy. Once, a friend of Mr. Forbes, on a shooting party, killed a female Monkey, under this tree, and carried it to his tent, which was soon surrounded by forty or fifty of the tribe, who made a great noise, and, in a menacing posture, advanced toward it; on presenting his fowling-piece they hesitated and appeared irresolute. But one, which, from his age and station in the van, seemed to be at the head of the troop, stood his ground, chattering and menacing in a furious manner; nor could any efforts, less cruel than firing, drive him off. He at length approached the tent-door, and, finding that his threatenings were of no avail, he began a lamentable moaning, and, by every token of grief and supplication, seemed to beg the body of the deceased, which was then given to him. With tender sorrow he took it up in his arms, embraced it

with conjugal affection, and carried it off, in a sort of triumph, to his expecting comrades. The artless behaviour of this poor animal wrought so powerfully on the sportsmen, that they resolved never again to level a gun at one of the Monkey race.

Protected and revered as the Entellus is by the Hindoos, its godship meets with no such respect from the larger beasts of prey ; it is especially obnoxious to the attacks of the Tiger ; and the terror of these Monkeys, at his appearance, so overcomes their presence of mind and activity as to lead to their destruction. "While the mischievous Monkey, and the innocent Dove," says the instructive writer above quoted, "found an asylum within the walls of Dhuboy, the adjacent country was infested with Tigers and savage beasts, which, in defiance of Pythagorean systems, and Brahminical tenets, waged perpetual war against the Antelopes and innocent animals near the villages : even the Monkeys, with all their wily craftiness, could not escape them." The peasants in the wilds of Bhaderpoor confirmed the stratagem used by the Tiger to effect his purpose, as mentioned by Dr. Fryer. "The woodmen assert that, when the Tiger intends to prey upon the Monkeys, he uses this stratagem : the Monkeys, on his first approach, give warning by their confused chattering, and immediately betake themselves to the highest and smallest twigs of the trees, when the Tiger seeing them out of his reach, and sensible of their fright, lies couchant under the tree, and then falls a roaring ; at which they, trembling, let go their hold, and, tumbling down, he picks them up to satisfy his hunger. That Monkeys are their food, their very ordure declares, scattered up and down, where is visible the shaggy coats of these creatures." The Entellus is very extensively spread over India, inhabiting, not only the hot lowlands, or plains, but the elevated and colder mountain ranges ; viz., the Ghauts, the Nepâl Hills, the Himalaya, and the high table lands of Bootan. Hence it would appear to be capable of enduring a considerable degree of cold with impunity, though not the changes and moisture of our climate.

Those which the author has had opportunities of observing in captivity have been remarkable for apathy, approaching even to melancholy, mixed with distrust and malice. The playful tricks of the Cercopithecæ, confined in the same cage, appeared rather to annoy than interest, or induce them to take part in the game ; and they bore the teasing of their companions with an air of impatience, but, at the same time, as if they were too listless to retaliate.

THE CROO.

SEMNOPIITHECUS COMATUS. (*Semnopithecus comatus*, F. CUVIER, Mamm. lith. fig. 1825.)

Semnopithecus comatus DESMAREST, in Supp. Mamm. p. 533. 1822.

Croo ♂. F. CUVIER, Mamm. lith. fig. tab. 11. 1825.

Presbytes mitrata ESCHSCHOLTZ, in Voyage de Kotzebue, iii. p. 353.

Simia comata FISCHER, Syn. Mamm. p. 16. 1829.

Semnopithecus comatus LESSON, Species des Mamm. p. 61. 1840.

SPECIFIC CHARACTERS.—Fur, soft and long; general colour, fine leaden grey; head, with a vertical compressed crest, of a blackish colour; hands and feet, whitish; tail tufted, and white at the tip.

LOCALITIES.—Sumatra, Java.

DESCRIPTION.—The face of an adult male in the Paris Museum is short, and of a brownish tint, with short, thinly-set grey hairs; the fur of the body consists of a soft, woolly, fine, but not very full, undercoat of greyish-white hairs, and of an outer vest of long, fine, silky hairs, loosely flowing (many of the length of five inches), and of a blackish colour, the general tint, resulting from the mixture, being a fine plumbeous grey; the hairs of the head form a compressed, ridged crest, somewhat peaked anteriorly; the top and sides of the head and the crest are dull black, with a brownish tint, losing itself in the plumbeous grey of the back; the shoulders and arms, externally, are of a deeper grey; the hands and feet are nearly white, with dark hairs interspersed; the tail is dark grey above, white beneath and at the tip, which is somewhat tufted; the inside of the arms, and of the thighs and legs, is abruptly pure white; which is the colour of the chin, whiskers, throat, and under surface of the body.

	ft.	in.
Length of head and body	1	9
Ditto tail	2	6½

An adult female, in the same museum, is similar, in colouring, to the male. Both were brought from Java, by M. Diard.

A nursling, also from Java, covered with delicate woolly fur, is altogether white, excepting a patch on the vertex (where the crest indicates itself), and down the spine, and along the upper surface of the tail, the hue of these parts being leaden black, or black with a tinge of grey.

It is, probably, to the present species that the “Guenon gris-blanc,” or “*Cercopithecus albo-cinereus*,” of Desmarest (*Supp.* p. 534), is referable; though, in some points, certainly, his description does not agree with it. Desmarest’s characters and description are as follow:—

“GUENON GRIS-BLANC, *Cercopithecus albo-cinereus* (not figured). A new species, from the collection preserved in the Museum, and brought by MM. Diard and Duvaucel.

“*Specific Characters.*—Fur, grey above, and of a deeper tint on the loins than elsewhere; the under parts whitish; a line of stiff black

hairs traverses the forehead ; the hands and feet are blackish ; the tail is brown ; size, that of the Diana Monkey.

“ *Description*.—The face is but little elongated, blackish and naked ; a row of stiff, black, and very long bristles is observable on the superciliary ridge ; these are erected upward and forward, and some are placed on the margin of the cheeks, rigid in texture, and directed laterally ; the cheeks, the top of the head, the back of the ears, and the chin are thinly covered with whitish hairs ; the ears are large, naked, angular, and black ; the shoulders, flanks, and outer surface of the humerus and of the thighs, are of a light grey ; the middle of the back is of a deeper grey, expanding and becoming more dusky towards the lumbar region ; the abdomen is white, and but thinly covered with hairs ; the limbs, externally, are of a deepish grey ; the top of the hands and feet blackish ; the tail is longer than the body, slender, and of a greyish brown.

“ *Country*.—The island of Sumatra.”

Respecting the *C. albo-cinereus*, M. Isidore says that no such animal was ever brought from India by MM. Diard and Duvaucel, answering to Desmarest's description, nor does any Guenon, agreeing with it, exist in the Museum of Paris. During the Author's recent visit to Paris, he examined, separately, every Monkey in the Museum, and, certainly, could discover no species to which the description can be said to be fairly applicable. Moreover, every specimen brought over from Java or Sumatra, and obtained there by MM. Diard and Duvaucel, is well known, and the species are not to be mistaken.

In the Catalogue of Zoological Specimens, appended to the *Life of the late Sir T. Stamford Raffles*, is introduced the *Semnopithecus* (?) *fascicularis* (*Simia fascicularis*, Raffl. *Linn. Trans.* vol. xiii. p. 246), with this observation: “ No specimen of this species, although it appears to be frequent in the forests of Sumatra and the Malay Islands, was found in Sir Stamford's collection. It is, of course, doubtful whether it is a true *Semnopithecus*.” By way of comment upon this passage, it may be stated, that the *Simia fascicularis* of Raffles, of which two specimens exist in the museum of the Hon. East India Company, and were thus entitled under the surveillance of Sir Stamford, is, certainly, the *Macacus carbonarius* ; and it is impossible to imagine on what grounds, with Sir Stamford's description before him, Fischer could have given the *S. fascicularis* as a synonym of *S. comatus*, an error which has led to no little confusion. There will be occasion to refer to this subject in the description of the Macaque alluded to.

GENERAL HISTORY.—Of the habits of the *Semnopithecus comatus*, or Croo, we have no definite accounts. So closely, however, do the *Semnopithecus* resemble each other in manners and general economy, that the details respecting one species are, to a great extent at least, applicable to all.

THE BLACK-CRESTED MONKEY.

SEMNOPIITHECUS MELALOPHOS. (*Semnopithecus melalophos*, F. CUVIER, Mamm. lith. 1821.

Cimcpaye F. CUVIER, Mamm. c. fig. tab. vii. 1821.

Semnopithecus melalophos . . . DESMAREST, Supp. 533. 1822.

Simia melalophos FISCHER, Synops. Mamm. p. 14. 1829.

Semnopithecus melalophos . . . LESSON, Species des Mamm. p. 61. 1840.

SPECIFIC CHARACTERS.—Contour, slender; fur, long and silky; vertical crest, compressed; general colour, fine fulvous red, paler on the under parts; a frontal stripe, and the crest, blackish.

LOCALITY.—Sumatra.

DESCRIPTION.—Description of an adult male (No. 15, of Catalogue, Mamm., 1838), in the museum of the Zoological Society, London. The contour of the body is long and slender; the head is small; the fur is long, soft, falling, and glossy; the head is ornamented with a long, compressed, peaked, vertical crest; the general tint is a fine, bright, golden rust colour, pure and rich on the limbs, but slightly washed with a dusky tint on the back; the lower part of the abdomen and the inside of the limbs are straw yellow; the crest is washed with a fuliginous tint, passing into black at the tip; a black or blackish line, beginning over the eyes, passes across the temples, and, turning up over each ear, merges into the colour of the crest; the occiput on each side of the crest, and the whiskers, are sandy red; the skin of the face is dusky blueish; the palms, soles, and nails are black; the form of the head and face is as in *S. cristatus*.

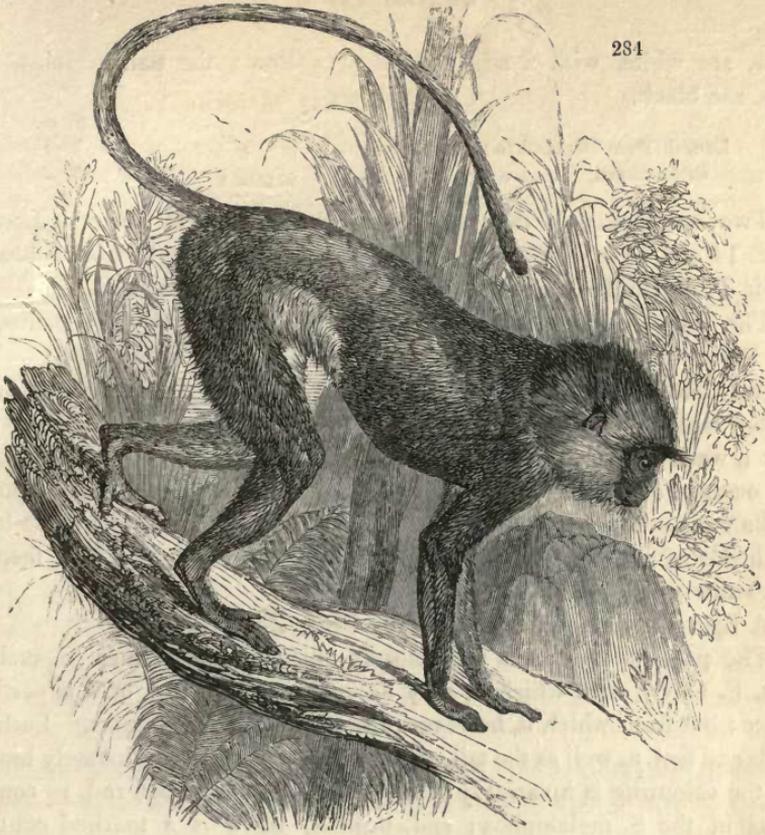
	ft. in.
Length of head and body	1 8
Ditto tail	2 8

A specimen examined in the Museum of Paris, differed slightly from the foregoing, in being somewhat more purely and brilliantly coloured. The general hue was deep rich red, without any wash of black on the back; a semilunar streak, over the temples from the superciliary ridge, was faintly perceptible; the crest was washed with black; the throat, abdomen, and inside of limbs were red, a little paler than the back.

	ft. in.
Length of head and body	1 7
Ditto tail	2 1
Ditto foot	0 5¼

In the description of the following species, some remarks will be made relative to a confusion in the nomenclature of the present animal, which, it must be observed, is not the *S. melalophos* of Sir T. S. Raffles; his *melalophos* being, in fact, the *S. flavimanus* of Isidore Geoffroy.

GENERAL HISTORY.—This beautiful Monkey is said to be extremely active, and to tenant the deep retreats of the forest; but of its exclusive habits and manners no details have been received.



THE SIMPAI, OR CIMEPAYE.

SEMNOPIITHECUS FLAVIMANUS. (*Semnopithecus flavimanus*, ISIDORE GEOFFROY, in Voyage Belanger, Supp. 38-74.)

Semnopithecus melalophos (Simpai), RAFFLES, in Linn. Trans. xiii. p. 242. 1822.

Semnopithecus flavimanus . . . LESSON, Species des Mamm. p. 60. 1840.

SPECIFIC CHARACTERS.—Contour, slender; fur, long, silky, and of a sandy rufous tint above, washed with black; head with a vertical crest; forehead and occiput, yellowish white; throat, under parts, and limbs, internally, abruptly white; a line from each ear, losing itself on the crest, black; fore limbs, externally, pale yellow; hind limbs, of a pale rufous tint.

LOCALITY.—Sumatra.

DESCRIPTION.—The fur is long and silky, and the hairs are elevated into a peaked crest on the top of the head; the contour is very slender; the hands and tail are long; the general colour of the upper parts and of the tail is sandy red, or pale reddish brown, slightly washed with dusky black, the ends of the hairs being thus tinted; the forehead and occiput are of a pale yellowish white; and a blackish shade, from each ear, spreads on the long, peaked vertical, crest, becoming more decided at its apex; the fore-arms and the posterior limbs, externally, are of a pure, pale, sandy yellow; the throat, the chest, abdomen, and inside of the

limbs, are white, with a slight tinge of yellow; the palms, soles, and nails, are black.

Length, from forehead to root of tail	ft. in.
Ditto of tail	2 3
	1 7

Two specimens, in the museum of the Zoological Society, London (Nos. 14 and 14 *a*, of Catalogue, Mamm., 1838), brought from Sumatra, by Sir T. S. Raffles, have furnished the preceding description.

The following was taken from the specimen of *S. flavimanus*, in the Paris Museum, the original of M. Isidore's description:—The general contour is slender; the fur is long, soft, silky; the head is ornamented with a long, peaked crest, or toupet; the back is of a sandy red, with a wash of black tinging the ends of the long hairs; the forehead and occiput are of a whitish yellow, with a brown wash, more decided on the crest; the tail is sandy red above; the beard is white; the belly and inside of the limbs are abruptly white; the hands and hind feet are of a straw yellow.

A figure will be found in Lesson's *Cent. Zool.* tab. xl.

The present species is very closely allied to the former (*S. melalophos*, F. Cuv.), with which it may be easily confounded, on a superficial glance; but from which it, however, differs in many particulars. Both the hands and feet, as well as the tail, are, in this species, proportionately longer, and the colouring is invariably destitute of the rich, golden red, so conspicuous in the *S. melalophos*; and, besides, there is a marked contrast between that of the upper parts, and that of the chest and abdomen.

The *S. flavimanus* is, undoubtedly, the *S. melalophos* of Raffles, as the specimens brought by himself, and placed under that name, in the museum of the Zoological Society of London, sufficiently prove; but the naturalists of the Paris Museum conferred that title upon another, also inhabiting Sumatra, and regarded, by them, as identical with the species described by Raffles, which latter, when it came into their hands, M. Isidore Geoffroy perceived to be distinct from the former, the *S. melalophos* of the French naturalists; and, accordingly, he described it in the *Supplement to Belanger's Voyage*, under the name of *flavimanus*. Hence the term, *flavimanus*, might be merged into a synonym of *S. melalophos*, Raffles; while to the *S. melalophos* of F. Cuvier and the French naturalists a new title might be given. This, however, would tend rather to increase than to disentangle the confusion; the term *melalophos* is, therefore, retained for the bright golden red species, and *flavimanus* for that to which M. Isidore has appropriated it; viz., the *melalophos* of Raffles, the *Simpai* of the Malays.

GENERAL HISTORY.—As in the instance of the preceding species, no account of the habits of this animal, in its native woods, has been recorded by travellers. It prefers the forests of the hilly districts to those of the plains.

THE KALASIE.

SEMNOPIITHECUS RUBICUNDUS. (*Semnopithecus rubicundus*, MULLER, in Tydschrift voor Natuurlijke, &c. vol. v. parts i. ii. 1838.)

- Kalahie* apud Banjarmaling.
- Kalasio* Bejadjoo Dayaks.

SPECIFIC CHARACTERS.—General colour, rufous brown, deeper on the hands and feet, black hairs being intermixed with the others; on the vertex the hairs form a circular corolla; occiput crested.

LOCALITY.—Borneo.

DESCRIPTION.—The whole of the body, and the tail are of a dark reddish brown; the hands and feet are uniformly of a darker hue, blackish hairs being intermixed with the reddish brown fur; on the top of the head the hairs form a circular crown, a peculiarity by means of which this species is readily distinguished from all other Semnopithecus of the Indian Archipelago; the occiput is decorated by a rather high crest, which falls down on the neck, in the form of a comb.

		ft. in.
Length of body in adult male	. . . . .	about 1 9
Ditto tail	. . . . .	2 4
Ditto head	. . . . .	0 4

GENERAL HISTORY.—Our knowledge of this remarkable species, of which we have never seen a specimen, is due to Dr. S. Müller; and it would appear, from the account which he has given, to be closely related to the *S. melalophos*, and the *S. flavimanus*; the difference, however, in the arrangement of the hairs of the head, and the tendency to black in the hands, independently of the browner tone of the general colouring, are sufficient to distinguish it from either of those Monkeys, which appear, besides, to be confined to the Island of Sumatra; while the Kalasio is found only in Borneo. Müller’s description is accompanied by a characteristic figure.

According to its discoverer, this species inhabits the elevated south-eastern parts of Borneo; and, like the *S. melalophos* of Raffles, which tenants the high lands of Sumatra, prefers mountain districts to low situations, being rarely found in the plains which border the sea-coast.

The inhabitants of Banjarmaling give to this Monkey the name of Kalahie, and the Bejadjoo Dayaks, that of Kalasio; which latter name is here adopted as its ordinary appellation.

THE LUTUNG, OR GOLDEN MONKEY.

SEMNOPIITHECUS AURATUS.

- Cercopithecus auratus* GEOFFROY, Ann du Mus. xix. 1812.
Cercopithecus auratus KUHLE, Beitr. 1820.
Cercopithecus auratus DESMAREST, Mamm. p. 56. 1820.
Semnopithecus pyrrhus HORSEFIELD, Zool. Research. c. fig. 1824.
Simia aurata FISCHER, Synops. Mamm. p. 15. 1829.
Semnopithecus auratus, et Semn. pyrrhus, LESSON, Species des Mamm. p. 63-4. 1840.

SPECIFIC CHARACTERS.—Fur long, soft, and of a glossy, golden, fulvous colour, paler on the under parts; a diffuse crest on the head.

LOCALITIES.—Java and the Moluccas.

DESCRIPTION.—The fur of a specimen from Java, presented by Dr. Horsefield to the Zoological Society, London, as his *S. pyrrhus*, is long, silky, and delicate, and falls gracefully down the sides; the head is ornamented with a full, diffuse, not peaked, crest of long hairs; the hair on the abdomen is soft, thin, and curled; the general colour is fulvous, or bright sandy red, with a golden gloss on the head, back, and tail; that of the under parts is pale golden, or yellowish; the palms of the hands and feet are of a pale yellow; the nails are tinted yellowish white.

	ft.	ln.
Length of head and body	1	7
Ditto tail	2	0

The present species was first described by Geoffroy (*Ann. du Mus.* xix. 1812), under the title of *Cercopithecus auratus*; and, as a comparison of examples will prove, it is identical with the *S. pyrrhus* of Horsefield, notwithstanding some little difference of colouring.

The original specimen of *S. auratus* exists in the Museum at Paris, and was carefully examined by the Author during his visit to that city. The head is furnished with a full, but not peaked, crest, the hairs being long and erect. The general colour is golden yellow; this hue being the most intense at the roots of the hairs, which are of a rusty yellow; the fur is long, straight, full, and glossy. A large, dusky, black patch, of an oval shape, two inches and a half long, is placed on each knee; and one or two little spots, of the same colour, are scattered on the toes of the feet; several marks, of a similar tint, occur also along the tail; the skin of the face has been painted dull pink, but that of the chest has evidently been orange. Excepting the dusky black patches, the general colour is the same as in *S. pyrrhus*, Horsefield, with which it agrees in form and general appearance. With respect to these patches, their position and irregularity prove them to be accidental; probably, the animal is subject to variations of this nature. The specimen described by M. Geoffroy is stated to have been brought from the Moluccas.



THE LUTUNG, OR GOLDEN MONKEY.

(*Semnopithecus auratus.*)

Length of head and body	ft. in.
Ditto tail	1 9
	2 4

Admitting that the species, described by Geoffroy as *C. auratus*, is identical with the *S. pyrrhus* of Horsefield, it will follow that the latter term must merge into a synonym; but the black marks which Geoffroy describes as characteristic of the *S. auratus* are no longer to be considered in such a light, and cannot be received as specific distinctions.

GENERAL HISTORY.—The habits and manners of this beautiful species present the same features as those of the other *Semnopithec*i; but the animal is little known, and has never been brought alive to Europe.

THE BARE-FRONTED MONKEY.

SEMNOPIITHECUS FRONTATUS (*Semnopithecus frontatus*, MULLER, in Tydschrift voor Natuurlijke, &c. vol. v. parts i. ii. 1838.)

Sampoolan of the Bejadjoo Dayaks of the south coast of Borneo.
Djirangan gunung of the Malays.

SPECIFIC CHARACTERS.—General colour, fine red, paler on the back; limbs and apical part of tail, blackish red; throat and abdomen, greyish yellow; vertical crest very long; a naked mark on the forehead, of a livid white; face black, surrounded by a black beard.

LOCALITY.—Borneo.

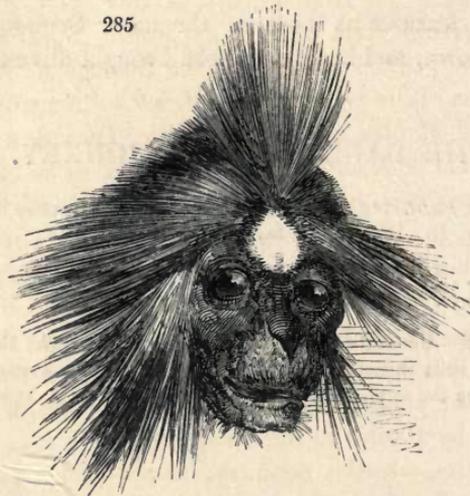
DESCRIPTION.—The limbs of this species are very slender; and it is characteristically marked, not only by this meagreness of form, but also by the presence of a high but narrow crest, which rises over the top of the head like a comb, and then falls over the occiput as far as the neck; it has, besides, above the nose, on the forehead, a large, naked spot, which is of a bluish white, or milky tint, contrasting very strongly with the small, dull, black face, surrounded by a long black beard on both sides of the cheeks. The fur, in adults, is generally dark red, but on the back, especially toward its anterior portion, the colour is lighter, inclining more or less to a yellowish grey; on the extremity of the tail, and toward the lower portion of the limbs, the general colour assumes, gradually, a dark, rusty-black tint, which on the hands of the anterior extremities becomes almost pure black; the throat, breast, and entire abdomen are yellowish grey; the iris is brown.

In the adult male, the length of the body amounts to about	ft. in.
Ditto ditto tail	1 9
	2 6

GENERAL HISTORY.—This beautiful species surpasses, in the elegance of its form, and in the agility and quickness of its movements, most of the others of the genus. The Bejadjoo Dayaks, on the south coast of Borneo,

know this Monkey by the name of Sampoolan; and the Malays who live there, by that of Djirangan gunung, which means Djirangan of the mountains, to distinguish it from the *Semnopithecus cristatus* of Raffles, which the natives designate simply Djirangan. From this difference of denomination, it is apparent that the present species (*S. frontatus*) inhabits, by preference, the higher districts; while the *S. cristatus* selects for its abode more especially the woods of the plains or lowlands.

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Head of the Bare-fronted Moukey.

THE HOARY, OR CRESTED MONKEY, OR CHINGKAU.

SEMNOPITHECUS CRISTATUS.

- Simia cristata* RAFFLES, in Descript. Cat. in Linn. Trans. (xiii. p. 244), read Dec. 5, 1820.
Chingkau of Malays, RAFFLES, ut suprâ.
Semnôpithecus pruinôsus . . . DESMAREST, Mamm. Supp. p. 533. 1822.
Semnôpithecus pruinôsus . . . LESSON, Species des Mamm. p. 62. 1840.

SPECIFIC CHARACTERS.—Contour slender; colour black, grizzled with white; fur long; hairs on the forehead diverging; occipital crest long.

LOCALITY.—Sumatra.

DESCRIPTION.—Description of an adult specimen (No. 19, Catalogue, Mamm., 1838), in the museum of the Zoological Society, London, forming part of the Rafflesian collection. The general form is peculiarly slender; the ears are large and rounded, and, together with the face, which is nearly naked, are of a black colour; the orbits are large; the beard is scanty; the neck is short; the hair of the body is long and falling; the universal colour is silvered, or hoary black, the hairs, which are black throughout the greater part of their length, having white tips; on the

under surface of the body the hairs are iron-grey; the hairs of the forehead diverge over the face; those on the top of the head are elevated into a long, peaked crest.

	ft.	in.
Length of head and body, nearly	2	0
Ditto tail	2	6

The Chingkau, when very young, is of a reddish fawn colour, with blackish hands and feet; when half grown, of a greyish brown, with black hands and feet; the frontal hairs, at this stage, diverge forward, and the peaked vertical crest is very apparent. Specimens (Nos. 19a, 19b, 19c, 19d, 19e), in the museum of the Zoological Society, London, exhibit the progress of the animal from infancy to maturity.

Sir T. Stamford Raffles observes, in *Linn. Tr.* vol. xiii. p. 145: "A variety of this animal is described, by the natives, to be of a light grey or whitish colour;" and it is, probably, on the strength of this observation that Baron Cuvier, in his *Règne Animal*, refers the *Simia cristata* of Raffles to the *Semnopithecus comatus*, or Croo, which he would not have done had he been acquainted with the specimens of the Chingkau brought home by that zealous naturalist. Cuvier, also, supposes the *S. maurus* to be the Tchincou (Chingkau); observing, however, in a note, that there is some confusion in the application of these Malay names, the term, Chingkau, being applied by Raffles to the *Simia comata*.

Other naturalists, on the contrary, consider the *Simia cristata* of Raffles to be identical with the *Simia maura* of Schreber. An examination of the specimens of the *S. cristata*, presented by Sir T. S. Raffles to the Zoological Society, London, will afford evidence of its distinctness. It differs from *S. maurus*, not only in colour, but in being a much more slender animal; in having the ears large, and exposed; and in the presence of a long, peaked, vertical crest. Desmarest, who must have been aware of Sir T. S. Raffles's name and account (since, in the description of the *Cimepaye*, *Suppl.* p. 533, he quotes this writer), failed to recognise, in the characters of the *S. cristata*, so clearly detailed (*Linn. Tr.* xiii.), the animal to which he applied the specific term, *pruinusos*, and with which it is identical. As to the priority of the two names, it is evident, from the reference made by Desmarest to Sir T. S. Raffles's paper, that the term, *cristata*, was applied to the species in question, before that of *pruinusos*.

GENERAL HISTORY.—The Crested Monkey, or Chingkau, inhabits the forests covering the flat districts of Sumatra; and, as it appears from Müller, also of Borneo: it is active and graceful; but nothing more is known respecting it.

THE BUDENG, OR MOOR MONKEY.

SEMNOPIITHECUS MAURUS.

- Middle-sized Black Monkey* . . EDWARDS, Gleanings, pl. 311. 1750 (?).
Simia maura SCHREBER, Saugth i. pl. 22, B. 1775 (?).
Cercopithecus maurus ERXLEBEN, Syst. Regn. An. 1777.
Simia maura LINNÆUS, Syst. Nat., ed. Gmelin. 1788.
Guenon nègre BUFFON, Hist. Nat. Suppl. vii. p. 83. 1789.
Negro Monkey PENNANT, Synops. 1771, et Quadruped. 1793.
Cercopithecus maurus GEOFFROY, Ann. du Mus. xix. 1812.
Cercopithecus maurus DESMAREST, Mamm. p. 55. 1820.
Tchincou F. CUVIER, Mamm. lith. fig. Nov. 1822.
Budeng of Javanese HORSEFIELD, Zool. Research. c. fig. 1824.
Simia maura et *S. Edwardsii* . FISCHER, Synops. p. 15. 1829.
Sennopithecus maurus LESSON, Species des Mamm. p. 63. 1840.
Cercopithecus Afer LATREILLE, in Buff. Hist. Nat. xxxvi. (?)

SPECIFIC CHARACTERS.—General colour black; fur long and silky, the hairs diverging from the vertex and concealing the ears.

LOCALITY.—Java.

DESCRIPTION.—In an adult specimen (No. 20, Catalogue, Mamm., 1838) in the museum of the Zoological Society, London, the general colour is deep black, with a decided silvery grey patch on the under surface of the tail at its root; the hairs of the head radiate from a centre, and those on the sides of the head and face are long and bushy, completely overhanging the ears; the fur is full, soft, long, and glossy; the face is flat; the length of the head and body is twenty inches; the tail is imperfect.

In the Museum at Paris is an adult specimen apparently identical with this species, of which the following is a description:—

The hair on the forehead is reverted forward; that on the sides of the cheeks is very full; on the body, the fur falls down over the sides; the general colour is black, grizzled about the face, on the shoulders and thighs, and also toward the end of the tail; but there is no white spot at the root of the latter, beneath.

	ft.	in.
Length of head and body	1	8
Ditto tail	2	2

In two middle-aged specimens, of a uniform black, agreeing in form, no white is perceptible at the root of the tail, nor yet in a nursling, which is also black, with the tail rusty beneath, and at the tip. In a young specimen (No. 20, in Catalogue, 1838) in the museum of the Zoological Society, there is no white spot at the root of the tail, but only a few grey hairs. On the head the hair radiates, that of the forehead being directed forward; and there is no crest: on the sides of the face the hair is full, long, and bushy, obscuring the ears; the fur is full and soft; the colour is glossy black; length, eighteen inches; tail, twenty-two inches and a half. Were it not for the absence of a peaked vertical crest, the adults of this species might be confounded with the *S. cristatus* (*Simia cristata*, Raffles), from which, however, it appears to be quite distinct. With

respect to the white, or whitish spot at the root of the tail underneath, and which is so distinct in the adult specimen in the museum of the Zoological Society, it cannot but be considered as a variable character. This species must not be confounded with the Lotong, or *Simia maura* (?) of Raffles, which is the *S. femoralis* of Horsfield; it is, however, most probably, identical with the *S. Edwardsii* of Fischer, which, in his *Synopsis*, he regards as synonymous with the "Middle-sized Black Monkey" of Edwards, and also with the *Cercopithecus maurus* of Erxleben, and the *C. Afer* of Latreille, in Buff. *Hist. Nat.* xxxvi.; at the same time he considers it as a doubtful species. He gives Guinea, with a query, as its habitat; doubtless, on the authority of Edwards, who states that the Monkey, figured by him under the name of "Middle-sized Black Monkey," came, as he was informed, from Guinea; but he does not assert it as an ascertained fact. In his description of this Monkey, Edwards observes that the hair above the eyes was long, and also on the temples, partly covering the ears; and adds, that he had an opportunity of seeing a Black Monkey, something like his species, called a Spider-Monkey, from the thinness and length of his limb, with four fingers, and a prehensile tail; in short, a species of the American genus *Ateles*. Now we gain, from this statement, an important fact; viz., that the long and slender limbs of this *Ateles* struck him as being like those of his "Middle-sized Black Monkey," thereby almost demonstrating that this animal must have been a *Semnopithecus* (in which genus the character of the limbs is much the same as in *Ateles*), and not one of the African genus, *Cercopithecus*; indeed, the figure given by Edwards, though rude, has all the appearance of a young species of *Semnopithecus*. That it was not an *Ateles*, is proved by its non-prehensile tail, and by the presence of a thumb on the hands. The Guenon nègre of Buffon, is founded partly on this Monkey described by Edwards, and partly on a Monkey entitled *Simiolus Ceylonicus*, by Seba; its specific appellation indicating it to be a native of Ceylon; and Edwards observes that, "in Siam, is a large species of Monkey, probably different from this;" viz., the "Middle-sized Black Monkey." Shaw, combining the accounts of Edwards and Seba, states the *Simia maura* to be a native both of Ceylon and Guinea; but he only refers to Edwards. What the "Middle-sized Black Monkey" was, or whence it really came, is of course impossible to be determined; and, in considering it as identical with the *Semnopithecus maurus*, the Author is to be understood only as assuming a probability, based upon the coincidence of his description with that of the present species, or, rather, upon its agreement with the specimens of *S. maurus* which he has examined. Dr. Horsfield, in his *Zool. Res.* (1824), states that, in the *S. maurus*, or Budeng (of which he gives the figure of an adult and young), the ridge of the nose is elevated; the chin short

and small; the tail somewhat tufted at the apex; the lips thin, and the irides dark brown. He also notices that the young, after birth, are fulvous, or reddish yellow; and that, afterward, a grey discoloration, first appearing on the hands, gradually extends to the neck, shoulders, and flanks; and, as it spreads, becomes darker, passing gradually into jet. Sir T. S. Raffles observes the same with respect to the young of the *Simia cristata* (Linn. Tr. xiii. p. 244), which appears to be synonymous with *S. pruinusosus*, Desm.

GENERAL HISTORY.—The Budeng, according to Dr. Horsfield, is grave, sullen, and morose; it is found in abundance in the extensive forests of Java, where it forms its dwelling on the trees, and associates in numerous societies. Troops, consisting of more than fifty individuals, are often found together. In meeting these Monkeys, it is prudent to observe them at a distance. They set up loud screams at the approach of man; and, by the violent bustle and commotion excited by their movements, branches of decaying trees are not unfrequently detached, and precipitated on the spectators. They are often chased by the natives for their fur; and great numbers are wantonly destroyed with cudgels and stones. The fur is simply dressed in the European manner; it is jet black, silky, and usefully employed in riding equipages, and military decorations. They are neglected and despised by the natives, as much time and patience are required to improve the natural sullenness of their temper. For many months they are grave and morose; and, as they contribute nothing to amusement, they are seldom seen domesticated in villages or dwellings. When young, they feed on the tender leaves of plants or trees; and, when adult, on wild fruits of every description.

THE WHITE-THIGHED MONKEY.

SEMNOPIITHECUS FEMORALIS. (*Semnopithecus femoralis*, HORSEFIELD, Appendix to Life of Sir T. S. Raffles, 1830, and Catal. of Mus. Zool. Soc. 1829).

Simia maura Sir T. S. RAFFLES, Linn. Trans. xiii. p. 247. 1822.

Semnopithecus chrysomelas . . . MULLER, Tydschrift voor Natuurlijke, vol. v. parts i. ii. 1838.

SPECIFIC CHARACTERS.—General colour, black; the inside of the humerus, and of the thighs, white or yellowish; as is also a line down the centre of the abdomen; occiput tufted.

LOCALITIES.—Borneo, Java (?), Sumatra (?).

DESCRIPTION.—Description of a specimen in the museum of the Zoological Society, London (No. 18, of Catalogue, 1838), forming part of the Rafflesian collection. The general colour is black, fading on the top of the head, on the occipital tuft, on the back and shoulders, into dusky brown: the hairs of the forehead project forward, and are rather long; short white hairs are scattered over the chin; and the fore-arms are grizzled with white hairs, intermingled among the black; the inside of the humerus,

from the axilla to the elbow, and the inside of the thighs, are white, with an abrupt margin; and a white line runs down the chest and abdomen to its lower part: the sides of the face are not tufted, but a line of short black hairs occupies the malar bones; the skin of the face, ears, and palms is black.

Length of head and body	ft. in.
Ditto tail	1 7
	1 10½

The present species, regarded by Sir T. Stamford Raffles as the *Simia maura*, was first described as an addition to the genus *Semnopithecus* by Dr. Horsfield, in the *Appendix to the Life of Sir T. S. Raffles*, under the specific title of *femoralis*, in allusion to the conspicuous mark of white which runs down the inside of the thighs.

The museum of the Zoological Society has been recently enriched by another adult example (female) of this rare Monkey from Borneo, and a young *Semnopithecus*, presumed to be specifically the same.

The adult female closely agrees with the individual from which the foregoing description is taken, excepting that, not only the inside of the thighs is white, or, rather, yellowish white, but that, this colour is continued in a distinct line, tapering down the inside of the legs to the ankle-joint.

The presumed young has the face of a reddish black colour, with black superciliary hairs; the fur is short; the general colour is white, with a black mark beginning on the vertex, and continued along the back, where it is broader, and thence along the upper surface of the tail. The outer side of the shoulders and arms are washed with black, as are also the posterior limbs, but less decidedly.

The young specimen of a *Semnopithecus*, in the collection of the Earl of Derby, presents the same characters; it is the *Semnopithecus dorsatus*, Waterhouse, in MSS. The following is an accurate description:

The general colour is white, with a very faint yellow and grey tint; the back of the head, the middle line of the back, the tail, and the external aspect of the fore limbs, together with the fore feet, are of a brownish black; there are a few longish black hairs on the fore part of the forehead; the tail is of a dirty yellow white beneath, for two-thirds of its length, and a few greyish hairs are intermingled with the black; toward the tip it becomes more full, and ends in a tuft; the hind feet are blackish, with grey hairs thickly intermingled on the toes; toward the hinder part of the foot the hairs assume the same pale colour as that of the legs, interspersed, however, with blackish hairs in about equal proportions; the dusky black colour of the anterior limbs is extended on the lower part of the fore-arm, so as nearly to surround the wrist; the face appears to have been brownish, or dusky, passing into dull flesh-colour around the eyes.

	in. lines.
Length from nose to root of tail	11 0
Ditto of tail	16 6
Ditto hind foot	3 5
From base of thumb to end of longest finger	1 11

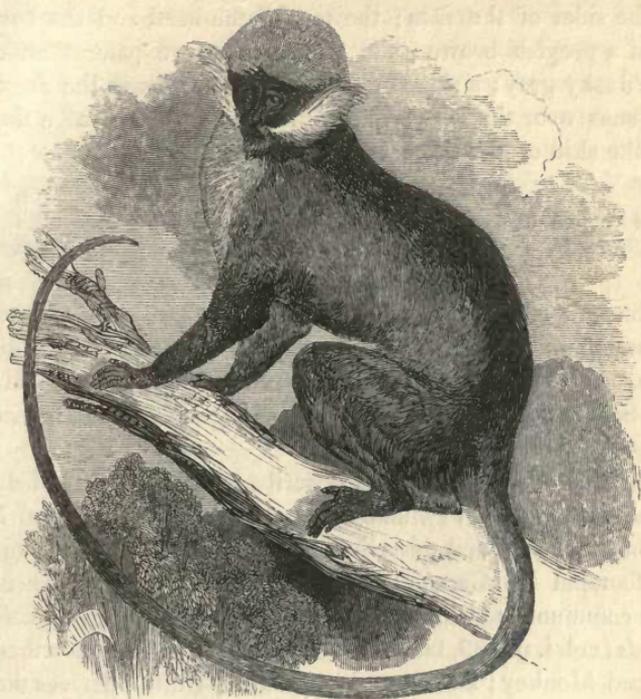
Müller, in his *Tydschrift voor Natuurlijke*, figures and describes a *Semnopithecus*, which he met with in Borneo, under the title of *S. chrysomelas*, but which, there can be little doubt, is identical with the *S. femoralis* of Horsfield. The subjoined details, given by the former traveller, agree with those afforded by the specimen (also from Borneo), which has been already mentioned, as recently added to the collection of the Zoological Society, London.

This species, in size, and the slenderness of the limbs, resembles the *Entellus*. The body throughout, with the tail, is uniformly black, excepting the interior of the arms, the lower part of the abdomen, and the basal portion of the tail, on all of which the fur is of an ochreous yellow tint. Of the latter colour, a well defined streak descends, tapering along the posterior sides of the inner margins of the hind legs, from the top to the heels; on the hands, also, as well as on the breast, silvery yellow hairs are mixed with the black colouring; on the top of the head the hairs form a comb-like crest, which extends from the occiput to the neck; the black hairs, both on the crown of the head, and also behind and under the ears, are elongated, by which means a sort of whisker is constituted on each side of the face; the colour of the face, of the ears, and of the palms, is sooty black, as in *S. maurus*.

	ft. in.
Length of the body about	1 6
Ditto tail	2 4

Müller states that his description was taken from the prepared specimen of an adult female; which, however, perfectly agreed in colouring with another adult female, and also with a male, of the same size, procured by M. Diard. A third example, obtained by the same traveller, at Pontianak, and, according to Müller, evidently belonging to this species, was found to differ in some degree from the other individuals, being of a dirty-reddish tint over the whole body, with many black hairs mixed among the yellow ones on the head and neck; while, on the outside of the limbs, and especially on the hands, smaller or larger spots of black were scattered. This specimen had a very imperfect covering of fur, and appeared to have been in a diseased state when killed.

GENERAL HISTORY.—In its habits, the White-thighed Monkey resembles the rest of the genus: it tenants the forests, living in troops, and is active in escaping from pursuit. It has never been imported alive into Europe.



THE WING-WHISKERED MONKEY.

SEMNOPITHECUS CEPHALOPTERUS.

- Lion-tailed Monkey* β PENNANT, Synopsis, p. 109, tab. xiv. fig. 2. 1771.
Cercopithecus cephalopterus . . . ZIMMERMANN, Geograph. Gesch. ii. pl. 185. 1780.
Guenon à face pourpre BUFFON, Supp. vii. p. 80, pl. 21. 1789.
Purple-faced Monkey PENNANT, Hist. Quad. vol. i. p. 187, pl. 21. 1793.
Simia dentata SHAW, Gen. Zool. i. p. 24. 1800. (?)
Cercopithecus latibarbatu . . . GEOFFROY, Ann. du Mus. xix. p. 96. 1812.
Cercopithecus latibarbatu . . . KUHLE, Beitr. 1820.
Cercopithecus latibarbatu . . . DESMAREST, Mamm. 1820.
Cercopithecus leucoprymnus . . . OTTO, Nova Acta Acad. Nat. Cur. xii. 1825.
Semnopithecus fulvo-griseus . . . DESMOULINS, Dict. Classique, vii.
Simia leucoprymna, et *Simia cephaloptera*, FISCHER, Syn. Mamm. p. 16, 17. 1829.
Semnopithecus Nestor BENNETT, in Proceed. Zool. Soc. p. 67. 1833.
Semnopithecus leucoprymnus, et *Semnopithecus Nestor*, LESSON, Species des Mamm. 1840.

SPECIFIC CHARACTERS.—Colour fuliginous, becoming black on the limbs; beard large, pointed, and whitish; head, brownish grey; crupper and tail, grey; the latter, at the apex, whitish, and tufted; face blackish, with a tinge of purple.

LOCALITY.—Ceylon.

DESCRIPTION.—The general colour of this species is fuliginous, or deep blackish grey, passing into black on the hands and feet; the lower part of

the back, the crupper, and the tail are of a pale grey, with a tinge of lake-brown; the end of the tail, which is somewhat tufted, becoming almost white; a large pointed or triangular beard, of soft, long, whitish hairs, occupies the sides of the face; the top of the head and the back of the neck are of a greyish brown; the under parts are paler than the back, being of a dusky grey; a ridge of stiff black hairs, as in the *Semnopithecus* generally, runs over the eyes; the palms and soles are of a dull black, as is also the skin of the face, with a tinge of purple.

	ft.	in.
The length of the head and body, about	1	9
Ditto tail, about	2	7

The above details are taken from a specimen (16 a, in Catalogue, 1838) in the museum of the Zoological Society, London, and which died in the menagerie. A smaller specimen (16, idem) is the original of Mr. Bennett's *Semnopithecus Nestor*, in *Proceedings of the Zoological Society, London, 1833*, p. 67.

The present species was first described by Pennant, in his *Synopsis* (p. 109, tab. xiv. fig. 1771), under the name of the Lion-tailed Monkey; and it is on this figure and description, that Zimmermann (*Geogr. Gesch.* ii. 1780) founded his *Cercopithecus cephalopterus*. Subsequently, from a drawing communicated to him by Mr. Loten, Pennant, in his *History of Quadrupeds* (vol. i. p. 189, tab. 21, 1793), figured and re-described it as the Purple-faced Monkey; and from this authority Buffon derives the delineation and account of the *Guenon à face pourpre*, in the *Supplement* to his great work (vol. vii.). In Pennant's *Quadrupeds*, the face and hands of this Monkey are stated to be purple; but, most probably, these parts were too highly coloured in the drawing mentioned; for, in a young example living in the menagerie of the Zoological Society, London, 1838-9, the purple tint on the face was very slight; and in specimens preserved in the museum, it is not to be discerned. In the *Annales du Musée*, 1812 (vol. xix.), M. Geoffroy St. Hilaire characterized the Purple-faced Monkey under the title of *Cercopithecus latibarbatus*, in allusion to the long, wing-like whiskers of white hairs, which garnish the sides of the face; whence also the title, *cephalopterus*, proposed, long before, by Zimmermann.

The next original description of this Monkey is by Otto (in the *Nova Acta Acad. Nat. Curios.* xii. 1825), under the title of *Cercopithecus leucopymnus*, that naturalist failing to recognise in his specimen the characters either of *C. latibarbatus*, as detailed by Geoffroy, or of *C. cephalopterus*, as drawn by Zimmermann, from Pennant's Lion-tailed Monkey, var. β . In Lesson's *Manuel*, while no notice is taken of *C. cephalopterus*, the *C. latibarbatus* and the *C. leucopymnus* are given as

two distinct species, without a suspicion, on the part of the author, as to their identity.

In 1833, Mr. Bennett, from a young specimen in the museum of the Zoological Society, London, as already stated, characterized his *Semnopithecus Nestor* (in *Proceedings of the Zoological Society, London*); observing, that "the moderate length of the hairs, the somewhat lighter colour, and especially the white of the lower part of the sides of the face, distinguish this species from the *S. leucoprymnus*." But neither to the *C. latibarbatus* of Geoffroy, the "Purple-faced Monkey" of Pennant, nor to the *C. cephalopterus* of Zimmermann, does he make any allusion.

M. Desmoulins in the *Dict. Classique d'Histoire Nat.* describes a species under the title of *Semnopithecus fulvo-griseus*, at the same time assigning Java as its habitat; the species, however, is, undoubtedly, the *S. latibarbatus*, or *leucoprymnus*, or *Nestor*. Very recently, the Author of this work carefully examined the specimen (a young female, with the tail imperfect) of the *S. latibarbatus* in the Museum of Paris, and which, as there is reason to believe, is the one from which M. Desmoulins took his external characters. Underneath the stand was written, "De M. Leschenault, 1822. *Semnopitheque de Ceylon*; espèce nouvelle. Il n'y avait pas de crâne dans la peau. C'est le *C. leucoprymnus* Otto (jeune); *Semn. fulvo-griseus* Desmoulins, *Dict. Classique*." It is also added, in reference to M. Desmoulins: "Il parait qu'il a pris un des squelettes du Cabinet d'Anatomie, appartenant au Croc (*Semn. comatus*), pour le squelette de cette espèce."

The description of this specimen is as follows:—Young female; tail imperfect; the sides of the face are bearded; the top of the head is of a vinous grey-brown; the general colour is smoky brown; the crupper is of a dull grey, with a tinge of lake-colour; the tail is of the same tint, but a little darker; the colour of the body deepens on the hands and feet to black, with a tinge of brown; the whiskers, beard, and throat are white. Length, from the top of the head to the root of the tail, nineteen inches. This description may be compared with that of the specimen, No. 16 a, in the museum of the Zoological Society, London, and with the description of *C. latibarbatus* in Desmarest's *Mammalogie*, p. 57, No. 16.

It would appear that, as respects intensity of colour, the *S. latibarbatus* is subject to some variation; the colour of the adults being the deepest: M. Temminck, indeed, describes it as black. The Author, however, has seen no specimen in which the general hue of the body is deeper than fuliginous, or deep blackish-grey, passing into black on the limbs.

GENERAL HISTORY.—The individual of the present species which lived for some time in the menagerie of the Zoological Society, London, resembled the *Entellus* in its general manners: it was extremely active, and sometimes lively, playing with its companions in captivity; it was

tolerably gentle and confiding, as far as concerned those from whom it was accustomed to receive its food; but toward strangers it manifested moroseness and distrust, and threatened with its teeth, when attempts were made to court its familiarity. This moroseness, had the animal completed its maturity, would, doubtless, have increased, as is the case with all the *Semnopithecus*, which, in adolescence, are sportful, fond, and pleasing; but which, when adult, and especially when advanced in life, become savage, and, from their long canines, very dangerous.

No information relative to the economy of the *Semn. cephalopterus* in a state of natural freedom has been obtained. It may be presumed, however, that, in the vast forests of Ceylon, it associates in troops, feeding on the fruits which abound in that luxuriant island.

THE DUSKY MONKEY.

SEMNOPIITHECUS OBSCURUS. (*Semnopithecus obscurus*, REID, in *Proceed. Zool. Soc.* p. 14. 1837.)

Semnopithecus leucomystax . . . TEMMINCK, in MSS. (?)

Semnopithecus obscurus Cat. Mamm. Zool. Soc. 1838.

SPECIFIC CHARACTERS.—General colour, sooty black, passing into dusky grey below; occiput with long hairs of a greyish brown colour; tail, dusky grey; hairs of upper lip and chin, white.

COUNTRY.—District adjacent to Singapore, in the Malay Peninsula.

DESCRIPTION.—The following details are taken from the original specimen, on which Mr. Reid founded the species, in the museum of the Zoological Society, (No. 21, of Catalogue, Mamm., 1838), and also from some fine specimens brought, in 1840, from Singapore, by H. Cuming, Esq., and presented by him to the same museum, (No. 21 a & b, of MS. App. to Cat.) The general colour is sooty black, inclining, on the shoulders, haunches, and central line of the back, to greyish, or to brownish black; the fur being long, flowing, and rather glossy: the hair of the head is directed backward; that on the occiput being very long, and lying like a crest, on the neck; the colour of this occipital crest is always of a paler hue than that of the body and forehead, and is sometimes of a greyish, sometimes of a pale brown tint; on the forehead the hairs are nearly black, and a row of long, stiff, black hairs runs along the superciliary ridge; the whiskers on the sides of the face are long, and directed backward; they are of the same colour as the body generally, or, perhaps, a little paler: the upper lip is furnished with scanty hairs, of a dirty white colour; but those about the angles of the mouth are black: a small tuft of dirty white hairs occupies the chin; the under parts are of a dusky or brownish grey; the hands and feet are black; the tail is always of a pale tint, sometimes grey, sometimes of a flaxen or yellowish hue. In a young, half-grown specimen, the general colour is sooty grey,



THE HOODED MONKEY.

(*Semnopithecus Johnii.*)

with a pale brown wash down the middle of the back; the limbs are grey; the abdomen is dirty yellowish white; the hands and feet are black; the tail, and the occipital crest are of a yellowish grey.

	ft.	in.
Length of an adult male, about	1	9
The tail, about	2	8

A specimen in the Paris Museum agrees precisely, in all respects, with the above description of the adult. It is a male. According to Mr. Cuming, this species, which he found to be very common at Singapore, varies greatly in the depth of its colouring, no two specimens being precisely the same. The general hue ranges from greyish black, or smoke grey, to black; the occipital crest and the tail being always paler than the other parts.

The present Monkey is closely allied both to *Semn. latibarbatus* and *Semn. Johnii*. In *Semn. Johnii*, however, the chest and under parts are black, as is also the tail, while the whole of the head is brown; but in *Semn. obscurus*, the fore-part of the head is always dark, the occipital crest alone being pale. In *Semn. latibarbatus* the whiskers are white, and the whole of the upper surface of the head is of a uniform greyish brown. In the present species the whiskers are of the same colour as the rest of the body generally.

GENERAL HISTORY.—Of the habits of this species no particular details have been received: its manners and modes of life are similar to those of the *Semnopithecus* generally; but naturalists have had no opportunity of observing it in captivity.

THE HOODED MONKEY.

SEMNOPITHECUS JOHNII.

Simia Johnii FISCHER, Synops. Mamm. 1829.

Semnopithecus cucullatus . . . ISIDORE GEOFFROY, in Voyage de Belanger, Supp.

Semnopithecus cucullatus . . . LESSON, Species des Mamm. p. 59. 1840.

SPECIFIC CHARACTERS.—Contour, robust; general colour, black; fur, glossy, long, and somewhat coarse; the head clothed with undulating greyish brown hairs; the crupper more or less inclining to grey, or chestnut brown.

LOCALITIES.—Malabar, and the neighbourhood of Madras.

DESCRIPTION.—Description of a specimen in the Paris Museum, brought by M. Leschenault, “des montagnes des Gates” (Ghauts):—The general contour is stouter than in the *Semnopithecus* generally, and the limbs and hands are robust and powerful; the fur is full, long, and rather coarse, with a good gloss; the hairs of the head fall back from the forehead; the whole of the head, whiskers, and beard are of a smoky greyish brown; the eye-brows are long, full, black, and very distinct; the face is black, with a few black hairs, especially about the angles of the

mouth ; the general colour of the body is dark brownish black, or, rather, black, with a tinge of chestnut, more apparent on the sides of the crupper ; the tint of the body passes gradually, on the fore-arms and legs, into jet black ; the hair on the hands and feet is rough, and coarse ; on the back the hairs are from three to four inches long, and longer still on the sides.

									ft. in.
Length of the head and body	.	.	.	.	.	.	.	.	1 10
Ditto tail	.	.	.	.	.	.	.	.	3 2

A young specimen of the preceding, ticketed, " Du nord de la côte de Malabar, par M. Dussumier, 1830," agrees precisely with the adult, excepting that its hair is not even tinged with chestnut, but is black, with greyish-black roots, the grey being a little more apparent about the hip-joint ; the tail is slightly grizzled ; the hair of the hands and feet is rough.

									ft. in.
Length of head and body	.	.	.	.	.	.	.	.	0 11
Ditto tail	.	.	.	.	.	.	.	.	1 8

Of two specimens in the museum of the Zoological Society, London, the adult (No. 17 a, of Catalogue, Mamm. 1838), is black, the top of the head being covered with long, bright, flaxen-brown, undulating hairs ; the occipital portion of the head is of the same colour as the body ; the whiskers are bushy, and brown ; the hairs of the face are black ; the crupper and outside of the thighs are grizzled, as is the tail, but more obscurely.

									ft. in.
Length of head and body	.	.	.	.	.	.	.	.	2 4
Tail imperfect									
Length of feet	.	.	.	.	.	.	.	.	0 7½
Ditto hands	.	.	.	.	.	.	.	.	0 5¾

From Madras.

The younger specimen (No. 17, Catal., Mamm.) also from Madras, presented by J. M. Heath, Esq., differs from the preceding, in having the whole head and back of the neck of a flaxen-brown ; the hairs on the top of the head, and the whiskers, are comparatively shorter, and there is no decided grey on the crupper ; but the outside of the thighs is suffused with sooty brown.

									ft. in. lines.
Length	.	.	.	.	.	.	.	.	1 8 0
Ditto of tail	.	.	.	.	.	.	.	.	2 5 0
Ditto foot	.	.	.	.	.	.	.	.	0 5 4
Ditto hand	.	.	.	.	.	.	.	.	0 4 0

This species was first characterized and named by Fischer, in his *Synopsis Mammalium*, p. 25, 1829, from a description by John (*Beschreib. einiger Affenarten in Neuen Schriften der Gellesch. Naturf.*

Freunde i., p. 25), who gives Tellichery (Malabar) as its locality; and it is, doubtless, identical with the *S. cucullatus* of Isidore Geoffroy, whose specimens were obtained in the range of the Ghauts, which extend from Bombay along the whole of the Malabar coast.

In the Paris Museum a specimen exists, which is here referred, though with some degree of doubt, to the *S. Johnii*; as it differs considerably in the general tone of its colouring, from any of the examples of this species hitherto examined. It is an aged female from Malabar, and is accompanied by a nursling, considered to be her own offspring. The fur resembles that of an adult *Entellus*; the back is of a fuliginous grey, becoming darker on the shoulders and thighs, and still more so on the arms and legs, where the colour is nearly black; the hands and feet being quite black: the head, whiskers, and beard, which latter is conspicuous, are of a dirty straw colour, passing insensibly into the hue of the back; the long eyebrows, and hairs continued from them over the sides of the cheeks, are black, as are also those scattered on the upper lip; the face is black; the tail is dark brown, its apical third being much paler; the inside of the humerus, and of the thighs and the under surface of the body, are of a dusky straw-colour.

	ft.	in.
Length of head and body	2	0
Ditto tail	3	2

The nursling is covered with close, soft, soot-coloured hairs.

It has been already stated that, in the *Semnopithecus obscurus*, the intensity of the general colouring is subject to great variation; and in the present species such also would appear to be the case; at least, if this specimen be truly referable to it.

GENERAL HISTORY.—Of the *Semnopithecus* it unfortunately happens that few species have been studied by naturalists in their native forests. Our knowledge of the habits of the *Entellus* only, is full and satisfactory; and this results from its extensive range of habitat, its numbers, and its veneration by the Hindoos, in the districts of India where so many Europeans reside, and on whose attention it may be said to have forced itself. But the Hooded Monkey, like many others inhabiting the remote forest regions of a wild and mountain country, is only to be seen occasionally, by such persons as venture into the woods in quest of game, and from whom it precipitately retreats. It may, indeed, be chased and shot; but the sportsman or traveller who preserves the skin, and transmits it to Europe, has no information to communicate, besides the locality where the animal was found. The *Entellus*, on the contrary, in the districts where it is held sacred, emboldened by toleration, instead of seeking remote abodes, throngs around the settled dwellings of man, devastates his gardens and cultivated fields with impunity, and divides with him the possession of the

territory. But with respect to other Semnopithecus, the interest which attaches to them, in the eyes of the man of science, cannot be fully participated in by the general reader, who is anxious to learn, principally, the economy of the species presented to his notice; a desire experienced also by the naturalist; but which, unfortunately, will not always be gratified. Let it, however, be recollected that our knowledge of the animals of this genus is but of recent date; that, of all now described, two or three only have been imported alive into Europe; and that, of the rest, excepting as far as is to be gained by an examination of preserved specimens, no information, or but little, has been acquired. At the same time, so closely are these Monkeys related to each other in form and structure, that it is not presuming too much to say that their manners and habits agree in every essential. Some may prefer the forests of elevated tracts, and others those which cover sultry lowlands; but all are essentially arboreal, all frugivorous, and all, when adult, indocile and morose. The Entellus, in fact, may be taken as a type of the rest.

GENUS.—COLOBUS.

Colobus ILLIG. Prodrum. Syst. Mamm. 1811.

GENERIC CHARACTERS.—Form and DENTITION as in Semnopithecus; STOMACH and CÆCUM as in Semnopithecus; (?) LARYNGAL SACCULI; (?) CHEEK-POUCHES; (?) THUMB of the fore-hands reduced to a nail-less tubercle, but with the bones in a rudimentary condition beneath the skin.

COUNTRY.—Africa, exclusively.

The genus *Colobus* may be described, in brief, as a repetition of Semnopithecus, with the thumb of the hand (see fig. 287) still more reduced, and useless; and it is upon this character, viz., the absence of a thumb, that it was founded by Illiger, in his *Prodrum*. As to the value of this negative character, remembering the almost rudimentary condition of the thumb in the Semnopithecus, and the very trifling



Hand of *Colobus*.

share of influence it exerts in their economy, we should not be disposed to lay much stress upon it, were not some extraneous importance given to it, by geographic distribution; a consideration which, in most instances, will avail little; but yet, which often corroborates the propriety of generic separations founded on characters of minor value. It is, indeed, true, that cheek-pouches, which cannot be said to exist in the Semnopithecus, are assigned, as a distinguishing character, to the Colobi;

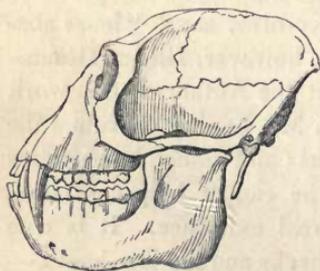
but upon this point there is some uncertainty. M. Rüppell, the only naturalist who has dissected one of these animals (see his account of the Col. Guereza, in *Neue Wirbelthiere Säugethiere*, i. 1835), does not make any mention of them. Mr. Ogilby, however, in his description of *Colobus fuliginosus*, C. Temminckii, (see *Proceedings of Zoological Society, London*, 1835, p. 98), observing that the face is short, the head round, and the whole form and habit those of the *Semnopithecus*, says, "the teeth are of the usual form and number, and there are large and very distinct cheek-pouches;" and he adds: "I was the more particular in making this last observation, because the organs in question had not been previously recorded as existing in the Colobi; and because M. Geoffroy St. Hilaire, in his valuable lectures, of which it is a matter of great regret that so small a portion has been given to the public, even doubts their existence. Of this, however, there can be no longer any reasonable doubt; they are extremely apparent, and rather capacious, in the specimen now under description." It may here be remarked, that Illiger, who established the genus, and that Desmarest,* who drew up its characters from Geoffroy, expressly affirm the presence of cheek-pouches; and M. Geoffroy, in his lectures, says, "leurs abajoues sont assez développées." Setting aside, however, Illiger, Desmarest, and M. Geoffroy, it is to be observed that the Author of this work has carefully examined the specimen, in which Mr. Ogilby considers the cheek-pouches to be both apparent and capacious; and though he hesitates in differing from so judicious a naturalist, yet he cannot help confessing that he felt by no means satisfied as to their real existence. It is true that there is a vacuum between the skin of the cheeks and the jaw-bones,—a vacuum not bounded posteriorly, as cheek-pouches are, but communicating with the hollow skin of the neck. Now, in effecting the preparation of the specimen,—and the remark applies to others also,—the skin of the head has, evidently, been separated from the bones, and, after the application of the ingredients used in preserving it, returned to its former position; hence, in drying, the skin no longer adhering to the bones of the jaws, a space between the skin and jaws would naturally be the result; and in a specimen so prepared, it would be difficult to say whether the vacuum, thus presented, indicated capacious cheek-pouches, or was merely a consequence of the flaying of the head, and the subsequent contraction of the skin, in drying. The fact is, that in dried specimens, as they are usually prepared, it is very difficult, if not impossible, to ascertain precisely, whether, in the living animals, cheek-pouches were present or not, and in this predicament stands the genus *Colobus*.

* Desmarest also gives cheek-pouches as characteristic of the genus *Semnopithecus*, a palpable error (see *Mammalogie, Supplement*, p. 532), proving how cautiously the assertions of the most accurate naturalists are to be received.

With respect to the presence of laryngeal sacculi, some doubt still exists.

Though the account of the stomach given by M. Rüppell (see his description of the *Guereza*) is very superficial, it is sufficient to satisfy us that this viscus approaches, if it does not quite resemble, in its sacculated character, that of the *Semnopithec*i. With respect to the cæcum, he states it to be rather small, and shaped like a nine-pin; if this account be correct, the difference between the *Colobi* and *Semnopithec*i, as far as this is concerned, is very considerable. The length of the intestinal canal in the *Colobi*, taking the *Guereza* as the standard, agrees with that of the intestinal canal of the *Semnopithec*i. The small intestines of the *Guereza* measured nine feet seven inches and a half; the large intestines three feet eleven inches; total, thirteen feet six inches and a half. The dentition of the two groups is precisely similar, as also is the form of the cranium (see fig. 288), which is remarkable for the boldness of the supra-orbital ridge, the distance between the orbits, the angularity and lateral projection of their osseous margin, and the depth of the lower

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Skull of *Guereza*.

jaw. As regards external characters, in physiognomy, in the presence of a projecting row of superciliary bristles, in the slenderness of the body, and length of the limbs and tail, the *Colobi* are repetitions, as before stated, of the *Semnopithec*i. Even in the fur may be traced their mutual resemblance; it is generally long, flowing, and glossy; and its character and colouring serve, as in the *Semnopithec*i, to subdivide the *Colobi* into sets or sections.

Of these, one section contains the species, either wholly black, or black ornamented with white; and with the hair, either of the whole body or of certain parts, peculiarly long and flowing; another section contains a set with long glossy hair, but not so long, on an average, as in the former, and remarkable for the mixture of black and bright maroon, bay and yellow, or dark and light bay, with which they are coloured; in size, too, they are scarcely equal to the former. A third section may be added, in which the fur is comparatively short, and, though still soft, partaking more than does that of the others, of the texture of the fur of the *Cercopithec*i: it also agrees in colour with that of a numerous group of the *Cercopithec*i, being olive, varying from a brownish to a greener tint, the hairs being annulated with black, a peculiarity not found in either of the foregoing sections, nor yet in the *Semnopithec*i. Of this section one example only is known; viz., the *Colobus verus* of Van Beneden; if, indeed, it be a *Colobus*.

Till within the last few years the genus *Colobus* comprised only

two species; viz., the Full-bottom Monkey of Pennant (*Colobus polycomus*), and the Bay Monkey of Pennant, (*Colobus ferruginosus*), neither of which have been seen by naturalists since the time of their describer. Recently, Kuhl, Rüppell, Ogilby, Waterhouse, and Van Beneden have added to the list, which now consists of ten accredited species; and of these, setting aside the *Colobus polycomus*, and *C. ferruginosus*, which do not appear to exist in any museum, and the *Colobus verus* of Van Beneden, which is only in the Museum of Paris, fine examples enrich the museum of the Zoological Society of London.

It is scarcely necessary to add, that the Colobi are as exclusively peculiar to Africa, as are the Semnopithecii to the hotter regions of Asia. Of the exact locality of one species, we are still ignorant; with regard to the rest they belong, respectively, to the borders of the Gambia, to Sierra Leone, and the island of Fernando Po, on the west, and to Abyssinia, on the east of that mighty continent.

THE KING MONKEY.

COLOBUS POLYCOMUS. (*Colobus polycomus*, GEOFFROY, Ann. du Mus. xix. 1812).

- Full-bottom Monkey* PENNANT, Quadr. i. 212, c. fig. tab. xlvi. et synops. 1771.
Simia polycomos SCHREBER, Säugth i. 94, c. fig. Penn. tab. x d. 1775.
Cebus polycomos ZIMMERMANN, Geogr. Gesch. 1778.
Guenon à camail BUFFON, Supp. vii. 65, c. fig. Penn. tab. xvii. 1789.
Simia comosa SHAW, Gen. Zool. i. p. 59, c. fig. Penn. tab. xxiv. 1800.
Cercopithecus comosus LATREILLE, Hist. Nat. Buff. ed. Sonnin. xxxvi. 286.
Ateles comatus GEOFFROY, Ann. du Mus. vii. 273. 1806.
Simia polycomos F. CUVIER, D'ct. Sc. Nat. xx. 34.
Simia polycomos DESMOULINS, Dict. class.
Colobus polycomos KUHLE, Reit. Zool. 1820.
Colobus polycomos DESMAREST, Mamm. 1820.
Simia polycomos FISCHER, Synops. Mamm. p. 13. 1829.
Colobus polycomos LESSON, Species des Mamm. p. 67. 1840.

SPECIFIC CHARACTERS.—General colour, black; the hairs of the head and shoulders being full, and very long, and of a yellowish white; tail, white; tufted at the extremity; fur of the body, short.

LOCALITY.—Sierra Leone.

DESCRIPTION.—The head is small; the face is short, black, and naked; the head and shoulders are covered with long, coarse, flowing hair, of a dirty-yellowish colour, mixed with black; the body, arms, and lower extremities, are covered with short hair, of a fine glossy blackness; the tail is very long, of a snowy whiteness, with long hair at the end, forming a tuft. Length of head and body, about three feet.

GENERAL HISTORY.—Our knowledge of this species is exclusively derived from Pennant, who is its only original describer; and it is from his figure and account, both taken from a skin which came under his notice, and which formed part of the celebrated Leverian Museum,

that all subsequent naturalists have copied. The most remarkable feature in this animal is the profusion of very long hair falling from the head and shoulders, of a dirty yellowish colour, and which is compared, by Pennant, to a "full-bottomed perriwig;" while the hair on the limbs and body is short. In the snowy whiteness of the tail, it agrees with two species described by Mr. Ogilby: one under the title of *Colobus ursinus*, the other under that of *Colobus leucomeros*. Both of these, however, have their distinguishing characters. In both, the hair of the body is very long, fine, and glossy, and not at all exceeded by that of the shoulders; the reverse of which is the case in *C. polycomus*.

Pennant gives no account of the habits and manners of this species; but observes that, in Guinea, it is called Bey, or King Monkey, and that the Negroes hold its skin in high estimation, using it for pouches, and for coverings to their guns.

THE GUEREZA MONKEY.

COLOBUS GUEREZA. (*Colobus Guereza*, RUPPELL, in neue Wirbelthiere Säugethiere 1. c. fig. tab. 1. 1835.)

Guereza of the Abyssinians.

Colobus Guereza LESSON, Species des Mamm. p. 68. 1840.

SPECIFIC CHARACTERS.—General colour, black; sides of the body and top of the loins ornamented with long pendent white hairs, forming a fringe-like mantle; face encircled by white; tail ending in a white tuft.

LOCALITIES.—Godjam, Kulla, and Damot, South and West Abyssinia.

DESCRIPTION.—The contrast of deep black and snow white, and the mantle of long flowing hairs which adorns the sides of this *Colobus*, render it at once beautiful and remarkable. Beginning on the shoulders, a series of long, flowing silky hair runs along each side of the body, meeting over the loins, and forming a mantle, which falls gracefully from the body, and hides the haunches and the thighs; its colour is white; a white bar crosses the forehead and spreads over the sides of the face, the throat, the sides of the neck, and the chin; the colour of the body and limbs, the outside of the thighs excepted, (this part being grizzled with white), is glossy black; the tail, at its basal half, is black, the apical half white and full-tufted; the skin of the face is black, but it is thinly covered with short white hairs.

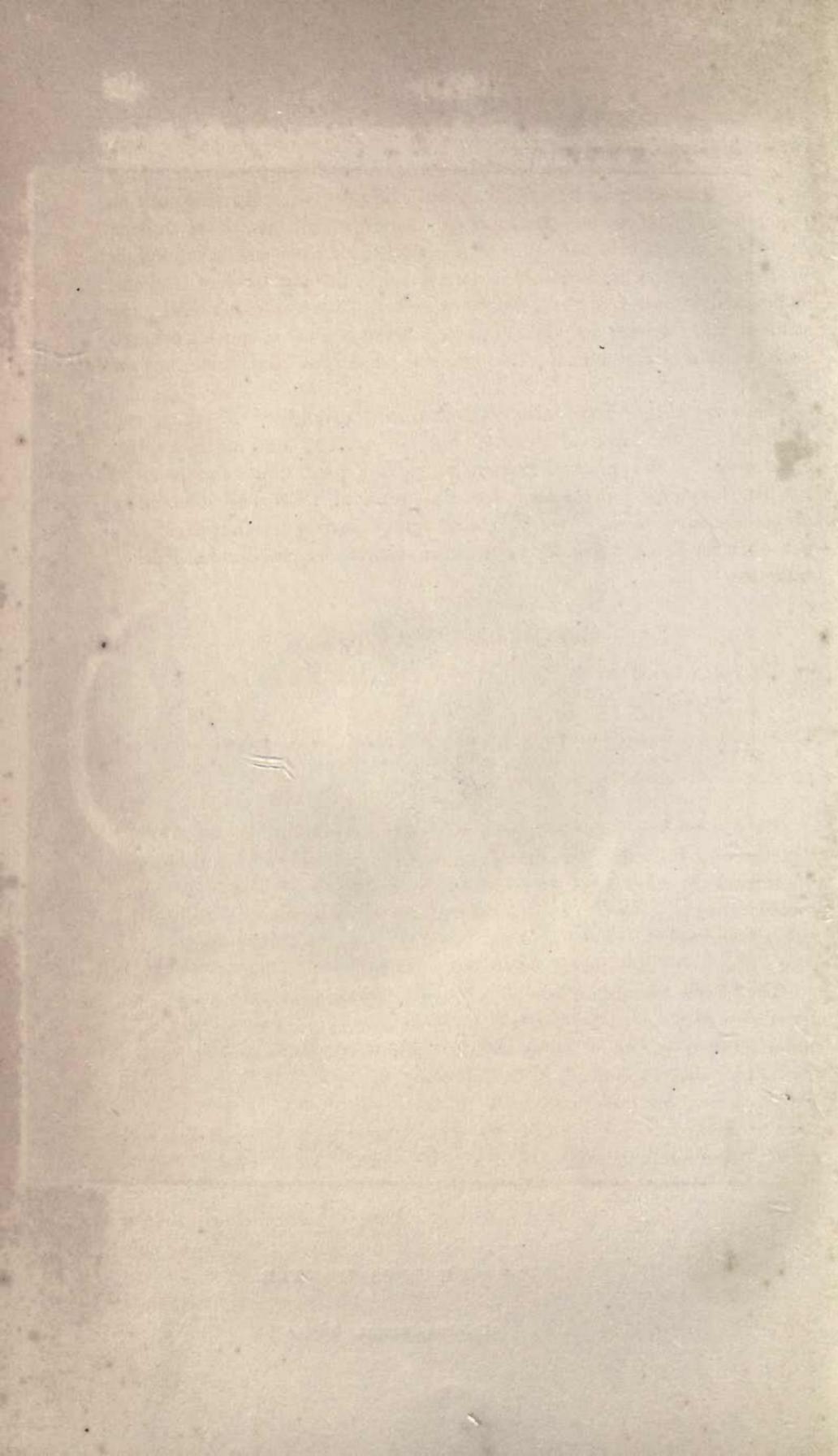
	ft.	in.
Length of adult from tip of nose to root of tail	2	4
Ditto tail	2	4½

Specimens of this rare species are preserved in the British Museum; the museum of the Zoological Society, London (No. 25, in Cat. Mamm. in Mus. Zool. Soc. 1838); the Museum of Paris; and the Museum of Frankfort.



THE GUEREZA MONKEY.

(Colobus Guereza. Rüpp.)



GENERAL HISTORY.—According to Rüppell, the Guereza lives in small families, tenanted the lofty trees in the neighbourhood of running waters. It is active and lively, without being unruly; and its disposition is gentle and inoffensive. Its food consists of wild fruits, grain, insects, &c. Its habits are diurnal—during the day it feeds, and it passes the night in sleep under the branches. It is only found in the provinces of Godjam, Kulla, and Damot, more especially in the latter, where it is hunted by the natives, who consider it a mark of distinction to possess a buckler covered with the skin of this animal; the part used being that from which flow the long white hairs.

Guereza is the Abyssinian name of this species of Monkey, and Ludolph (in the *Hist. Æthiopica*, lib. i. cap. 10), has made express allusion to it; the animal, however, which he figures under this name is not the Guereza, but another species. Salt, in his *Second Journey in Abyssinia*, also speaks of the Guereza; but, according to Rüppell, it does not exist in those parts of the country visited by the former learned traveller.

THE URSINE COLOBUS.

COLOBUS URSINUS. (*Colobus ursinus*, OGILBY, in *Proceed. Zool. Soc.* 1835, p. 98).

Colobus ursinus LESSON, *Species des Mamm.* p. 70. 1840.

SPECIFIC CHARACTERS.—Fur very long, glossy, and black; head, greyish white; tail white, tufted at the extremity.

LOCALITY.—Western Africa, Sierra Leone.

DESCRIPTION.—The fur is long and glossy, and of a jet black, over the whole of the body and limbs; the head, the back of the neck, and the throat, are of a silvery greyish white, becoming grizzled and intermixed with black, as this colour merges into the black of the body; the tail is long, and snowy white, with short hair, and slightly tufted at the end. The length of the fur on the back is about six inches.

The above description was taken from a fine skin, brought from Sierra Leone, by Major Henry Dundas Campbell, late governor of Sierra Leone, and exhibited at one of the scientific meetings of the Zoological Society (See *Proceedings* for 1838, p. 61). It is now in the Museum, 27 c, in *Suppl. to Cat. Mamm.* 1839.

Previously to the arrival of this skin three imperfect specimens only existed in the museum of the Zoological Society. (Nos. 27, 27 a, 27 b, of *Cat. of Mamm.* 1838). Two of these, which were said to have been obtained from Algoa Bay, were exhibited before the scientific meeting of the Zoological Society, June 26, 1832, and were regarded by Mr. Bennett as referable to the *Colobus polycomus*; the long milk-white tail, he observes, contrasted with the bright black fur of the body, being fully

sufficient to characterize it. The only discrepancy, he adds, observable between the specimen and the description of the species (*Col. polycomus*, or Full-bottom Monkey) given by Pennant, was in the great length of the hairs of the body, which were generally four or five inches long: this might be dependant on age or locality.

The value of the white tail, as an evidence in favour of Mr. Bennett's views, falls to the ground, when we know that this is also a character in the *Col. leucomeros*; besides which, the fur of the body, in no one specimen yet examined, has been otherwise than long; and there is no reason to presume that it is ever different.

Mr. Ogilby, when he described this species in the *Proceedings of the Zool. Soc. London*, 1835, p. 98, had not then seen a perfect skin; those from which he took his description wanting the head. Hence he observes: "Whether or not this species, like the *polycomus*, has the head of a different colour from the body, is a subject for farther observation; the white or silvery hairs, about the neck and shoulders, render it extremely probable that it has; but in no case can it form the striking contrast in length, nor present the long flowing mane, or wig-like appearance ascribed to the animal observed by Pennant." The correctness of Mr. Ogilby's remarks has subsequently been amply confirmed. Respecting the locality of the present species, he adds, "Mr. Gould, who procured these skins (*viz.*, the originals of his description) for the society, reported them as coming from Algoa Bay; we know enough of the zoology of that part of Africa, to render this account extremely doubtful; and the probability is, either that Mr. Gould was misinformed, or that he may have mistaken Delagoa Bay for Algoa, which, from the similarity of sound, might readily happen. If this conjecture should prove correct, it would follow that the *Colobus ursinus* was the analogue of the *Colobus polycomus* on the opposite coast; and the conjecture receives further countenance from the fact of many other known species of mammals having such analogues in the same localities." Very fortunately, the locality of the species is now ascertained, so that all speculation is at an end. The perfect skin, which we have described, was brought from Sierra Leone, by the late governor (Major H. D. Campbell), and Mr. Gould must have been misled.

GENERAL HISTORY.—Of the habits and manners of this beautiful Monkey, no accounts have been obtained; nor does it appear to have been seen alive by European travellers; the skins being purchased from the natives of the wooded districts, who bring them to Sierra Leone for the sake of barter.

THE WHITE-THIGHED COLOBUS.

COLOBUS LEUCOMERUS. (*Colobus leucomerus*, OGILBY, in *Proceed. Zool. Soc.* 1837. p. 69.)

Semnopithecus vellerosus ISIDORE GEOFFROY, *Voyage de Bellanger*, p. 37.

Semnopithecus bicolor WESMAËL, *Bull. de l'Acad. Royale des Sciences*, July 4, 1835, vol ii. p. 236. 1836.

SPECIFIC CHARACTERS.—Fur very long, silky, and of a shining black; a frontal stripe, the beard encircling the face, the throat, the thighs externally, and the tail, white.
LOCALITY.—Banks of the Gambia, Western Africa.

DESCRIPTION.—The fur is long, fine, silky, and shining; the general colour is black; a white frontal band spreads from the forehead over the whiskers on the sides of the face (which are large), and, passing down, occupies the throat; so that the face is surrounded with white, which is narrowest on the forehead; the hairs, covering the thighs externally, are white, more or less mixed with black, especially where the white begins to merge into the latter colour; the tail is long, and of a snowy white: size equal to that of the *Guereza*.

A perfect specimen, seen by the Author at an animal preserver's in Paris, 1838, furnished the details of this description.

An imperfect skin (No. 28, of *Catalogue of Mamm.* 1838), the original of Mr. Ogilby's description in the *Proceedings of the Zool. Soc.* 1837, exists in the museum of the Zoological Society, London. It was brought from the River Gambia. Imperfect skins exist in the Museum of Natural History of Paris.

This remarkable species has received three different specific titles; viz. *Semnopithecus vellerosus*, Isid. Geoffroy; *Semnopithecus bicolor*, Wesmaël; and *Colobus leucomerus*, Ogilby: in Lesson's *Species des Mammifères* these stand as the names of three distinct Monkeys. In the present work, that given by Mr. Ogilby is adopted; for to this naturalist belongs the credit of having correctly characterized it.

GENERAL HISTORY.—The White-thighed Colobus, like the two preceding, has never been observed by European travellers in its native forests; and nothing is ascertained respecting its habits and instincts, which, it may be believed, resemble those of the other species.

THE BLACK COLOBUS.

COLOBUS SATANAS. (*Colobus Satanas*, WATERHOUSE, in *Proceed. Zool. Soc. Lond.* 1838. p. 58.)

SPECIFIC CHARACTERS.—General colour black; the fur very long, and but slightly glossy.
LOCALITY.—Fernando Po.

DESCRIPTION.—The fur is extremely long, rather coarse, intensely black, and but slightly glossy; there is no under fur; on the back the hairs measure, on an average, fully ten inches.

	ft. in.
Length of head and body	2 7
Ditto tail	3 0

Three skins, one imperfect, the other two perfect, with the exception of the hands, the originals of Mr. Waterhouse's description, exist in the museum of the Zoological Society, London (Nos. 28 A, 28 A, a, in Suppl. Catalogue Mamm. 1839). They were presented by G. Knapp, Esq. The uniform black colour of this species will at once distinguish it from *Col. ursinus*, and *Col. leucomeros*, its nearest allies.

GENERAL HISTORY.—The specimens, from which the original description was taken, were brought from Fernando Po; but no details regarding the history of the species accompanied them; and, consequently, the habits and manners of this species are among the desiderata of the naturalist.

THE BAY MONKEY.

COLOBUS FERRUGINOSUS. (*Colobus ferruginosus*, GEOFFROY, Ann. du Mus. XIX. 1812.)

<i>Bay Monkey</i>	PENNANT, Quad. i. 218. 1771.
<i>Autre guenon</i>	BUFFON, Hist. Nat. Suppl. vii. 66. 1789.
<i>Simia ferruginea</i>	SHAW, Gen. Zool. i. 59. 1800.
<i>Simia ferruginea</i>	DESMOULINS, Dict. Class.
<i>Simia ferruginea</i>	F. CUVIER, Dict. Sc. Nat.
<i>Simia ferruginea</i>	DESMAREST, Mamm. 53. 1820.
<i>Simia ferruginea</i>	FISCHER, Synops. Mamm. p. 13. 1829.
<i>Colobus ferruginea</i>	LESSON, Species des Mamm. p. 68. 1840.

SPECIFIC CHARACTERS.—General colour ferruginous; the top of the head, the tail, and limbs, externally blackish.

LOCALITY.—Sierra Leone.

DESCRIPTION.—The crown of the head is black; the back is of a deep bay colour; the outside of the limbs are black; the cheeks, the under part of the body, and the legs are of a very bright bay; the tail is very long, slender, and black.

The above is, in substance, Pennant's description of a specimen formerly in the Leverian Museum, brought by Mr. Smeatham, from Sierra Leone. Several species, agreeing more or less closely with the above description of the Bay Monkey, by Pennant, but still affording good grounds on which to regard them as distinct, have to be noticed, and in the account of each respectively, these specific differences from the present species will be pointed out.

GENERAL HISTORY.—This species rests solely upon Pennant's brief description of a specimen formerly in the Leverian Museum; but, with the fact of its having been brought from Sierra Leone, our information ends; with respect to the habits and manners of the animal in its native country, nothing was collected by its first describer, nor has anything been subsequently ascertained.

TEMMINCK'S COLOBUS.

COLOBUS TEMMINCKII. (*Colobus Temminckii*, KUHLE, Beltr. 1820.)*Colobus Temminckii* DESMAREST, Mamm. p. 53. 1820.*Colobus fuliginosus* OGILBY, in Zool. Proceedings, p. 97. 1835.*Colobus Temminckii* LESSON, Species des Mamm. p. 69. 1840.

SPECIFIC CHARACTERS.—General colour of the upper parts sooty black, darker on the head; sides of the body, limbs, and tail, ferruginous; under parts yellowish white, sometimes whitish.

LOCALITY.—Gambia, Western Africa.

DESCRIPTION.—The top of the head is black, as is also the occiput, which latter is slightly sprinkled with rufous; the back, and the outside of the humerus, and of the thighs, are fuliginous, or of a sooty black colour, with a slate-blue tint; the sides of the face, the chest, the sides of the humerus, and the whole of the fore-arms are of a rufous colour, which becomes deeper and brighter on the hands: the anterior part of the thighs, the knees, and the legs, are also rufous, the feet being of a deeper hue; the throat, together with a line along the sides of the chest and of the abdomen, are of a sandy yellow; the middle of the chest, and of the abdomen is abruptly of a dirty yellowish white, varying to white; the tail, at the base, is black, with rufous hairs intermixed; it then assumes a chestnut red, or rufous colour, becoming darker at the extremity, where black hairs are numerous intermixed: an obscure dusky line runs along the whole of its upper surface; the tip is somewhat tufted. The naked skin of the face is brown, with a tinge of red purple; the palms and soles are of a purplish black.

	ft. in.
Length of head and body	2 2
Ditto tail	2 6

The preceding description of this remarkable species, is taken from a fine specimen in the museum of the Zoological Society, London (No. 26 of Suppl. Cat. Mamm. 1839).

Fischer, induced, probably, by the authority of Temminck, has united this animal (the *Colobus Temminckii*) with the *Colobus ferruginosus*, or Bay Monkey of Pennant, which he would not have done had he attended to the description of Pennant, who states the back of the *Colobus ferruginosus* to be of a deep bay colour; whereas Kuhl describes the *Colobus Temminckii* as having the head, neck, back, shoulders, and outer face of the thighs black; the hands, face, and tail, purplish red; the rest of the members clear red; the belly reddish yellow.

It was on a very pale coloured and aged female of this species, in the museum of the Zoological Society, London (No. 26, in Cat. Mamm. 1838), brought from the river Gambia, that Mr. Ogilby founded his

Colobus fuliginosus, which term sinks into a synonym of *Colobus Temminckii*, Kuhl.

The original of Kuhl's description was formerly in Bullock's Museum, but is, at present, in that of Leyden. With respect to the locality of this species, it is now ascertained to be Gambia, whence the specimen described by Mr. Ogilby was brought by Mr. Rendall (1835); others have been also received from the same district; the settlement of this point is of the more value, inasmuch as the locality whence Kuhl's original specimen was obtained is unknown.

In a very young example of this *Colobus*, recently examined, the fur of the back, which is of a deep, sooty, slate colour, is obscurely freckled with yellowish, each hair having a minute annulation of this tint: on the occiput, as in the adults, a marked transverse line is seen, where the hairs are more freely annulated with rust colour, communicating to this part a general rufous tinge: an abrupt yellow streak runs down each side of the body. The under parts are very thinly clad with silky white hairs; the tail is a dirty yellow at the base, rust coloured at the apex; the hind toes are all united as far as the first joint.

GENERAL HISTORY.—Nothing has been collected relative to the history of this species as it exists in a state of freedom.

THE RED AND BLACK COLOBUS.

COLOBUS RUFO-NIGER. (*Colobus rufo-niger*, OGILBY MSS.)

Colobus rufo-niger Catalogue Mamm. Zool. Soc. Suppl. 26 A, and 26 A, a. 1839.

SPECIFIC CHARACTERS.—Colour of the upper parts, and of the sides of the humerus and thighs, black; sides, and under part of body, chestnut red.

LOCALITY.—Gambia, Western Africa.

DESCRIPTION.—The head and the back are black, which colour extends over the outer side of the humerus, and of the thighs; the tail is black, with a tinge of chestnut; the whole of the under surface is maroon, or chestnut red; the knees are also chestnut red; and, as far as admits of being traced, this is the colour also of the fore-arms and legs; the specimens, however, being imperfect in the extremities, it is impossible to say whether the colour is pure and bright, as in *Colobus Temminckii*, and, according to Pennant's description, in *Colobus ferruginosus*; or more or less clouded with black: the fur of the body is long and soft; size that of *Colobus Temminckii*.

Three distinct specimens, imperfect in the limbs, exist in the museum of the Zoological Society of London: one is a late acquisition to the museum; it was presented by Edward Rudge, Esq., and obtained in the

district of the Gambia, Western Africa ; and it is from this (No. 26 A, Catalogue Mamm. Suppl. 1839) that we have taken our description.

The other two are the skins (No. 26 A, a, Catalogue Mamm. Suppl., 1839) referred to by Mr. Bennett in the *Proceedings of the Zool. Soc. Lond.* 1832, p. 122, and considered by him to be those of the *Colobus ferruginosus* (or Bay Monkey), when, as he adds, at the particular stage in which it is "described by M. Kuhl, under the name of *Colobus Temminckii*," Mr. Bennett, evidently regarding the latter as a mere variety of the former. To the same specimens Mr. Ogilby also subsequently alludes in the *Proceedings of the Zool. Soc. Lond.*, 1835, p. 99, observing, "notwithstanding some slight discrepancies, I agree with Mr. Bennett, in referring to the *Colobus Temminckii*, Kuhl (regarding it, however, as truly distinct from *Colobus ferruginosus*), the two other skins noticed by him in the part of the *Proceedings* already referred to. These skins were procured at the same time, and, most probably, in the same locality as those of the *Colobus ursinus* ; they were equally imperfect ; the hair of the shoulders and back is dead black, and without the beautiful gloss so conspicuous in the *Colobus ursinus* ; on the flanks, and over every part of the limbs, the colour is uniform maroon, or clear purple red ; the head and hands are wanting ; but the maroon of the tail is much deeper than that of the legs and flanks, approaching almost to black ; and in the older of the two specimens it is actually replaced by that colour on the terminal half of the tail."

Recently, however, Mr. Ogilby has had reason to alter his opinion, and to regard the skins in question as belonging to a species equally as distinct from the *Colobus Temminckii*, Kuhl, as this is from the *Colobus ferruginosus*.

The locality in which they were said to be obtained, viz., Algoa, or, with a query, Delagoa Bay, is evidently incorrect. The specimen presented by Mr. Rudge, came, without doubt, from the region of the Gambia, which may be regarded as the habitat of the species.

GENERAL HISTORY.—As is the case with all the Monkeys of this genus, one alone excepted, nothing is known of the habits and manners of the present *Colobus*.

PENNANT'S COLOBUS.

COLOBUS PENNANTII. (*Colobus Pennantii*, WATERHOUSE, in *Proceedings Zool. Soc. Lond.* p. 57, 1833.)

SPECIFIC CHARACTERS.—Head, and central line of back, black ; the sides, fulvous red ; under parts, yellowish ; tail, blackish brown ; cheeks and throat, whitish.

LOCALITY.—Fernando Po.

DESCRIPTION.—The prevailing colour is a bright rusty-red ; the head, back of the neck, and the central portion of the back, are black ; the

cheeks and throat are white, or dirty white; the chest, the fore part of the shoulders, the under parts of the body, and the inner side of the limbs, are dirty yellow; the inner side of the thighs is whitish; the hairs of the tail are brownish black. The fur is long and not very glossy; that on the head and fore parts of the body is the longest. There is no soft under fur; the hairs are of a uniform colour to the base, or, at least, are but very slightly paler at that part. The portion of the back, which is described as black, partakes in some degree of the rusty hue which prevails over the other parts of the body; it occupies only a narrow stripe of the dorsal region, and blends indistinctly into the rust colour. The lower parts of the limbs are removed, but as they are black at the knee, and also assume a deep hue below the elbow, it is probable that the remaining portions are black externally; but internally, as far as can be seen, the limbs are yellowish, or yellow white.

	ft. in.
Length of head and body	2 3
Ditto tail	2 5

Two specimens exist in the museum of the Zoological Society, London, Nos. 26 B, 26 B, a, of Suppl. to Cat. Mamm. 1839. Mr. Waterhouse, in his account of this species, observes, that it is "the nearest yet found to the Bay Monkey of Pennant, but that it differs in having the throat and cheeks white, and in having three distinct shades of colour on the body; while in Pennant's animal, the cheeks are of a pale bay colour, and the body is deep bay above, and pale bay beneath. It might be argued that, by 'deep bay,' Pennant meant to designate the peculiar colour described by me as black with a rusty hue: if so, he could scarcely apply the term 'very bright bay' to the parts which I call yellow. If, however, even this were the case, there is still another distinct tint which he has not mentioned, and that is the bright rusty-red colour of the sides of the body and limbs. On the whole, therefore, I think I am right in applying a name to the animal here described, which, it must be remembered, is from a different locality; viz., Fernando Po; that of the Bay Monkey being Sierra Leone. There is another circumstance which should lead us to be cautious in pronouncing any species, which differs as much as that here described, to be identical with Pennant's animal, since it so happens that each red Colobus discovered has, in its turn, been referred to the Bay Monkey, or to the *Simia ferruginea* of Shaw, which is the same animal, and has had one or both of these names applied, and subsequently changed upon the discovery of the next species; in consequence of which much confusion has arisen. I think we had better let the Bay Monkey stand until we can find an animal agreeing with Pennant's description."

GENERAL HISTORY.—It need scarcely be said that nothing is known of the habits and manners of this species.

BENEDEN'S COLOBUS.

COLOBUS VERUS. (*Colobus verus*, BENEDEN, "Notice sur une nouvelle espèce de singe d'Afrique," in BULL. de l'Académie Royale de Bruxelles, tom. v. No. 6, c. figurâ. 1838.)

Colobus verus LESSON, Species des Mamm. p. 70, 1840.

SPECIFIC CHARACTERS.—General colour, greenish, or olive brown; the hairs round the callosities, rust coloured; throat, grey.

LOCALITY.—Africa, district unknown.

DESCRIPTION.—General contour, stouter than in the ordinary Colobi; the limbs are tolerably robust, and the tail is very long. The head, the neck, the back, and the base of the tail are covered with hair of an olive-brown; this colour approaches that of the Sphinx Baboon, and of some of the Green Monkeys. The hairs on all the above parts are finely annulated with black. On the back of the neck, and particularly below, and to the outside of the callosities, the hairs assume a rusty brown tinge. The tail is long and grey throughout the whole of its length; the apex being a little deeper coloured. On the shoulders the colour of the back changes insensibly to pale greyish green, which is spread over the whole of the anterior extremities. On the hinder extremities, the colour of the back descends to the knees; but the legs and feet are of the same tint as the anterior extremities; the colour of the flanks is paler; and the abdomen is covered with dull grey hairs, as are the sides of the neck. The thumb of the anterior hands is so rudimentary, as not even to appear externally, in the form of a tubercle: the original of this description is deposited in the Museum of Natural History of Paris. (Vide Bull, de l'Académie Royale de Bruxelles, tom. v.)

GENERAL HISTORY.—Neither the precise locality, nor the habits of this animal, have been ascertained.

Here concludes the history of the genus *Colobus*, of which the two original species described by Pennant have never, as it is presumed, been since met with by naturalists; the others are all recent additions to the list of the Simiadæ; and, unfortunately (one species excepted), all that concerns their habits has yet to be discovered. It is to be hoped that this deficiency will, at no distant date, be supplied; and that, as our acquaintance with Western Africa enlarges, not only other species will be found, but that the economy of those already described, will be investigated by enlightened explorers of the rivers and forests of the regions they inhabit.

SUB-FAMILY III.—A section of the Simiadæ now presents itself, consisting of several genera, agreeing with each other in the structure of all the more important points of their organization, insomuch that, in some instances, the lines of division between them are scarcely discernible, and

are often more artificial, or convenient, than strictly natural. On the one hand, among the Cercopithecæ are to be found species (the Malbrouck and White-throated Monkey, for example) which, as far as form is concerned, have as good a claim as the Macaque (*Macacus cynomolgus*), or the *Macacus carbonarius*, to the genus *Macacus*, or, on the other hand, these latter might, with equal propriety, be referred to the genus *Cercopithecus*. On the contrary, the genus *Macacus* presents us with examples closely approaching the Cynocephali, as the *Macacus nemestrinus*; while, again, the Gelada of Abyssinia, which appears referable to the genus *Cynocephalus*, was placed by Rüppell, its discoverer, in the genus *Macacus*.

From the long-tailed, active, and lively Cercopithecæ (or Guenons of the French), to the short-tailed, heavy, ferocious Baboons, there is a gradual and uninterrupted series of transitions, and it is rather by taking locality into the account, and by tracing out a tendency to the same modifications of form in other species, that the several genera can be settled. The absence of a fifth tubercle, indeed, on the last molar tooth of the lower jaw throughout the Cercopithecæ, has been regarded as an index by which to be guided, and as an important diagnostic mark of the genus. It certainly cannot be overlooked; and though it happens that in the three species, viz., the Collared, the Sooty, and the Lunated White-eyed Monkeys (which may be justly separated from the genus *Cercopithecus*, as the representatives of a sub-genus), the fifth tubercle on the molars in question is present, the value of the character, as a diagnosis, is not materially affected. With regard to the possession of laryngeal sacculi, which are considered, by most naturalists, to be wanting in the genus *Cercopithecus*, it may be stated that, if not truly characteristic of the animals of that group, they are not absolutely so either of the genera *Macacus*,* or *Cynocephalus*; but it is ascertained that some species, even of *Cercopithecus*, possess them, as the Malbrouck and White-throated Monkey; while, on the other hand, the Author has failed to detect them in specimens of the Toque (*Macacus*) *radiatus*, of the Pileated Monkey (*Macacus pileatus*), of the Black Macaque (*Macacus niger*), and of the Common Macaque (*Macacus cynomolgus*); and, farther, in an immature female of the *Cynocephalus Papio*. Setting this point aside, a simple stomach and large cheek-pouches are common to all.

The tail, indeed, offers great variation in stoutness and length; and the muzzle is more developed in some species than in others; and in

* Cuvier says, speaking of the Macaques: "Ils ont tous un sac qui communique avec le larynx sous le cartilage thyroïde, et qui se remplit d'air quand ils crient," which assertion is not confirmed, in an absolute sense, by the author's investigations. It appears that these sacculi do not become developed until a certain age, and that in the females, of many species at least, they never acquire the magnitude which they assume in the males; and hence it happens that, in the same species, they are sometimes absent, sometimes present.

some of the Baboons (*Cynocephali*) but not in all (the Mandrill and the Drill for example), the nostrils are terminal and abrupt, giving a dog-like appearance to the extremity of the upper jaw. Where the tail is elongated, it acts an efficient part as a balancer to the animals in their arboreal evolutions; but where it is short, or only reaches to the heel, its utility appears to be more limited, and it is carried in an arched form, first rising from its base, and then sweeping down to, or toward, the ankle. The characters, however, derived from this organ, considered with regard to its length, are comparative, not positive; and, on the circumstance of the tail of one species being a few inches longer, or shorter than that of another, no generic divisions can be established.

An attentive and repeated examination of an extensive series of the skulls of various species, assigned by naturalists to the several genera, *Cercopithecus*, *Cercocebus*, *Macacus*, and *Cynocephalus*, for the express purpose of endeavouring to draw from them diagnostics, clearly distinguishing each genus respectively,—definite characters by which the generic place of any species might be at once ascertained,—has ended in no satisfactory results. Setting aside the fifth tubercle on the last molar of the lower jaw, common to the *Cynocephali*, the *Macaci*, and to the Collared and Sooty Monkeys, assigned, by most naturalists, to the genus *Cercopithecus*, the skulls failed to furnish, as they do in the Gibbons and *Semnopithec*i, positive data of separation. It is true that, if a skull of one of the *Cercopithec*i and of the Mandrill be placed together, the difference between them is striking; but these are two extremes of the chain, and the intermediate links consist of a series of forms passing by gradations from the *Cercopithec*i to the *Cynocephali*; the depression of the skull and the development of the muzzle, appearing, in a first stage, in some of the *Cercopithec*i, exhibiting a progressive advancement in the *Macaci* (in several of which, indeed, the depression of the cranium and the development of the muzzle are extraordinary), and carried to an ultimatum in the *Cynocephali*. With such a chain of links before him, the naturalist, looking at the skulls alone, will find some difficulty in drawing his lines of generic division, unless, indeed, he take into the account the character of the last molar tooth of the *Cercopithec*i (with three exceptions), and their habitat, in opposition to the character of the last molar of the *Macaci*, and to their habitat (with one exception; viz., the Magot). Habitat, it must be confessed, is in itself no generic character; nevertheless, by taking it into the account it aids the naturalist in doubtful cases, and so far becomes valuable, as an adjunct, to trivial or unimportant physical characters. Thus, independently of the consideration of these points, several Indian Monkeys, of the genus *Macacus*, as already stated, might be referred to the genus *Cercopithecus*.

Rejecting, however, these trivial characters, and influenced in his views by the part which the long tail of the species in question, exercises as a balancer in their arboreal movements, a talented naturalist* separates them from the Macaci with short or tuberculous tails, and places them in the genus *Cercopithecus*, while, sinking entirely the term *Macacus*, he substitutes a genus, termed *Papio*,† for the reception of the remaining species. The principle by which this naturalist is here guided, is briefly this:—that no characters can, with propriety, be received as generic, except such physical modifications as are palpably subservient to some design, and, therefore, are attended by a corresponding modification of habits and manners, a proposition which would have irresistible weight, could the real value of structural modifications be always determined; and did not anatomical minutiae necessarily guide the naturalist, even where the express results of these minutiae cannot be demonstrated. Hence it is that genera are founded upon the presence or absence of lachrymal sinuses, or inguinal pores, though their use and influence in the animal economy are not understood; and hence it is that, upon the number of toes, genera are established, though no results from a variation in this particular are to be perceived. Moreover, it would appear that characters, trifling in themselves, gain, from their universality and permanence, a value which they might not otherwise possess, and thus, notwithstanding the presence of the fifth tubercle in the lower jaw of the Collared and Sooty Monkeys (which may justly be placed under a sub-generic head), the genus *Macacus*, confined to India, with the exception alluded to, but containing certain sub-genera, may be received as based on sufficient warranty. The long-tailed Macaci, constituting a sub-genus, may be, indeed, regarded as the representatives of the African *Cercopithec*i; and the short-tailed species, of the *Cynocephali*; while, among these latter, the Magot, a native of the North of Africa and its districts, most adjacent to Asia, may form the type of a sub-generic section.

GENUS.—CERCOPITHECUS.

Cercopithecus ERXLEBEN, in part Syst. Regni Anim. 1777.

GENERIC CHARACTERS.—MUZZLE moderately prominent; the FACIAL ANGLE 45° — 50° ; HEAD round; SUPERCILIARY RIDGE moderate; MOLARS crowned with acute tubercles; LAST MOLAR of the lower jaw with only four tubercles; CHEEK-POUCHES usually ample; LARYNGAL SAC

* See Menageries in Library of Entertaining Knowledge, vol. xlii. part ii.

† This term, as a generic title, has been previously applied by Geoffroy, to the *Cynocephali*, in *Ann. du Mus.* vol. xix.; and also by Kuhl and Erxleben.

variable; ISCHIATIC CALLOSITIES moderate; GENERAL CONTOUR light but vigorous; LIMBS muscular; STOMACH simple; TAIL long; FUR moderate, the hairs annulated.

COUNTRY.—Africa.

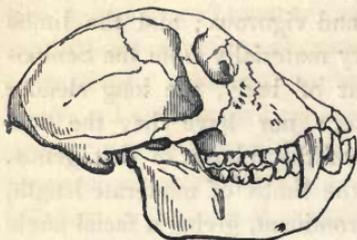
The Cercopithecæ are all restricted to the African Continent,* and are exclusively arboreal in their habits; they tenant the wild forests that skirt the rivers, and associate in large troops, being (as far as is known) all gregarious in their habits. Their actions are full of energy; restlessness, petulance, and inquisitiveness mark their disposition. During infancy they are gentle, but they become irascible and malicious with age. Though their form is light, it is muscular and vigorous; and the limbs are well proportioned; hence they differ very materially from the Semnopithecæ, having neither the meagre contour of body, the long slender limbs, nor the depressed face of the latter; nor have they the bold angular superciliary ridge so characteristic of the animals of that genus. The chest is deep; the loins are narrow; the limbs of moderate length, and muscular; the muzzle is moderately prominent, giving a facial angle of about 45° ; the tail is long, and acts, though not so decidedly as in the Semnopithecæ, as a rudder and balancer in their motions, which are characterized by abruptness, energy, and decision.

They express their displeasure by grinning and chattering, and though seldom venturing to make a decided attack, yet, headed in large numbers, in their native woods, they harass and annoy, with missiles, intruders within their bounds, and are not to be repelled without difficulty. Their diet is almost exclusively frugivorous, and they often commit great havoc in the fields of grain, in the vicinity of the wooded parts of the country; and that, not only by what they devour upon the spot, but, also, by what they carry away in their cheek-pouches, which extend below the angle of the lower-jaw, and which, when an opportunity happens, they cram with food, to be eaten at leisure. In this respect we at once perceive a material difference between the Cercopithecæ and the Semopithecæ. The former have cheek-pouches and a simple stomach; the latter no cheek-pouches, but a complex stomach, consisting of various compartments. The teeth of the Cercopithecæ, independently of the absence of the fifth tubercle on the crown of the last molar of the lower jaw, differ from those of the Semnopithecæ, by being more boldly tuberculate, and by not presenting, when worn, any appearance of re-entering enamel. In the Cercopithecæ, the thumb of the fore-hands is also more developed, and the hands themselves are shorter, broader, and have better pretensions to the title, than the long slender graspers of their

* One species of Cercopithecus only, viz., the *C. pygerythrus*, or Vervet (with one species of Baboon, the *Cynocephalus porcarius*, or *Chaema*), inhabits Africa, south of the Tropic of Capricorn.

Asiatic relatives. The general absence of laryngal sacculi has been already noticed; the os hyoides, however, is always expanded anteriorly, with its inner surface concave. The fur in the Cercopithecæ is moderately full and soft; and its colours are often elegantly disposed and contrasted; it may be laid down as a rule, that the hairs are always annulated with two or more tints; and though the Patas may, at first, seem an exception, it is not so in reality.

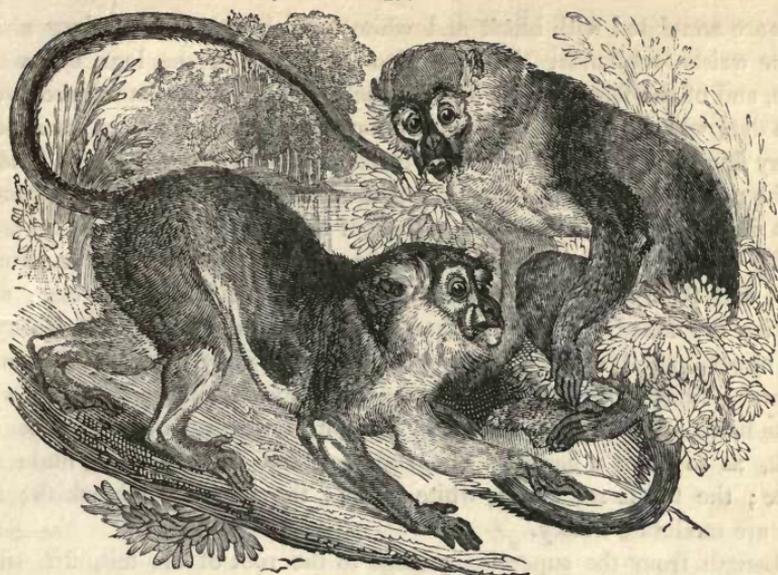
The skull in the Cercopithecæ (see fig. 289), compared with the skull in the Semnopithecæ, differs in several details. In the first place, the orbits are thrown less outwardly; they approach each other more closely, the inter-orbital space being very narrow; in the next place, the superciliary ridge is less bold, depressed, and angular; it gives a less frowning aspect to the orbits, the outer margin of which is far less projecting, and squared. Again, in the Cercopithecæ, the facial bones project more sensibly, giving an acuter angle to



Skull of *Cercopithecus sabæus*.

the face; but the lower jaw is less deep; and the chin retracts more obliquely. The skull is rounded and slightly flattened in front; the dentition need not be recapitulated; the incisors, especially the middle pair above, are large and oblique; the canines, which are of considerable magnitude, are compressed, with a sharp cutting edge, posteriorly.

The Cercopithecæ resolve themselves into several small groups, or sets, according to the mutual alliances of the species; these are respectively represented by the Patas, the Green Monkey, the Talapoin, and the Pogonias; while for the three White-eyelid Monkeys a sub-generic rank is adopted. The sub-genus is here termed *Æthiops*, and is characterized by the presence of a fifth tubercle on the last molar of the lower jaw, by the magnitude of the upper middle incisors, and by the hairs being destitute of annulations.



THE RED MONKEY, PATAS, OR NISNAS.

CERCOPITHECUS RUBER. (*Cercopithecus ruber*, GEOFFROY, Ann. du Mus. xix. 1812.)

Patas à bandeau noir, et Patas à bandeau blanc, BUFFON, Hist. Nat. xiv. tab. 25 and 26. 1766.

Cercopithecus barbatus rufus . BRISSON, Regn. An. 1756.

Red Monkey PENNANT, Synops. 1771, et Quadrup. 1793.

Simia Patas SCHREBER, Säugth. 1775.

Simia rufa SCHREBER, Supp.

Cercopithecus Patas ERXLEBEN, Syst. Regn. Anim. 1777.

Simia rubra GMELIN, Syst. Nat. Linn. 1788.

Simia rubra CAILLAUD, Voy. à Meroe. 1827.

Cercopithecus ruber KUHLE, Beitr. 1820.

Cercopithecus ruber DESMAREST, Mamm. p. 59. 1820.

Le Patas F. CUVIER, Mamm. 1820.

Le Patas à bandeau blanc . . . F. CUVIER, Mamm. 1829.

Simia rubra FISCHER, Synops. Mamm. p. 24. 1829.

Nisnas, Cercopithecus pyronotus HEMPRICH and EHRENBERG, Symbolæ Physicæ. 1838.

SPECIFIC CHARACTERS.—General colour red, passing into whitish on the under parts; superciliary stripe black, whence a black line is carried down the nose to its tip; face surrounded with ample whiskers.

LOCALITIES.—Senegal, Ethiopia.

DESCRIPTION.—Description of an adult male in the Paris Museum :—Form compact, denoting strength and activity; the teeth are large; the upper canines are deeply furrowed anteriorly; the head is broad and flattened; the nose depressed; the muzzle but slightly prominent; and the eyes rather sunk, and dark; the hands are small, the fingers being short and hairy above, to the nails; the fur is moderately long, and rather coarse and glossy; the general colour of the top of the head and back is bright foxy red, passing into grizzled grey on the shoulders (where the

hairs are annulated with black and white), which colour fades into white on the wrists and hands. This is also the colour of the legs below the knee, and of the feet. A line of stiff black hairs forms a distinct arch over each eye, whence a band, or patch, extends to each ear : from the superciliary double arch, a narrow line of black is carried down the raised ridge of the nose, to the tip, where it expands, forming a patch, conspicuous, from its contrast with the flesh colour of the orbits, cheeks, and muzzle. Bushy whiskers, commencing on the malar bones, below the orbits, extend back, and form a full margin on the sides of the face below each ear, limiting the naked part of the face to a narrow space between the eyes and upper lip. These tufts begin of a grizzled grey, and pass into buff, about the sides of the neck and throat ; the lips and chin are furnished with white hairs, which are rather long, but not, however, so much so, nor so thick, as to form a beard. The abdomen and inside of the limbs are white ; the tail is red above, white below ; the palms are blackish ; the ears are moderate dusky.

Length from the superciliary ridge to the root of the tail, 2ft. 1in. ; tail imperfect.

In the specimen of a female nearly as large as the preceding (also in the Museum of Paris), the shoulders are red, like the rest of the body ; but the fore-arms and hands are white. In young and semi-adult specimens, the shoulders are less purely grey, often washed with reddish, and the limbs are yellowish buff, or pale sandy red.

The following is the description of a semi-adult female, lately living in the menagerie of the Zoological Society, London.

Length of head and body, 1ft. 5in.

The coat was generally short, but in some parts, as on the occiput, for instance, between two and three inches long. The upper and outer surfaces were brownish ruddy, brightest on the head, tinged with grey on the arms, approaching to fawn on the legs, and blending into a yellowish grey toward the end of the tail ; the hairs being mostly annulated with grey, reddish yellow, and black. The under and inner surfaces were ashy, washed, in parts, with a slight tinge of yellow ; on the brow there was a band of stiff, black hairs, forming an arch over each of the eyes, and terminating above their outer angles, on the sides of the head, in patches of some breadth, and of the same colour. From the centre of this band, or double arch, a black line passed down the raised and narrow ridge of the nose, rapidly expanding, as it approached the tip of that part, into a broad, black, hairy patch, which (the muzzle, orbits, and cheeks being of a pale flesh-colour) was remarkably conspicuous ; the lips were furnished with dusky hairs ; and the whiskers, which commenced on the front of the cheeks, and terminated behind the ears, were rather long, straight, and projecting ; their colour was yellowish posteriorly, ashy in the middle, and

blackish at their anterior edges ; whence the hair was continued of the same hue downward to the chin, beneath which it formed two short, slender pencils.

It will be evident that the Patas à bandeau noir, and the Patas à bandeau blanc, are here regarded as the same animal, notwithstanding the differences pointed out by Fred. Cuvier, which appear to be dependant upon age or season. The male, with its white moustaches, its grey shoulders, and white arms and legs, from which the first description is taken, closely agrees with that of the Patas à bandeau blanc, in F. Cuvier's *Mammalogie*.

GENERAL HISTORY.—The Red Monkey, or Patas, common as it now is in our menageries, has not often been either figured or described from nature. Prosper Alpinus (*Rerum Ægypt.* iv.) gave the first account of it under the name of Simius Callitrichus, accompanied by an indifferent figure. From that time, to the time of Buffon, it appears to have been unnoticed. This naturalist described and figured it under the title of Patas à bandeau noir, et Patas à bandeau blanc. Schreber next delineated it : recently it has been figured and described by F. Cuvier, and again by E. T. Bennett, in the *Gardens and Menagerie delineated*. The figure given in this work is from a specimen living in the menagerie of the Zoological Society, London. In its native woods of Senegal, the Patas, as it is denominated by the natives, associates in large troops, which according to De la Brue, are in the habit of uniting together in the common cause against an enemy. As he passed along the river, with his party, in boats, they descended from the tops of the trees and advanced to the extremity of the lower boughs, for the purpose of examining more closely the objects below. Having, for some time, attentively watched the boats, and no longer satisfied with remaining merely spectators, they began a system of offensive operations, casting dry branches, and other missiles at the party, who, in return, fired and killed several of the assailants. Upon this, the survivors began to utter the most frightful cries, and undauntedly redoubled their efforts at annoyance ; some gathered stones, others sticks, and various missiles, for the purpose of hurling them at their enemies ; and it was not until severely taught the inequality of the contest, that they terminated it by a retreat.

In captivity, the Patas is lively, but very spiteful and capricious ; as with its race in general, its evil qualities become more developed, the more it advances in age, when its liveliness degenerates into irascibility, and its temper becomes morose and vindictive. Mr. Bennett observes, that the young individual which he figured, had a habit, when pleased, of dancing on all fours, in a peculiar and measured step, which was far from being ungraceful, though, after a time, it became ludicrous from its

monotony. We have noticed the same action in young Monkeys of other species.

Rüppell observed this species in Kordofan and Darfur, and it is undoubtedly the Nisnas of Hemprich and Ehrenberg. The term Nisnas, seems a word of general application, in Egypt, to Monkeys; for the Hamadryas and the Anubis are thus denominated. According to Dr. Rüppell, this species is less frequently tamed in Egypt than the Tota (Grivet, *Cerc. griseo-viridis*), with which the Egyptian peasantry confound it under the common name of Abellan. We learn, from the same authority, that its native appellation, in Kordofan, is Nango.

M. Ehrenberg, in his description of the Nisnas, as it is called by the Arabs of Ethiopia, remarks, that the adult male, when in full health, is furnished with a copious mane. This character has not been observed in the specimens which have fallen under the Author's observation; probably, by the expression, a copious mane, is only intended that the hair on the neck, or shoulders, is longer than that on the limbs and back; but that it has a copious mane, truly so called, as we see in the Gelada or the Hamadryas, must be regarded as very doubtful.

Representations of the present species, occur on the tombs of the ancient Egyptians; and Mr. Ogilby considers that it is "unquestionably the Cepus, which Ælian, on the authority of Pythagoras, describes as an inhabitant of the countries bordering on the Red Sea," as, indeed, the description, remarkable for its accuracy, proves. The Kebos of Aristotle is probably the Gelada of Abyssinia.

THE WHITE-THROATED MONKEY.

CERCOPITHECUS ALBOGULARIS. (*Cercopithecus albogularis*, SYKES, in Proceedings, Zool. Soc. p. 18. 1832.)

Semnopithecus(?) albogularis. . SYKES, in Proceedings Zool. Soc. p. 105-6. 1830-1.

SPECIFIC CHARACTERS.—Fur of upper parts freckled with black and yellow,—of under parts with white and black; throat, white; limbs, black; full whiskers hide the ears; long superciliary bristles.

LOCALITY.—(?)

DESCRIPTION.—Description of a specimen (No. 36, Cat. Mamm. 1838), in the Museum of the Zoological Society, London:—General contour stout and muscular; the fur is soft and adpressed; but on the fore-limbs the hairs become more rigid and shorter; on the back they measure from two to three inches in length; the canine teeth are remarkably long (nearly three quarters of an inch), slender, and sharp; the incisors very short and even; the head is rounded and short; the ears are very small, nearly rounded, and, for the most part, concealed in the

long hair about the head; the eyes are deeply seated, and shaded by a continuous arch of long hairs directed forward; the irides are broad, and of a brown ochre colour; the hair forms a bunch on each cheek, resembling whiskers; there is no beard; the cheek-pouches are rudimentary only, and not observable externally, even when filled, being concealed by the bushy hair of the cheeks; the thumbs of the anterior hands are short; those of the posterior hands are long; the general colour is deep grey, washed on the back with olive green, the whole of the upper surface of the animal is of a mingled black and yellowish ochre colour, each hair being banded black and ochre; the black prevailing on the shoulders, the ochre on the back and flanks; the under surface is grizzled white and black; the anterior limbs are of a uniform black; the posterior are black, tinted with a little of the dorsal colour; the chin and throat are of a pure white; the tail is black, and half as long again as the body.

	ft.	in.
Length of head and body	1	9
Ditto tail	2	7

An account of the visceral anatomy of this species, by Prof. Owen, will be found in the *Proceedings Zool. Soc.* for 1832, p. 19. "The larynx was, as usual, in the Cercopithecæ and Macacæ, viz., with two wide lateral sacculi, and a middle pouch, continued forward, between the os hyoides and thyroid cartilage, and extending about three inches under the skin of the neck. The aperture by which it communicated with the larynx was large enough to admit the little finger."

The first specimen known of this interesting species is that preserved in the Museum of the Zoological Society, London, and which died in the Society's menagerie. According to Col. Sykes, by whom it was presented to the Society, the animal "was obtained at Bombay, where it was believed to have been taken from Madagascar." Most probably, however, it was originally brought from the African coast; no well authenticated instance, indeed, occurs in which any Monkey has been found to be indigenous in that island; for, though both the Mangabey and Sooty Monkey were supposed, by Buffon, to be natives of Madagascar, it is now ascertained that they are exclusively peculiar to the African Continent.

The White-throated Monkey is closely allied to the Malbrouck and the Grivet, but has its own characters too decided to allow its being confounded either with one of these, or with any others of the genus; the uniform black colour of the anterior limbs, and also of the posterior extremities and tail, and the grizzled white and black of the under surface, sufficiently distinguish it.

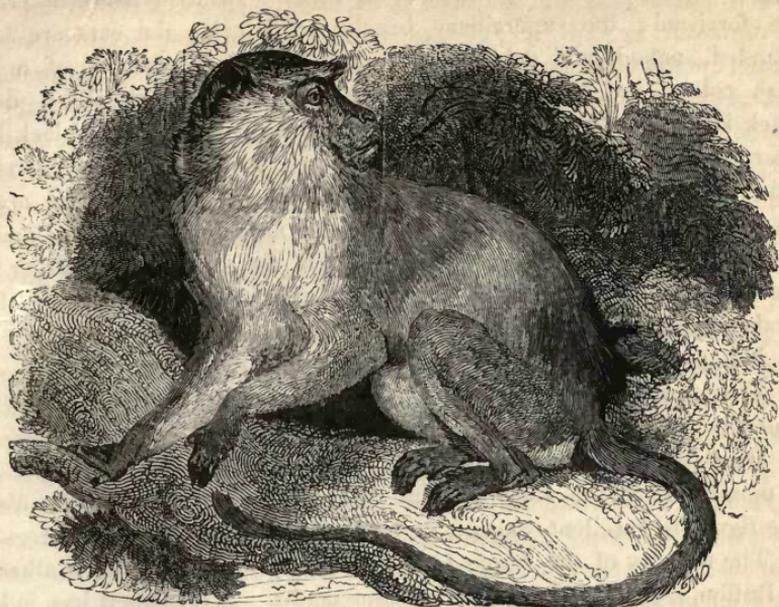
GENERAL HISTORY.—With respect to the habits of this animal, in a

state of nature, nothing has been ascertained. Its manners in captivity, as observed by Col. Sykes, "are grave and sedate. Its disposition is gentle, but not affectionate : and though free from that capricious petulance and mischievous irascibility characteristic of so many of the African species, still it quickly resents irritating treatment, and evinces its resentment by very smart blows with its anterior hands. It never bit any person on board ship, but so seriously lacerated three Monkeys, its fellow passengers, that two of them died from the wounds. It readily ate meat, and would choose to pick a bone, even when plentifully supplied with vegetables and dried fruits."

Mr. Ogilby informs us, that he has seen a second individual of this species in the possession of a travelling showman, and that it "strongly exhibited the same antipathy to other Monkeys that Col. Sykes has recorded in the case of his specimen. It even flew upon a stuffed skin which its owner threw down to it, and worried it with all the hatred and fury of a Terrier against a Rat. In other respects, and toward its master and visitors, it appeared to be as docile and good-natured as the individual observed by Col. Sykes, and this is, no doubt, the natural character of the species."

The country whence this second specimen was brought, could not be ascertained.

A third specimen has very recently (1840) been added to the living inmates of the menagerie of the Zoological Society, London, and is said to have been brought from Madagascar,—a singular coincidence, as the specimen obtained by Col. Sykes was also reported to have been obtained there ; still, as no Monkeys have been hitherto observed by European residents in the woods of Madagascar, where the Lemurs supply their place, we are inclined to doubt the correctness of the inference, as to that island being the native locality of this species, and to consider the Comoro Islands, or the Mozambique coast, as its true habitat. The individual in question is tolerably gentle, but seems reserved and unsociable, avoiding the other inmates of its cage, or driving them from it, as if indisposed to gambol with them ; it appears, indeed, to be more apathetic than the Cercopithecæ generally are ; and, if destitute of the malice of some, it has nothing of the liveliness and inquisitive disposition of others.



THE MALBROUCK MONKEY.

CERCOPITHECUS CYNOSURUS. (*Cercopithecus Cynosurus*, GEOFFROY, Ann. du Mus. xix. 1812.)

- Simia Cynosurus* SCOPOLI, *deliciae floræ et faunæ*, p. 44, tab. 19—male (?)
Simia Faunus LINNÆUS, *Syst. Nat.* Ed. 10. 1758 (?)
Malbrouck BUFFON, *Hist. Nat.* xiv. c. fig. 29—female. 1766.
Callitriche Var. AUDEBERT, *Hist. Sing. and Mak. Fam.* iv. sect. 2, pl. 7. 1797.
Dog-tailed Baboon SHAW, *Gen. Zool.* i. p. 32. 1800.
Le Malbrouck F. CUVIER, *Mamm.* pl. 22. 1819.
Cercopithecus Cynosurus KHUL, *Beitr.* 1820.
Cercopithecus Cynosurus DESMAREST, *Mamm.* p. 60. 1820.
Simia Cynosurus FISCHER, *Synops. Mamm.* p. 22. 1829.
Cercopithecus Tephrops BENNETT, in *Proceedings Zool. Soc.* p. 109. 1833.

SPECIFIC CHARACTERS.—Colour of upper parts, greenish brown, or olive,—of under parts whitish; limbs, externally, greyish; face, of a pale flesh colour; nose and cheeks, covered with scattered, short, dusky-black hairs; muzzle, thick; scrotum, blue, surrounded with rust-coloured hairs.

LOCALITY.—Western Africa. (Guinea?)

DESCRIPTION.—Description of an adult male (No. 40, a, Cat. Mamm. 1838), in the museum of the Zoological Society, London. The colour of the top of the head and upper surface is olive green, and resembles that of the Green Monkey (*Cerc. sabæus*), having the separate hairs, which are cinereous at the roots, ringed with black and yellow; on the outside of the fore-arms and legs the olive passes into a grizzled greyish hue, the rings on the hairs of these parts being black and white. The under surface is nearly pure white, and this colour extends to the insides of the limbs and to the sides of the neck anteriorly, where the hairs do not attain a sufficient

length to constitute moustaches; an obscure whitish bandeau crosses the forehead; the superciliary bristles are black; the ears are large, rounded, naked, and dusky; the naked skin of the face is of a light flesh colour, but covered on the nose and cheeks with short, dusky black hairs; the hairs about the lips are white, with longer black hairs intermixed; the tail is dusky grey above, whitish below; callosities red; scrotum fine turquois blue; hairs beneath the tail, and around the scrotum, rust red; the head is broad and rounded above, and the muzzle thick and obtuse, the expression of the countenance being very peculiar, and unlike that of any of the other Cercopithecæ; the forehands are short and small, and the thumb is almost rudimentary.

Length of head and body, 1ft. 6½in. Tail imperfect.

This specimen was procured on the West coast of Africa, and presented by Lieutenant Rainer.

Daubenton's description of a young female in Buff. *Hist. Nat.* (vol. xiv. c. figurâ, pl. 29) is very accurate, and closely agrees with the above. The figure is excellent, except, perhaps, that the hand is too large.

The identity of the *Simia Cynosurus* of Scopoli with the Malbrouck of Buffon, may, perhaps, admit of some doubt. Mr. Bennett has, indeed, observed that the figure and description of the *Simia Cynosurus* are so imperfect as to apply, with almost equal justice, to any of the species related to the Malbrouck of Buffon. Nevertheless, it appears to us that the description is more applicable to the present animal than any other; the transverse whitish mark over the eyes, and the elongated face, are distinctly noticed. Scopoli's description, taken from a living male specimen in the Jardin des Plantes of the Marquis of Andrioli, at Milan, and preserved after death in the museum of St. Alexander, is as follows:—Size that of a middling dog; length almost two feet; tail dependant, hairy, and proportionate; fingers and thumbs on the hind hands larger than those of the fore; face elongated; chin and lips clothed with rather longish hairs; eyes moderately large; forehead high, and adorned with a transverse tuft, whitish near the eyes, but red and black elsewhere; back and sides reddish and dusky; under part of neck hoary; breast and belly white; arms red; scrotum bluish, and on each side of it are two round spots of a yellowish colour, which, however, totally disappear after death; hands, on the upper parts, of a variegated dusky and ashy hue; palms, naked and white. It is stated to have been extremely fond of eating Spiders and the *Scarabæus Melolontha*; it would also devour Lizards, first skinning them and tearing them to pieces. Snuff was received with pleasure, and this it would rub over its body in a very ludicrous manner. In its temper and habits it agreed with its race.

After all, it is of little consequence whether the *Simia Cynosurus* of Scopoli be identical with the Malbrouck of Buffon or not; nor would we,

on a merely doubtful point, add to the list of confusing synonyms, by changing the specific name (*Cynosurus*), applied by common consent to the Malbrouck, for another, without any definite advantage. Buffon regards the Malbrouck as identical with the *Simia Faunus* of Linnæus (*Syst. Nat.* ed. x. p. 26) which is founded on a figure given by Clusius in his *Exotica*, taken, not from any animal (for the animal itself Clusius never saw), but altered from a painting. To this figure (*Cercopithecus Primus Clusii Exotic.* p. 371) Buffon also alludes, and as he considers the *Simia Faunus* of Linnæus to be referable to his Malbrouck, so does he equally consider this figure. It cannot, however, be doubted that the figure in question is of no authority; and that the *Simia Faunus* of Linnæus will not stand as the accredited title of the present species. We know not on what information Buffon assigns Bengal as the native country of the Malbrouck, nor yet the grounds of his assertion that such is its name among the inhabitants of that country. The Macaque and the Egret Monkey, he observes, are "natives of the southern countries of Africa;" the Malbrouck and Chinese Bonnet Monkey are from Bengal. Into the origin of errors so glaring it is useless too curiously to inquire. Information on points of locality, when Buffon wrote, was neither so precise nor so attainable as in the present day. The Malbrouck, as is now known, is a native of Western Africa, whence, as already said, one of the specimens in the museum of the Zoological Society, London, was brought, which died in the menagerie. Desmarest follows Buffon in assigning it to Bengal. Fred. Cuvier, in his *Mammalogie* (1819), gives a good figure of the species, which he identifies with the Malbrouck of Buffon, and the *Simia Faunus* of systematic writers. With respect to its identity with the Malbrouck of Buffon there can be only one opinion, as, indeed, an examination of the specimens in the Paris Museum will prove, and which agree in all respects with those in the museum of the Zoological Society, London, of which one specimen (No. 40, in *Catal. Mamm.* 1838) was regarded by Mr. Bennett as identical with the Malbrouck of Buffon, but not of Fred. Cuvier, Mr. Bennett considering F. Cuvier's Malbrouck to be specifically distinct from the animal figured under that name by Buffon. In this point, however, he was certainly mistaken. The specific name of *Tephrops*, therefore, must sink; indeed, as Buffon considered his Malbrouck to be the *Simia Faunus* of the systematic writers, its adoption, granting the specific distinctness contended for, would scarcely be justifiable.

In retaining the title of *Cynosurus*, as the specific appellation of the present species, in preference to *Faunus*, we are influenced by the following considerations. In the first place, it is the name generally adopted by modern writers; it is applied to this animal by F. Cuvier, Desmarest, Fischer, and others; and it was given by Scopoli to the animal which he examined alive, and of which the description is more applicable to

this species than any of the other green Cercopithecii. In the next place, the title of Faunus was not given to the animal itself, living or dead, by Linnæus, but to a figure by Clusius, which, though regarded by Buffon, as that of his Malbrouck, is far from being proved to be so; indeed Mr. Bennett asserts, that, if correctly drawn, it represents a species nearly related to the Diana. As, then, we do not know positively that the S. Faunus, is the Malbrouck, nor, indeed, what it is, we receive it only as a doubtful synonym.

GENERAL HISTORY.—The Malbrouck is far less frequently brought to Europe than others of the Cercopithecii more immediately allied to it. We have only seen two living specimens in the menagerie of the Zoological Society, London.

In its disposition, this Monkey combines a certain degree of sluggishness, with a savage and vindictive temper; but there is much difference in various individuals. One of the specimens in the menagerie of the Zoological Society, London (an adult male), was gentle, familiar, and pleased to be noticed, or caressed; but, at the same time, it was neither lively nor playful. The other was deceitful, and, though apparently calm, very suspicious; it was roused by the slightest provocation to anger, and would turn upon its disturber, with the utmost malevolence depicted in its countenance, making every possible effort to assault him; exhibiting its teeth, and gazing fixedly in his face. One which Fred. Cuvier notices, was extremely restless, and very active; but it was also sly and malicious. It would not make an open attack, but always watched for an opportunity of springing unawares upon the object of its hatred; it would then as suddenly fly from him, and effect its retreat; then, again, make an unexpected assault, and so continue a system of treacherous warfare, seizing every opportunity of gratifying its revenge or malice. On the whole, indolence and ferocity form the character of the adult, at least in captivity; of their manners, in their native state of freedom, nothing is known.

Specimens, in the Leyden Museum, are said to have been brought from Guinea.

THE GRIVET.

CERCOPITHECUS GRISEO-VIRIDIS. (*Cercopithecus griseo-viridis*, DESMAREST, Mamm. p. 61. 1820.)

- Simia Engythithia* HERMANN, Obs. Zool. i. 1804.
Le Grivet F. CUVIER, Mamm. 1, fasc. 7, pl. 20. June, 1819.
Simia subviridis F. CUVIER, Dict. Sc. Nat. xx. 26.
Simia subviridis DESMOULINS, Dict. Class.
Cercocebus griseo-viridis LESSON, Man. de Mamm. 1827.
Simia subviridis FISCHER, Synops. Mamm. p. 22. 1829.
Cercopithecus cano-viridis RUPPELL, neue Wirbelthiere, Säugethiere. 1835.
Cercopithecus griseus LESSON, in Species des Mammifères. 1840.

SPECIFIC CHARACTERS.—General colour, grey, the head and back being washed with olive ; whiskers very long and full ; a frontal band, and the body below white ; tail, blackish, becoming white at the tip ; face, black ; scrotum, blue, surrounded with long white hairs.

LOCALITIES.—Nubia, Abyssinia.

DESCRIPTION.—Description of a specimen (No. 42, Cat. Mamm. 1838) in the museum of the Zoological Society, London:—The general colour is grey ; the top of the head and back are washed with olive, the hairs being annulated with black and yellow ; a white band crosses the forehead and joins the white whiskers, which consist of long hairs directed backward, and spreading so as to conceal the ears ; the under surface, and inside of the limbs, are white ; the tail is black, intermixed with grey hairs above, passing into white at the termination ; the hands and feet are dusky black ; the face is black, becoming livid around the eyes, an angle of black facial hairs pointing behind them, to the ears ; the ears and palms are black ; scrotum, of a turquoise colour, surrounded with long white hairs ; the hands are short and small.

	ft. in.
Length of head and body	1 8
Ditto tail, imperfect	1 8

In general form the Grivet approaches the Malbrouck, its head, however, is less rounded, and the muzzle less thick ; a triangular mark of black hairs behind each eye points to the top of the ears ; and the whiskers, instead of being short, form full and long cheek-tufts. The ears, also, are smaller in proportion. From the Green Monkey it may at once be distinguished by its greyer hue, by the white frontal band, the white colour of the whiskers, and by the grey termination of the tail.

GENERAL HISTORY.—The disposition of the Grivet is similar to that of the Green Monkey ; but of its habits in a state of nature nothing is ascertained.

Our first knowledge of the species is due to Fred. Cuvier, who figured it in his *Mammalogie*, under the title of Grivet. Rüppell informs us that it is common in the low lands of Abyssinia, in Sennaar, and Kordofan, to an elevation of 4,000 feet above the sea. It is called Tota in Abyssinia, and Abellan in Sennaar and Egypt.

THE GREEN MONKEY, OR CALLITHRIX.

CERCOPITHECUS SABÆUS. (*Cercopithecus sabæus*, ERXLEBEN, Syst. Regn. An. 1777.)

- St. Jago Monkey* EDWARDS, Glean. i. c. fig. tab. 215. 1743.
Simia sabæa LINNÆUS, Syst. Nat. ed. 12. 1766.
Le Callitriche BUFFON, Hist. Nat. xiv. c. figurâ, tab. xxxvii. 1766.
The Green Monkey PENNANT, Syn. 1771.
Le Callitriche AUDEBERT, Fam. iv. sect. ii. p. 7, c. fig. tab. iv. 1797.
The Green Monkey SHAW, Gen. Zool. 1800.

Cercopithecus viridis HERMANN, Observ. Zool. i. p. 2. 1804. (†)
Cercocebus sabæus GEOFFROY, Ann. du Mus. xix. 1812.
Le Callitriche F. CUVIER, Mamm. fas. l. c. fig. 1819.
Cercopithecus sabæus KUHLE, Beitr. 1820.
Cercopithecus sabæus DESMAREST, Mamm. p. 61. 1820.
Simia sabæa FISCHER, Synops. Mamm. p. 21. 1829.
Cercopithecus sabæus LESSON, Species des Mamm. p. 79. 1840.

SPECIFIC CHARACTERS.—Colour above, olive green,—beneath, whitish; head, pyramidal; whiskers, long; scrotum, copper green, surrounded with yellow hairs; tail, yellow at the tip; face, black.

LOCALITIES.—Senegal and the Cape, Cape de Verd Isles.

DESCRIPTION.—An adult male (No. 37, Cat. Mamm. 1838) in the museum of the Zoological Society, London, presents the following characters:—The superciliary ridge is bold and depressed; the muzzle is long; the ears are large and naked; the general hue of the upper parts is olive green, the hairs being annulated with black and yellow; on the outer side of the limbs a greyish tint prevails, the hairs of these parts being annulated with white, or yellowish white and black; the hands and feet are grey; the under surface of the body, and the inside of the limbs, are white, with a faint tinge of yellow; the hairs on the side of the face are long and full, and are directed up toward the ears, spreading in the manner of a frill; their colour, with that of the hairs of the throat is bright but delicate yellow; the scrotum is green, and the circumjacent hairs are yellow; the tail is olive green above, passing into bright yellow at the tip; the face, ears, and palms are black; the hands and feet are long.

	ft.	in.
Length of head and body	2	0
Ditto tail	2	4½

GENERAL HISTORY.—It is probably to this species that Adanson refers, under the name of Singe Verte, as being abundant in the woods of Podor, along the Niger; and of which he says, “it was only by the branches which they broke on the tops of the trees, whence they fell upon me, that I became aware of the presence of these Monkeys; for, otherwise, so silent were they, and so light in their gambols, that it would have been difficult to have perceived them. Here I stopped, and killed first one, then two, and even three, without the others appearing frightened; but when most were wounded they began to seek shelter, some concealing themselves behind the thick branches, others descending to the ground; but the greatest number darting from the top of one tree to that of another. It was very interesting to see a bough, when several of them leaped together on it, bend under them, and the outermost Monkey drop to the ground, while some cleared their way onward, and others were suspended in the air. In the meantime I continued firing, and killed twenty-three in less than an hour, and in the space of twenty fathoms, without one of them having

uttered a single cry, although they collected together several times, knitting their brows, gnashing their teeth, and making demonstrations of an intended attack upon me." (*Voy. au Sénégal*, par M. Adanson, p. 178, 1757.)

The Green Monkey is one of the species most commonly brought to this country, and is distinguished for intelligence and activity. At the same time it is savage, and treacherous, and disposed to resent the slightest injury. When young it is much more gentle and familiar, and is then diverting from its antics and grimaces; but, as it acquires age, it becomes very malicious and irascible. So decidedly is this the character of the Green Monkey, as far, at least, as the observations of the Author of this work extend, that the adult specimen described by Fred. Cuvier must have been an exception to its race; he informs us that it was good tempered, gentle, and familiar, courting the notice of persons with whom it was acquainted, and exhibiting signs of pleasure on being caressed; it expressed its feelings of satisfaction by a low purring noise; and it seldom became excited by anger, or attempted to bite. The purring noise, mentioned as having been uttered by F. Cuvier's specimen, does not appear to have attracted the notice of other naturalists; and, though the Author has observed many of these animals in captivity, he never heard it.

The Green Monkey, indigenous as it is in a hot climate, is one of the hardiest of the Cercopithecæ, and bears our changeful seasons better than most.

The name of *Callithrix* (*Callitriche*, French) is given, by Pliny, to a Monkey of Ethiopia, which Cuvier, erroneously supposes to be the Wanderoo, but which was, probably, the Guereza. Buffon first applied it to the present species, and, though it is a misnomer, it is generally adopted.

THE VERVET.

CERCOPITHECUS PYGERYTHRUS. (*Cercopithecus pygerythrus*, F. CUVIER, Mamm. Jan. 1821.)

Le Vervet, Cercopithecus pygerythrus, F. CUVIER, Mamm. lithog. c. fig. 1821.

Guenon Vervet, Cercopithecus pygerythrus, DESMAREST, Suppl. p. 534. 1822.

Cercopithecus pusillus, Delalande, DESMOULINS, Dict. Class. vii. 568.

Guenon naine, Delalande . . . ISIDORE GEOFFROY, Voy. Belang. Zool. 49.

Simia pygerythra . . . FISCHER, Synop. Mamm. p. 22. 1829.

Cercopithecus pygerythrus . . . LESSON, Species des Mamm. p. 83. 1840.

SPECIFIC CHARACTERS.—Colour above, grey, slightly tinged with olive; whiskers very long; a frontal stripe, and the under parts of body white; feet, black; tail, largely black at its terminal portion; face, sprinkled with black hairs; scrotum, turquoise coloured, or greenish blue, surrounded with bright rust-red hairs.

LOCALITIES.—Cape of Good Hope and Southern Africa.

DESCRIPTION.—The general colour of a very fine specimen (No. 29, Cat. Mamm. 1838) in the museum of the Zoological Society, London,

is palish freckled grey, the top of the head and upper part of the back having a general slight wash of olive green; the limbs, externally, are of a fine freckled grey; the whiskers are white, and of considerable length; they commence on the malar bones, and are increased by long hairs coming from the throat; their direction is upward and backward, so as partially to conceal the ears; and a white band traversing the forehead, merges into the white of the whiskers, anteriorly to the ears; the superciliary bristles are long, black, and erect; the under parts and inner sides of the limbs are white; the hands and feet are black; the tail is largely black at the tip, or all black; beneath the tail, and about the callosities, the hairs are brightly rust coloured; the face is covered with black, long hairs; the general fur is full, long, and coarse; the scrotum is of a turquoise colour, or rich greenish blue; the eyelids are of a pale flesh colour; the face and chin are black; the ears are black; the iris is hazle: in its contour the body is robust, and the hands are long.

	ft. in.
Length of head and body	1 10
Ditto tail	2 3

The Vervet is closely allied to the Malbrouck and Grivet, so that a little care and attention are necessary to enable the observer to discriminate between them. It differs, however, from both, in having the fur long, and rather coarse, and of a much greyer tint, the wash of olive being less decided; in the tail being black, nearly throughout its whole length; and in the superciliary bristles being very conspicuous: from the Malbrouck it may be distinguished by the muzzle being less thick and heavy, and from the Grivet by the rust-red hairs on the space below the root of the tail.

GENERAL HISTORY.—Two fine adult specimens were lately living in the menagerie of the Zoological Society, London. The female was smaller than the male, but both had large sharp canines, and both were intractable and malicious. They uttered a guttural, barking noise, when irritated; fixed an intense look upon the object of their displeasure; displayed their teeth; and took every opportunity of making a sudden attack. It was dangerous to come very near to the cage in which they were confined, unless due precaution was taken; and, had they been at liberty, the Author is convinced that, on more than one occasion, they would not have hesitated to spring upon him; yet no cause of offence had been given. They seemed, indeed, to entertain capricious feelings of animosity toward some persons, while toward others, if not gentle, they were much more indifferent. Their ferocity (especially that of the male) was equalled by their audacity; and their strength was such as to render them sufficiently formidable. From the daring which they manifested, it might be concluded that, in their native woods, the troops of this species

would not tamely endure the attack of a single hunter ; but experience proves that these animals, at large, however they may grin and gnash their teeth at the sportsman, whose gun is dealing slaughter among them, hesitate, or have not sufficient intelligence, to commence a simultaneous onset, but sooner or later make a hasty retreat.

The Vervet is common in the forests along the Great Fish River, and other streams, between Algoa Bay and Cape Town. Its range extends also along the Natal coast, throughout the Amakozah country, and Caffre land generally, where most travellers through these regions have met with it. Its food consists of fruits, and particularly of the gum which exudes from various species of acacia. Though abundant in the Cape colony, it is rarely imported alive into Europe, much less so, indeed, than the Chacma, probably because it is not so easily captured ; the young, when the parents are shot, having better opportunities of escape among the forest branches, than the Baboon among the rocks.

THE DIANA MONKEY.

CERCOPITHECUS DIANA. (*Cercopithecus Diana*, ERXLEBEN, Syst. Regn. An. 1788.)

Exquima cerc. barbatus Guineensis, MARCGRAVE, Hist. Rer. Nat. Braz. 227, c. figurâ. 1648.

Simia Diana LINNÆUS, Stockholm Trans. c. figurâ, for 1754, 210, and Syst. Nat. ed. 12. 1766.

Spotted Monkey PENNANT, Synops. Quad. 1771.

Palatine vel Rolowai ALLAMAND, Hist. Nat. BUFFON, ed. Sonn. xv. pl. 77. 1779.

Le Roloway ou la Palatine BUFFON, Hist. Nat. Suppl. vii. 77. 1789.

Palatine and Spotted Monkey PENNANT, Quad. 1793.

La Diane AUDEBERT, Singes et Mak. Fam. iv. sect. ii. pl. 6. 1797.

Palatine and Spotted Monkey SHAW, Gen. Zool. 1800.

Cercopithecus Diana GEOFFROY, Ann. du Mus. xix. 1812.

Cercopithecus Diadema KÜHL, Beitr. 1820.

Cercopithecus Diana DESMAREST, Mamm. p. 60. 1820.

Simia Diana and Roloway FISCHER, Synops. Mamm. pp. 19, 20. 1829.

Cercopithecus Diana LESSON, Species des Mamm. p. 72. 1840.

SPECIFIC CHARACTERS.—General colour, dark freckled grey, passing into black on the limbs ; a long stripe down the back, chestnut coloured ; a frontal semilunar mark, and the beard, which is peaked, white ; throat, chest, and anterior part of shoulders, white ; inside of thighs, fulvous, or orange red ; outside of thighs marked with an oblique white stripe ; face and ears black.

LOCALITIES.—Guinea, Congo, Fernando Po.

DESCRIPTION.—The top of the head, the back of the neck, the shoulders, the sides, and the middle of the body beneath, are of a deep, grizzled, ashy grey, each hair being annulated with white and black, and tipped with white. On the outside of the limbs, the colour thus produced, becomes darker, and, finally, passes into black on the hands ; the tail is grey, becoming darker to the tip, which is black ; a semilunar line, of long projecting white hairs, surmounting a less conspicuous one of black, passes across the forehead, and from its resemblance to “ Dian’s silver

bow," has suggested the animal's name; the sides of the face are covered with long, bushy, white hairs, which terminate on the chin, in a long, thin, flat, and pointed beard, of two or three inches in length; the front of the neck and chest, and the anterior part of the humerus, are also white, the latter with an abrupt line of demarcation; on the middle of the back commences a mark of deep chestnut, which gradually widens as it passes along to the root of the tail, forming a defined elongated triangle with the base on the crupper; a line of white, commencing at the root of the tail, runs obliquely along the outer side of each thigh to the knee; the lower part of the abdomen and the inner side of the thighs are abruptly of an orange yellow, orange red, or bright rust colour; the face is long and triangular, and, together with the ears, intensely black.

	ft.	in.
Length of head and body	about	2 0
Ditto tail		2 4

The following observations on this richly coloured and elegant species, from the pen of the late E. T. Bennett, Esq., contain so excellent an eclaircissement of the confusion with which it has been surrounded, that, in justice to his memory, we cannot withhold them. "The Diana Monkey, so called by Linnæus, from the fancied resemblance of the crescent-shaped bar, which ornaments its brow, to the ancient poetical representations of the goddess of the silver bow, was first figured by Marcgrave, in his *Natural History of Brazil*, under the name of Exquima, by which, according to him, it was known to the Negroes of Congo, its native land. No subsequent naturalist appears to have observed it, until Linnæus carefully described and figured it, in the *Stockholm Transactions* for 1754, from a living specimen, and gave a long and highly interesting account of its habits and behaviour. But this paper, probably on account of its being written in Swedish, or, perhaps, in consequence of the affected contempt with which the great French natural historian was wont to treat the still greater naturalist of the North, seems to have been so little known to Buffon, that the latter, setting aside the positive assertion of Marcgrave, whom alone he quotes, maintains that the Exquima must have been one of the prehensile-tailed Monkeys of the western world. From this strange assertion, to which he was probably induced by the figure of one of these being erroneously inserted into the text, in place of that of the African Monkey, which was given on another page, and from his making no farther mention of the animal, it appears that he had never seen a specimen. Allamand, however, in the Dutch edition of Buffon's *Natural History*, gave an excellent account of two living individuals which had fallen under his notice at Amsterdam, which he imagined to belong to a new species, and to which he first assigned the name of Palatine, on account of the peculiar ruff of the fore part of the neck, but

changed, afterwards, for that of Roloway, by which he was informed it was called in Guinea, whence his specimens were brought. By this latter title it was received into the posthumous *Supplement to Buffon*, published by Lacépède; and Gmelin, Pennant, and other compilers have adopted it, as forming a distinct species from the Diana, a distinction without a difference. We cannot, however, agree with M. Fred. Cuvier, in considering the Monkey figured by him under the name of Diana, in his splendid *Histoire Nat. des Mammifères*, as belonging to this species, of which it has none of the characteristic marks. It appears to us to be entirely new; but, at the same time, to be much more closely allied to the *Cercopithecus Mona*, than to the subject of the present article."

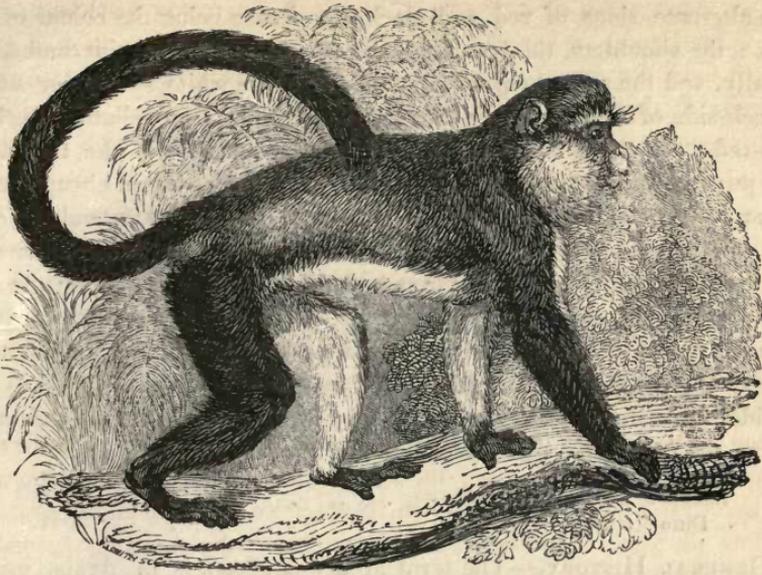
With respect to the animal figured by Fred. Cuvier, under the title of Diana (the original specimen of which, in the Paris Museum, the Author of this work has carefully examined), it is, without hesitation, to be assigned to the *C. leucampyx* of Fischer, a species which has usually been considered as doubtful, and which, together with the *Semnopithecus Johnii*, has been recently named afresh.

GENERAL HISTORY.—The Diana is rarely brought alive to Europe; nor, indeed, are its skins very common in collections. The author only observed one specimen in the Paris Museum from the Gold Coast, Africa. Three are in the museum of the Zoological Society of London; of these, one specimen (No. 32, Cat. Mamm. 1838) died, some years since, in the menagerie of the Society, and is the original of the figure and description in the *Gardens, &c. delineated*, p. 34. The other two, 32 a, 32 b, Sup. Cat. Mamm. 1839, are from Fernando Po. Of the habits of the Diana in a state of nature nothing is correctly ascertained. In captivity, like the rest of its tribe, it is gentle, lively, active, and familiar, while young; but, as age advances, it becomes reserved and treacherous. The beauty of its colouring, and the gracefulness of its form, render it one of the most attractive of the genus; but its frontal crest of white hairs, and its white peaked beard, "of formal cut," give a singular aspect to its physiognomy. This latter ornament it has been observed, as Mr. Ogilby states, to be solicitous in keeping neat and clean; when about to drink it takes the beard in its hand with amazing gravity, and holds it back, in order to prevent it from dipping into the fluid. On one of these occasions, when that naturalist laughed at the action, which struck him with a sense of the ludicrous, the animal suddenly looked up in great astonishment, but instantly penetrating, as it appeared, the cause of what it considered a personal insult, flew at him with great malice, and was only prevented from revenging the indignity by the shortness of the chain which attached it to a pole for security. In the same room, fastened by a chain and running ring to an adjacent pole, was a small prehensile-tailed American Monkey (*Cebus*); the distance between the two animals being

such as to prevent their biting each other, still they could reach each other with their hands, and would often play together, and claw at each other with their hinder paws ; sometimes the Cebus would hook his tail round the limbs of the Diana Monkey, and endeavour to drag him toward himself ; when, by way of retaliation, the latter would seize hold of this unfair lasso of entanglement, and, mounting his pole, drag up the owner after him. Except when irritated by casual causes of annoyance, this Diana Monkey was good tempered, and its movements light and graceful ; but, unfortunately, its constitution soon gave way under the effects of our climate.

Considering the range of habitat which the Diana enjoys, and that it is indigenous in districts abundantly frequented by Europeans, the scarcity of this Monkey, whether in our collections or vivaria, may appear to be not a little surprising. We have no reason to believe it rare in its native regions ; and its beauty is sufficient to attract attention. Perhaps it frequents the wilder and more wooded parts of the country, avoiding the spots tenanted by Man, and habitually dwelling among the topmost branches of the gigantic trees, composing vast and almost untrodden forests, bordering the course of rivers, and thus escapes observation. Judging from what we know of the few individuals which have been brought alive to Europe, none of its race are better qualified for an arboreal mode of existence ; and we may well believe that a troop of these animals would escape from the hunter, whether European or native, with such celerity, bounding from tree to tree in their course, as to render pursuit hopeless.

That the skins of this, and of other beautifully furred Monkeys, might be advantageous, in a commercial sense, and used as are those of the Chinchilla, the Sable, and the Ermine, could they be obtained in sufficient numbers, is not to be doubted ; it is, perhaps, only the difficulties to be overcome in collecting them, which have deterred persons from the attempt.



MONA MONKEY.

CERCOPITHECUS MONA. (*Cercopithecus Mona*, ERXLEBEN, Syst. Regn. An. 1771.)

- La Mone* BUFFON, Hist. Nat. xiv. p. 258, c. figurâ, tab. xxxvi. 1766.
Varied Ape PENNANT, Quadrup. 1793, and Synops. 1771.
Simia Mona SCHREBER, Säugth. 1775.
Simia Mona GMELIN, Syst. Nat. Linn. 1788.
Le Mona BUFFON, Supp. vii. pl. 19. 1789.
La Mone AUDEBERT, Sim. et Makis, Fam. iv. sect. ii, 12. 1797.
Cercopithecus Mona GEOFFROY, in Ann. du Mus. xix. 1812.
La Mone F. CUVIER, Mamm. fig. 1819.
Cercopithecus Mona KUHLE, Beitr. 1820.
Cercopithecus Mona DESMAREST, Mamm. p. 58. 1820.
Simia Mona FISCHER, Synops. Mamm. p. 17. 1829.
Cercopithecus Mona LESSON, Species des Mamm. p. 74. 1840.
Simia Mona F. CUVIER, Nouv. Dict.
Simia Mona DESMOULINS, Dict. Class.

SPECIFIC CHARACTERS.—Head of a yellowish olive colour; a black frontal stripe above the eyebrows is surmounted by another of a whitish tint; back, chestnut brown; haunches and limbs, externally, dusky black; tail, black with a white spot on each side of its origin, on the crupper; under parts, and inside of the limbs, white; whiskers very full, of a yellowish tint, slightly washed with black.

LOCALITY.—Western Africa (Guinea).

DESCRIPTION.—Description of a specimen (No. 30, Cat. Mamm. 1838), in the museum of the Zoological Society, London:—The top of the head is of a greenish yellow, mingled with black, each hair being black at the base and point, and yellow in the middle; the neck, back, and sides, as far as the shoulders and haunches, are of a deep chestnut brown, minutely speckled with black, the hairs being grey at the base, and then annulated

with alternate rings of red and black, the latter being the colour of the apex; the shoulders, the haunches, the anterior and posterior limbs, externally, and the tail, are of a deep dusky black, a white spot being seated on each side of the base of the latter, and the thighs being slightly freckled with red; the under surface of the body, and the inside of the limbs, are of a pure white, separated from the adjoining colours by an abrupt line of demarcation; above the eyebrows a transverse black band extends on each side, as far as the ears; and this, again, is surmounted by a whitish, narrow, crescentic stripe, more apparent in some individuals than in others; the skin of the orbits and cheeks is bluish purple, the upper and under lips flesh-coloured; on the sides of the face, large bushy whiskers, of a straw yellow, slightly tinged with black, advance forward, and extend over a considerable portion of the cheeks; they also cover the sides and lower part of the neck; the ears and hands are of a livid flesh colour.

	ft. in.
Length of head and body	1 8½
Ditto tail	1 11

GENERAL HISTORY.—The term Mone, or Mona, is of Arabic origin, and is the Moorish name for all the long-tailed Monkeys indiscriminately. “Reperiuntur in Mauritaniæ sylvis simiarum variæ species, quarum quæ caudam gerunt Monæ dicuntur,” *Leo Afric. Desc. Afric.*, vol. ii. p. 757. In Egypt, according to Prosper Alpinus, the same animals are termed Monichi, evidently a corruption of the Moorish name.* From Northern Africa the term Mona passed into Spain, Portugal, and Provence, where it is the common name for any of the long-tailed Monkeys; nor has it stopped here; it is evidently the root of our word Monkey, which has exactly the same meaning, being only applied to the long-tailed species of Simia, but which is supposed, by some, to be a corruption of the word Monikin, or Manikin, in which case it would be more appropriately applied to the tail-less species.†

Be this as it may, the exclusive application of the title Mone, as Buffon has corrupted it, or Mona, to the present species, is entirely arbitrary; nor can any stress be laid on his opinion that the Mona is the Cebus, or Kebos, of the ancients. (See observations in description of Patas.) Of the habits and manners of the Mona, in a state of nature, nothing is definitely known. It bears our climate better than most of its

* “Simii caudati et barbati qui vulgo Monichi vocantur. Monichi, Simii caudati, et barbati, ex Æthiopiæ locis conterminis in Ægyptum deducuntur.” Prosper Alpinus, *Hist. Ægypt.* lib. iv. p. 242.

† It is not too much to suppose that with the animals imported by sailors from various parts of Northern Africa, was also imported the name by which they were known to the people from whom they were obtained. Nor must we forget the influence which the Moorish nation exercised upon Southern Europe in the middle ages; nor the influx of Arabic words, into all parts of Europe, with the return of the Crusaders. Besides, it seems to be going out of the way to seek, in our own language, for the origin of the name of a foreign animal, with which our Saxon forefathers, and, indeed, ourselves, till at a comparatively late period, were unacquainted.

congeners; and from what observations the Author has been able to make upon living individuals, it is, when adult, as savage and irritable as the rest. Buffon and Fred. Cuvier, however, commend it for its gentleness, intelligence, and the absence of those evil passions so prevalent throughout the tribe. It is from young individuals, most probably, that they have formed their opinions; but we well know how the temper and disposition of all the Simiæ alter with their age, and how the most lively and good-tempered, while in adolescence, become irascible and revengeful when arrived at maturity; such is the case with the Mona, of which the males in particular are malicious and petulant; the adult females are less so; and the young of both sexes are playful. Fred. Cuvier, however, is correct in attributing to it gracefulness of movement and beauty of colouring, and, for these, it claims our admiration.

DIADEM MONKEY.

CERCOPITHECUS LEUCAMPYX.

La Diane, Cercopithecus Diana. F. CUVIER and GEOFFROY, Mamm. vol. iii. June, 1824. Fæm. (*Simia leucampyx* FISCHER, Syn. Mamm. p. 20. 1829.)
Cercopithecus Diadematus . . . ISIDORE GEOFFROY, in Voy. Belang. Zool. 51.
Cercopithecus dilophos in Mus. Lugd. Bat. and OGILBY, in Menageries, part ii. 1838.

SPECIFIC CHARACTERS.—General colour black, finely grizzled on the back and sides with white, or yellowish white; a white frontal semilunar mark; tail black at the apex; whiskers hoary.

LOCALITY.—Western Africa.

DESCRIPTION.—Fur full, and rather harsh; teeth large; form, robust and powerful; the top of head, the occiput, the back of the neck, the shoulders, the belly, and all the limbs, inside and out, are of a deep black; a white semilunar streak (with the convex edge above) crosses the forehead, its breadth, in the middle, being three quarters of an inch; the hairs on the cheeks are close, and grizzled with black and white annulations; the back, beyond the shoulders, the sides and haunches, and the posterior margin of the thighs, are of a beautiful grizzly grey, each hair being ringed, alternately, five or six times with black and white; the tail is grey at the base, becoming darker towards the apex, which is black and pencilled; the hairs on the upper lip and chin, are white and short, with a few black intermixed; the face is of a violet black.

Length of head and body	ft. in.
Ditto tail	1 11
	2 8½

The preceding details were taken from the original specimen in the Paris Museum (an adult female, which lived many years in the Jardin des Plantes), described and figured by F. Cuvier, under the title of *Diana*, though with considerable hesitation.

Fred. Cuvier informs us, that, when young, its head, its neck (on the upper part), its arms, fore-arms, hands, chest, belly, and tail, were black, but of a deeper tint on the under parts, and on a considerable portion of the tail, than elsewhere; the back was speckled, each of the hairs being annulated with black and white; the whiskers, also, were speckled, though not with white and black, but black and yellow; on the forehead there was a yellow band, in the shape of a crescent reversed; and about the chin a small quantity of white hair, but not forming a long beard; a few yellowish hairs garnished the callosities; the face was of a violet tint, blue predominating on the cheeks, and red on the muzzle and eye-lids. The eyes were fawn-coloured, and the hands quite black. "At present," our author, speaking of the animal in a mature state, says "the general distribution of the colours is the same, but the white rings of the dorsal hairs have become yellow: this colour, too, has augmented on the whiskers; the hairs on the higher internal parts of the thighs have become annulated with grey and white, so that the coat there is of a delicate ash colour; the hairs on the tail are similarly annulated, except that, on this organ, the darker rings are nearly black; on the upper surfaces the coat is abundant, but very scanty on the under, where, as on the other parts of the body, the skin is bluish."

It may here, by way of note, be added, that the annulations of the hairs of the back appeared to be white; but the yellow tint may have faded since death. Two specimens, entitled *Cercopithecus dilophos*, exist in the Museum of Leyden, and are said to have been brought from Guinea; in one, the lunate stripe over the eyes is slightly sprinkled with brown; in the other, it is purely white.

GENERAL HISTORY.—All we know respecting the habits of the present Monkey, is derived from the only living specimen ever seen in Europe; namely, that now in the Paris Museum. According to Fred. Cuvier, they closely resemble those of the Diana and the Mona; but the *C. leucampyx* is far larger, and more robust and powerful than either of these two species, and must be, when irritated, more formidable. Fred. Cuvier does not particularize any traits of its disposition, and, being a female, the evil features of its character were, probably, far less prominent than would be the case in the male. Excepting, perhaps, in certain limited districts, this animal must be very rare, for no example has been hitherto imported into our island.

TEMMINCK'S MONKEY.

CERCOPITHECUS TEMMINCKII. (*Cercopithecus Temminckii*, OGILBY, in Menageries, Monkeys, Lemurs, and Opossums, part ii. p. 345. 1838.)

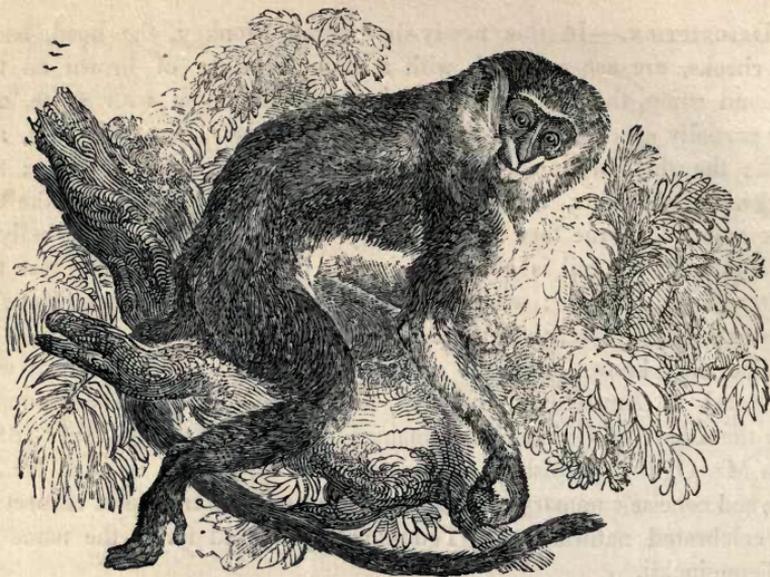
SPECIFIC CHARACTERS.—General colour, ashy grey, freckled with white; limbs, black; chin and throat, white; face, naked, and of a pale lead colour.

LOCALITY.—Guinea.

DESCRIPTION.—In this newly-discovered Monkey, the head, back, and cheeks, are ash-coloured, with a slight mixture of brown on the hips and rump, the hairs being every where annulated with white, and thus partially speckled ; the arms, fore-arms, thighs, legs, and paws, are black ; the whole of the chin and throat are of a pure, unmixed white ; the cheeks, the whiskers, and head, are of a grizzled ash-colour, like the back and sides ; the face is apparently of a greyish blue ; the belly is ash-coloured ; the tail is about the length of the body, but has lost the greater part of the hair : what remains, however, is of the same colour as that of the body ; size, that of the Diana.

The only known specimen exists in the Leyden Museum ; it was purchased at Amsterdam, in 1824, and is said to have been brought from the Coast of Guinea, but remained undescribed till the year 1838, when Mr. Ogilby published, in his work on Monkeys, Lemurs, &c., a clear and concise summary of its characters ; and, as a tribute of respect to the celebrated naturalist, M. Temminck, proposed for it the name of *C. Temminckii*.

GENERAL HISTORY.—After what has been stated, it is almost useless to say that the habits and manners of this animal are utterly unknown, as far, at least, as they are peculiar to the species. As, however, it is clearly allied to the Diana, the Mona, and the Diadem Monkeys, its instincts and disposition are probably similar.



THE MOUSTACHE MONKEY.

CERCOPITHECUS CEPHUS. (*Cercopithecus Cephus*, ERKLEBEN, Syst. Regn. An. 1777.)

- Cercopithecus alius Guineensis* MARCGRAVE, Hist. Rer. Nat. Braz. 1648.
Cercopithecus alius Guineensis RAY, Syn. 1693. (Quad.)
Cercopithecus Guineensis barbâ flavesc. BRISSON, R. An. 1756.
Simia Cephus (?) LINNÆUS, Syst. Nat. ed. 12. 1766.
Moustac BUFFON, Hist. Nat. xiv. c. fig. tab. xxxix. 1766.
The Moustache Monkey PENNANT, Synops. 1771, and Quadrup. 1793.
Moustac AUDEBERT, Hist. Sing. et Mak. Fam. iv. sect. ii. tab. xii. 1797.
Cercopithecus Cephus GEOFFROY, in Ann. du Mus. xix. 1812.
Cercopithecus Cephus DESMAREST, Mamm. p. 57. 1820.
Cercopithecus Cephus KÜHL, Beitr. 1820, aliorumque auctorum.
Moustac F. CUVIER, Mamm. c. fig. vol. ii. March, 1821.
Simia Cephus FISCHER, Synops. p. 20. 1829.
Cercopithecus Cephus LESSON, Species des Mamm. p. 77. 1840.
Simia Cephus F. CUVIER, Dict. Sc. Nat.
Simia Cephus DESMOULINS, Dict. Class.

SPECIFIC CHARACTERS.—General colour above, golden brown, freckled with black; on the head and thighs a greener tint prevails; tail, fulvous orange; under parts, whitish; whiskers full, and of a yellow colour; face, violet blue; upper lip, with a white triangular mark, above a black margin.

LOCALITY.—Guinea.

DESCRIPTION.—The muzzle is rather short; the nose moderately elevated; the margin of the upper lip is black, this colour extending back to the whiskers; the under lip and chin are black also; between the black margin of the upper lip and the nose, is a white stripe, somewhat in the form of a “broad arrow,” also advancing to the whiskers; the whiskers form full cheek-tufts of rich golden yellow hairs, directed backward and

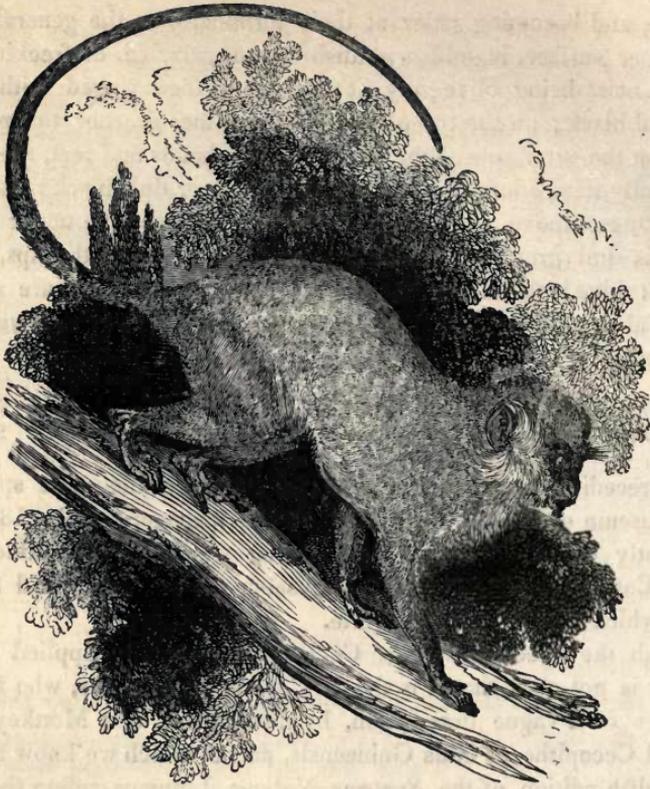
downward, and becoming paler at their termination; the general tint of all the upper surface, is golden reddish brown, grizzled, or freckled with black, the hairs being olive grey at the roots, then ringed with bright fulvous and black; on the top of the head, a rather greener tint prevails, and also on the outer side of the thighs; on the hands and feet, the golden hue gradually passes into grizzled dusky brown, or dull black; the tail is fulvous orange, above and below, except at the base, the under surface of which is dull grey; the face, with the exception of the lips, is of a fine violet blue; the throat, below the chin, is white, as are also the chest and abdomen, but less purely; the ears are black, with yellowish white hairs.

Length of head and body	ft. in.
Ditto tail	about 2 2

The preceding description agrees closely with a fine male specimen, in the Museum of Paris, which died at the menagerie, July, 1822, and subsequently examined with others, among which may be noticed one (No. 34, Cat. Mamm. 1838) in the museum of the Zoological Society, London, which died in the menagerie.

Though the specific title of *Cephus*, is generally applied to this animal, it is not clear that it is the *S. Cephus* of Linnæus, who founded his species on a vague description, by Marcgrave, of a Monkey which he termed *Cecopithecus alius Guineensis*, and of which we know nothing. In his twelfth edition of the *Systema Naturæ*, Linnæus refers the *Simia Æthiops*, originally described by himself in his *Museum Adolphi Frederici*, to the *Simia Cephus*, as a variety, and hence both the *Simia Cephus*, and *Simia Æthiops* of Linnæus, are involved in inextricable obscurity; a circumstance of little moment, provided naturalists are agreed as to what species shall now be termed *Cephus*, and what *Æthiops*, setting the Linnæan descriptions out of the question.

GENERAL HISTORY.—This beautiful Monkey is seldom seen alive in Europe; two or three opportunities of observing it in captivity have been afforded the Author, and, from these examples, he is induced to form a favourable opinion of its temper and disposition. It appears to combine great intelligence, with familiarity and playfulness, and is lively, active, and graceful; at the same time, it is not destitute of spirit, and will immediately resent an injury, but soon becomes reconciled: inquisitive and prying, the Moustache Monkey is not obtrusive; and an abrupt movement, or action, is sufficient to make it retire. Unfortunately its constitution is extremely delicate, and it suffers in our climate from the changes of temperature, and soon dies. Of its habits in its native forests, of which it is a great ornament, nothing has been ascertained.



THE TALAPOIN MONKEY, OR MELARHINE.

CERCOPITHECUS TALAPOIN. (*Cercopithecus Talapoin*, ERXLEBEN, Syst. Regn. An. 1777.)

- Talapoin* BUFFON, Hist. Nat. xiv. tab. xl. 1766.
Simia Talapoin GMELIN, Syst. Nat. Linn. 1788.
Talapoin Monkey PENNANT, Synops. 1771, and Quadrup. 1793.
Cercopithecus Talapoin GEOFFROY, Ann. du Mus. xix. 1812.
Cercopithecus Talapoin KUHL, Beitr. 1820.
Cercopithecus Talapoin DESMAREST, Mamm. p. 56.
Melarine, or Talapoin F. CUVIER and GEOFFROY, Mamm. vol. iii. August, 1824.
Simia Talapoin FISCHER, Synops. Mamm. p. 21. 1829.
Cercopithecus Talapoin LESSON, Species des Mamm. p. 78. 1840.

SPECIFIC CHARACTERS.—General colour above, olive green,—below, whitish; upper lip, yellow, sprinkled with black hairs; skin below the eyes, orange coloured; above the eyes, whitish; rest of the face black; whiskers, short, and of a pale straw, golden colour.

LOCALITY.—Western Africa.

DESCRIPTION.—In a good specimen of this Monkey (No. 41, Cat. Mamm. 1838), in the museum of the Zoological Society, London, the nose and cheeks are black; the upper lip is yellow, or yellow-white, sprinkled with black hairs, a few white ones also being scattered over the margin; the naked skin round the eyes is orange-coloured; the upper eyelids to the super-

ciliary ridge are white; the whiskers, or cheek-tufts, which are not full, as in the Moustache Monkey, are directed downward, and are of a delicate golden straw colour; the top of the head, and the upper surface generally, are of a bright olive green, the hairs being plumbeous grey at the roots, then olive green, and then blackish at the tips; the olive green tint becomes paler on the anterior hands, and on the hind hands, or feet, passes into yellowish olive; the tail is of an ashy grey; the chin is dusky; the under surface, and the inside of the limbs, are white; the ears are black, large, and naked. This species differs, among other things, from the Moustache Monkey, in having the ears comparatively larger, and in the hairs of the back not being ringed so often, nor so strongly; in the Moustache Monkey they are annulated three times with fulvous, and the ears are covered with yellowish white hairs.

Length of head and body 1ft. 1½in.; tail imperfect.

GENERAL HISTORY.—The Talapoin is by no means identical with the Grivet, as has been suspected, but is a species closely allied to the Moustache Monkey, from which, however, it is sufficiently distinguishable. Fred. Cuvier has figured a young female, which he obtained in Paris, but he could gain no information as to the country whence it was brought: it was gentle and lively.

From the name Talapoin, which is that of a sect among the Buddhists of India, Buffon was led to refer the present species to that country as its native habitat. How it obtained this name does not appear; most probably it is a misnomer, and might, as Mr. Ogilby suggests, be changed for that of Melarhine, as used by Fred. Cuvier. Certainly, it is not a native of India.

A specimen of the Talapoin was living, a few years since, in the menagerie of the Zoological Society, London. It was remarkable for intelligence, good nature, and the elegance of its movements; it was very lively, but timid, and, though disposed to be familiar, was neither obtrusive nor mischievous. Like the Moustache Monkey the constitution of this species is very delicate; and it is rarely seen in the menageries of Europe, the climate of which it does not long endure.

THE RED-EARED MONKEY.

CERCOPITHECUS ERYTHROTIS. (*Cercopithecus erythrotis*, WATERHOUSE, in Proceedings Zool. Soc. p. 59. 1838.)

SPECIFIC CHARACTERS.—General colour, grey; the hairs of the upper parts being annulated with black and yellow; throat and cheeks, white; arms, blackish; tail, rufous, with a black line on its upper surface, and with the tip black; ears, rufous.

LOCALITY.—Fernando Po.

DESCRIPTION.—Description of original specimen (No. 33 A, Suppl. Cat. Mamm.) in the museum of the Zoological Society, London:—

The hairs on the upper parts of the body are black, annulated with yellow; on the hinder part of the back the yellow assumes a deep golden hue, but, unlike what occurs in the Moustache Monkey, the black prevails over the yellow. On the sides of the body and the outer side of the hinder legs, the hairs are greyish; and on the belly and inner side of the limbs, they are greyish white. The fore legs are blackish externally; a dark mark extends backward from the eye to the ear; below this, on the cheeks, there is a tuft of white hairs, beneath which the hairs are grizzled black and yellow, there being, in these respects, a close resemblance to the Moustache Monkey. The ears are furnished, internally, with bright ferruginous hairs; the tail is bright rufous, with a dusky black line extending down its upper surface. The face is imperfect, and the feet have been removed from the skin; these parts, therefore, cannot be described.

	ft. in.
Length of head and body	1 5
Ditto tail	1 11

This beautiful little species is about the same size as the Moustache Monkey (*Cerc. cephus*), and has undoubtedly a close affinity to that animal; it may, however, be distinguished by the bright rusty-red hairs, which cover the ears internally, by its brilliant red tail, and by the hairs below the root of the latter being also of a bright red.

GENERAL HISTORY.—Of the habits and manners of this species nothing is known. It is a native of the forests of Fernando Po; and a single specimen, presented to the museum of the Zoological Society, London, by G. Knapp, Esq., is the only one in the collections of Europe.

THE WHITE-NOSED MONKEY, OR HOICHEUR.

CERCOPITHECUS NICTITANS. (*Cercopithecus nictitans*, ERXLEBEN, Syst. Regn. An. 1777.)

- Cercopithecus Angolensis altus*. MARCGRAVE, Hist. Rer. Nat. Braz. 227. 1648.
Simia nictitans LINNÆUS, Syst. Nat. ed. 12. 1766.
Winking Monkey PENNANT, Synops. 1771.
Guenon à nez blanc proëminent BUFFON, Hist. Nat. Supp. vii. c. fig. tab. xviii. 1789.
White-nosed Monkey PENNANT, Quadrup. 1793.
Hocheur AUDEBERT, Hist. des Sing. et Mak. Fam. iv. sect. i. pl. 2. 1797.
Cercopithecus nictitans GEOFFROY, Ann. du Mus. xix. 1812.
Lasiopyga nictitans ILLIGER, Prod. Syst. i. 1812.
Cercopithecus nictitans KÜHL, Beitr. 1820.
Cercopithecus nictitans DESMAREST, Mamm. p. 58. 1820.
Hocheur F. CUVIER, Mamm. c. fig. 1825.
Simia nictitans FISCHER, Synops. Mamm. p. 18. 1829.
Cercopithecus nictitans LESSON, Species des Mamm. p. 75. 1840.

SPECIFIC CHARACTERS.—General colour, black, freckled with white; limbs, black; whiskers, ample; chin, beardless; nose, white.

LOCALITY.—Guinea.

DESCRIPTION.—A specimen in the Paris Museum, presents the following characters:—The head is round, the forehead elevated, the face depressed; the nose is broad, and prominently convex, and of a clear white from between the eyes to the nostrils, where the white ends, without infringing on the lower lip; this white is produced by short, smooth, closely-set hairs; the colour of the rest of the face is bluish black; the chin and throat are without a beard, but have a few scattered, close, white hairs; the upper lip is sprinkled with black hairs; very full bushy whiskers, arising immediately below the eyes, spread backward and downward; the hair of the head is very full, boldly overreaching the eyes, obscuring the ears, and adding to the breadth and elevation of the top of the head; the colour of the whiskers and of the head is grizzled black, as is that, also, of the back, sides, thighs, and legs (but darker on the latter): this hue is produced by each hair being grey at the root, then ringed with black and straw; the shoulders, the chest, the arms, fore-hands, and feet, are black; the tail, also, is black; the abdomen is of a dirty blackish grey; on the back, a few long hairs are completely black; and the edges of the whiskers below the ears, indicating the division between them and the long hair of the head, are black also; the ears are dusky: the orbits are of a flesh colour; the hands and feet are long.

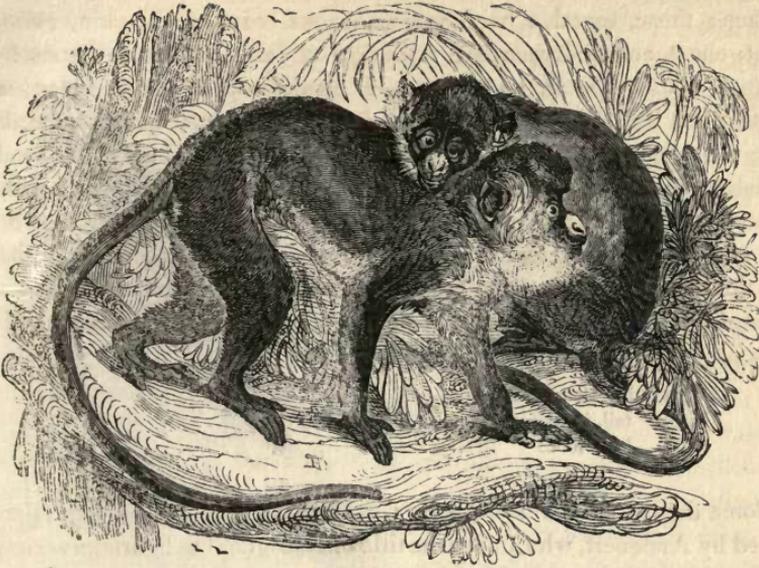
	ft. in.
Length of head and body	1 4½
Ditto tail	2 5
Ditto hind foot	0 5

The fine specimen from which the preceding description was taken, in the Museum of Paris, was obtained from the master of a travelling menagerie, November, 1818; a somewhat larger specimen, in an indifferent condition, presents exactly the same characters and colouring, but the eyes are painted round with orange red.

The physiognomy of this Monkey is very different from that of *Cerc. Petaurista*, from which it may be distinguished, independently of the general colouring, by the white being restricted to the nose; by the absence of a beard below the chin, which is nearly naked; by the fulness of the whiskers and hairs of the head, and by the comparatively greater length of the hands and feet.

GENERAL HISTORY.—The White-nosed Monkey, or Hocheur, was, originally, indicated by Marcgrave. Linnæus, again, under the denomination of *Simia nictitans*, gave a brief account of it from Alstrœmer's description of a living individual belonging to a Professor of Botany at Amsterdam. Buffon not only described, but figured it; so, also, did Audebert: each, however, merely from a cabinet specimen. The former gave it the name of *Guenon à blanc nez proéminent*, and considered it

as being, perhaps, identical with the Blanc-nez of Allamand (Cerc. Petaurista); while the latter, from whom it received the name of Hocheur, deceived by the imperfect condition of his specimen, erroneously alleged the species to be destitute of callosities. Pennant, too, gave an account of it, derived principally, as it would seem, from his observations on a specimen in the Leverian Museum. Finally, it has been minutely described, and beautifully figured, from an adult living female, in his magnificent work on the present class, by Fred. Cuvier, from whom we learn that its disposition was mild and gentle, and that, in its habits, it closely resembled the Diana. The individual described, while alive, by Fred. Cuvier, is, as there is reason to believe, the same from which the present account is also taken.



THE LESSER WHITE-NOSED MONKEY, BLANC-NEZ, OR ASCAGNE.

CERCOPITHECUS PETAURISTA. (*Cercopithecus Petaurista*, ERXLEBEN, Syst. Regn. An. 1777.)

- Simia Petaurista* SCHREBER, Säugth. c. fig. tab. xix. b. 1775.
Simia Petaurista GMELIN, Syst. Nat. Linn. 1788.
Blanc-nez BUFFON, Hist. Nat. Supp. vii. p. 67. 1789.
Simia Petaurista, and *Simia Ascanius*, LATREILLE, in Buffon Hist. Nat. ed. Sonn. Sing. ii. Nos. 12, 13. 1797.
Blanc-nez and Ascagne AUDEBERT, Sing. et Mak. Fam. iv. sect. ii. pp. 14, 15. 1797.
Cercopithecus Petaurista GEOFFROY, in Ann. du Mus. xix. 1812.
Cercopithecus Petaurista DESMAREST, Mamm. p. 59. 1820.
Ascagne F. CUVIER, Mamm. c. fig. Feb. 1820.
Lesser White-nosed Monkey BENNETT, in Gardens and Menag. del. c. fig. 1829.
Simia Petaurista FISCHER, Synops. Mamm. p. 18. 1829.
Cercopithecus Petaurista LESSON, Species des Mamm. p. 76. 1840.
Simia Petaurista F. CUVIER, Dict. Sc. Nat.
Simia Petaurista DESMOULINS, Dict. Class.
Blanc-nez ALLAMAND, in BUFFON ed. Holl. xiv. pl. 39.

SPECIFIC CHARACTERS.—General colour above, olive brown; a black frontal stripe runs over the eyes, and a blackish mark crosses the vertex from ear to ear; a similar stripe runs below the ear, bounding a streak of white; face, black; nose at its apex, and the contiguous part of the upper lip, white; whiskers, beard, and under parts, white; limbs, olive grey.

LOCALITY—Guinea.

DESCRIPTION.—The form of the head is as in the Hocheur; the lower half of the nose, and the anterior portion of the upper lip are white; the face is covered with short black hairs, those on the cheek-bone having

a tinge of fulvous; the whiskers are short, and arise from the sides of the face; these, together with a conspicuous beard on the chin, and the throat, chest, and abdomen, are white; a streak of black hair runs from the face, below the ear, and loses itself on the top of the shoulder; and between this black line and the hairs of the head, a conspicuous streak of white runs below the ear; the general colour of the back and head is reddish olive brown, the hairs being grey at the base, and then ringed fulvous and black; a band across the forehead, above the eyes, and a band traversing the vertex, from ear to ear, are black; on the limbs, a grey tint prevails, deepening to dusky black on the hands and feet; the tail is of a dusky grey above, white beneath; the hands are short.

	ft. in.
Length of head and body	1 5
Ditto tail, imperfect	1 9
Ditto hind foot	0 4

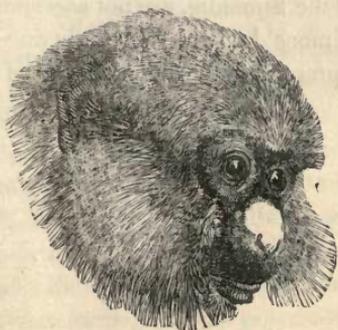
Some degree of confusion exists, with respect to the present species, created by Audebert, who, under the title of *Ascagne*, has figured a variety of the *Blanc-nez*, distinguished by the prevalence of a violet tint on the naked parts of the face. Audebert conferred this appellation (*viz.*, *Ascagne*), on a living specimen, the original of his figure and description, which was kept, for a short time only (having been the property of a private individual), in the menagerie at Paris. Latreille afterwards, in Sonnini's edition of Buffon, gave a figure of the same animal, from a drawing by Maréchal, accompanied by a description founded on that of Audebert. Cuvier subsequently published a new account of this identical *Guenon*, with a much superior figure than that given by Latreille, but from the same original drawing. A second living specimen has been beautifully figured and described by Frederic Cuvier. Audebert pronounced it to be specifically distinct from the *Blanc-nez* of Allamand; so, again, though not without some scruples, did Latreille. By Frederic Cuvier, it seems to have been regarded as a variety; but his brother, the Baron, deemed it identical with the preceding *Guenon*, and, rejecting Audebert's proposed denomination, described it under Allamand's term, as rendered by Buffon, in his Supplement, of *Blanc-nez*. In the last edition of his great work, however, he has adopted the name *Ascagne* for the species, but without indicating the *Blanc-nez* of Allamand as a variety. Desmoulins again notices the species under the appellation *Ascagne*, yet so far differs from Cuvier, as to make it a variety of the *Blanc-Nez*. Erxleben, Gmelin, Geoffroy, Desmarest, and Bennett, like Cuvier, appear to have considered the *Blanc-nez* and *Ascagne* completely identical.

GENERAL HISTORY.—The present species, like the *Hocheur*, is gentle, graceful, and intelligent; perhaps, however, not without a mixture

of the usual petulance and caprice of its race. The individual figured by Mr. Bennett, in the *Gardens and Menagerie delineated*, was by no means familiar, and appeared to be particularly anxious to conceal its face, crying out, and kicking with all its might, when handled for the purpose of inspection. Several living specimens have been, at different times, observed by the Author of this work: all were extremely lively, and as amusing from their antics, as attractive by their beauty, and the lightness and grace of their actions; they were in perpetual motion, gambolling with their companions, and pursuing, or pursued by them, in the exuberance of playfulness. They were, at the same time, docile and familiar, but disliked to be taken hold of, or interfered with. Allamand says, that the Blanc-nez which lived in his possession, and which was remarkably gentle and sportive, became angry when interrupted while eating, or when mockery of it was made, but that its displeasure was very transient. The dislike of being the subject of ridicule, appears to be a feeling in which most Monkeys participate (it has been noticed in the instance of the Diana); and it is one of the proofs of their intelligence, that they are capable of appreciating ridicule, or mockery, and are sensitive of the injury.

The present species is evidently common in Guinea, and is frequently brought to Europe; but its constitution is not proof against the rigours of our climate, under which it soon begins to succumb. It is of this Monkey, that Barbot, as Allamand thinks, makes mention, when he describes certain Monkeys of Guinea, which have a white beard and chest, a white mark over the tip of the nose, and a black stripe across the forehead. The annexed figures of the heads of the Hocheur and the Ascagne, convey a clear idea of their distinguishing characteristics.

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Head of Hocheur.

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Head of Ascagne.

MARTIN'S MONKEY.

CERCOPITHECUS MARTINI. (*Cercopithecus Martini*, WATERHOUSE, in Proceedings Zool. Soc. 1838, p. 58.)

SPECIFIC CHARACTERS.—Hairs of the body above, annulated with black and pale yellow; top of head, arms, and tail, blackish; throat and under parts, brownish grey.

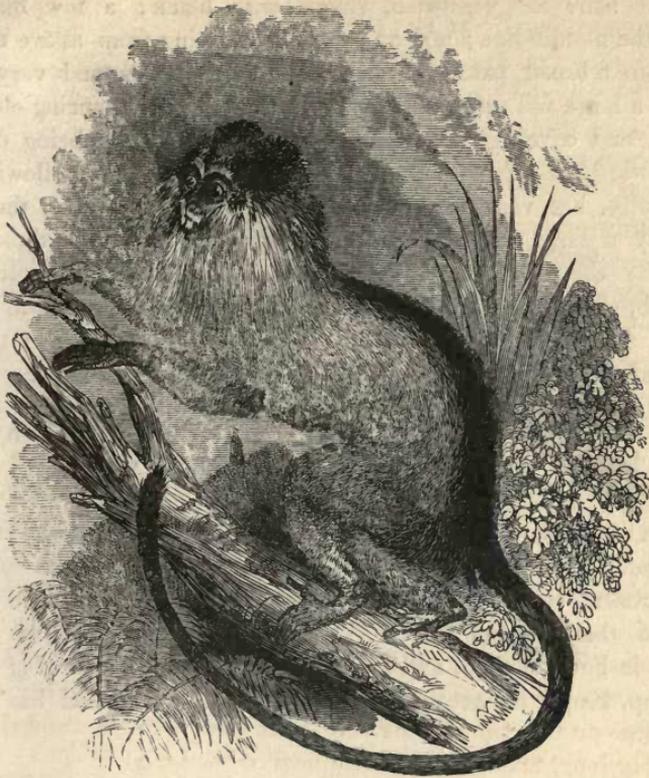
LOCALITY.—Fernando Po.

DESCRIPTION.—Of this animal two skins (No. 33 B, 33 B, a, in Suppl. Cat. Mamm. 1839), exist in the museum of the Zoological Society: both very nearly agree in colouring, but differ slightly in size; the dimensions are from the larger specimen. The face, hands, and feet, are, unfortunately, wanting. It appears to be most nearly allied to *Cerc. nictitans*; the hairs of the upper part of the body, however, are more distinctly annulated, and the general tint is somewhat greyish; each hair is grey at the base, and has the apical portion black, with, generally, three yellowish white rings; the crown of the head and the fore-legs are black; the hind-legs are blackish, the hairs being but obscurely annulated; the throat is dirty white; the belly and inner side of the legs, at the base, are of a brownish colour; the tail is black above, and somewhat grizzled at the sides; at the base of the tail beneath there are some deep reddish brown hairs; the naked callosities are small; the hairs on the fore-part of the crown of the head are black, annulated with brownish white, and so are those on the side of the face immediately below the ear; the fur is tolerably long, and but loosely applied to the body.

In the smaller specimen the under parts of the body are somewhat paler than those in the larger, being brownish grey.

Length of head and body	ft. in.
Ditto tail	1 10
	2 2

GENERAL HISTORY.—The habits and manners of this species, which has but recently been added to the list of the Simiadæ, are not ascertained. The original, and, indeed, only specimens known, were obtained at Fernando Po, by G. Knapp, Esq., and presented to the museum of the Zoological Society, London.



THE BEARDED MONKEY.

CERCOPITHECUS POGONIAS. (*Cercopithecus Pogonias*, BENNETT, in Proceedings Zool. Soc. 1833. p. 67.)

Cercopithecus Pogonias LESSON, in Species des Mamm. p. 74. 1840.

SPECIFIC CHARACTERS.—General colour blackish, freckled with white; the middle of the back, the crupper, the tail above and at the tip, and a stripe on the temples, black; forehead and limbs, externally, yellowish, punctulate with black; whiskers long and full, and of a yellowish white; under parts generally, rufous yellow.

LOCALITY.—Fernando Po.

DESCRIPTION.—Description of specimens (No. 33, Catalogue, and 33 a, Suppl. Cat. Mamm. 1838-9) in the museum of the Zoological Society, London:—The hairs of the upper surface are black, ringed with whitish, producing a grizzled appearance, which occupies the back part of the head, the fore-part of the back, the sides, the outer surface of the anterior limbs, and the posterior hands; in the middle of the back commences a broad black patch, which extends to the tail, and is continued along its upper surface for about two-thirds of the length of that organ, the remaining portion being black both above and below; on the fore-

head the hairs are yellowish, ringed with black; a few black hairs occupy the middle line; and on each side, passing from above the eye to the ear, is a broad patch of black; the whiskers expand very broadly, forming a large full tuft on each side of the face, commencing close under the eye, and covering the whole cheek, their direction being downward and outward; the hairs composing them are of a dirty yellowish white, occasionally, but very sparingly, ringed with dusky black; the ear has internally a long tuft of hairs of the same colour with those of the whiskers; the outer side of the hinder limbs, the hands excepted, is yellowish, grizzled with black, the colour being intermediate in intensity between the lightest portion of the sides, and the whiskers; the under surface of the body, the insides of the limbs, and the under surface of the proximal two-thirds of the tail, are reddish yellow.

	ft. in.
Length of head and body	1 5
Ditto tail	2 0

GENERAL HISTORY.—The original of Mr. Bennett's description (No. 33, in Cat. Mamm. 1838) was, for many years, the only example known of the present species. Recently, however, a second specimen has been added to the museum of the Zoological Society, London. It was obtained in Fernando Po, and presented, with other interesting skins, by G. Knapp, Esq. No account of the habits of the animal has been yet procured.

CAMPBELL'S MONKEY.

CERCOPITHECUS CAMPBELLII. (*Cercopithecus Campbellii*, WATERHOUSE, in Proceedings Zool. Soc. 1838. p. 6.)

SPECIFIC CHARACTERS.—Fur, very long, rather silky, and divided down the middle of the back; head, and anterior part of body, olive grey; the hairs being annulated with black and yellow; the posterior part of the body, and the thighs, externally, of a deep grey; under parts, white; arms, externally, black; tail, black, intermixed with yellow; pencil, at the extremity, black.

LOCALITY.—Sierra Leone.

DESCRIPTION.—Description of specimen (No. 33 c., in Suppl. Cat. Mamm. 1839) in the museum of the Zoological Society, London:—This species appears to be most closely allied to the *Cercopithecus Pogonias* of Mr. Bennett; but it has not the black back which serves to distinguish that animal.

The most remarkable characters, of the *Cerc. Campbellii* are its long fur, and the division of the hairs on the back, as in most of the species of the genus *Colobus*. The average length of the hairs of the back is about two inches and a half; on the hinder half of the back, however, they exceed three inches. These hairs are grey at the base, and the remaining

portion of each hair is black, with broad yellow rings, the latter colour prevailing. On the posterior half of the body, and the outer side of the hinder legs, the hairs are of an almost uniform deep slate grey; but some of those on the middle of the back are obscurely freckled with deep yellow, and those on the thigh are very indistinctly freckled with white. The belly, inner sides of the limbs, fore part of the thigh, chest, and throat, are white. The hairs of the cheeks and sides of the neck are very long, and of a greyish white, grizzled toward the ends with black and yellow. Some whitish hairs, tipped with black, are observable across the front of the forehead. The inner side of the ear is furnished with very long light grey hairs, obscurely annulated with grey and pale yellow. The fore legs are black externally, and the hair here is comparatively short. The hairs of the tail are grizzled on the upper surface with black and dirty yellow, on the under surface with black and brownish white. The point of the tail is black, and the hairs are long. The black portion of the tail occupies about one-third of its entire length.

The animal is named after the late Governor of Sierra Leone, Major Campbell.

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