A HISTORY OF THE EARTH AND ANIMATED NATURE.

BY OLIVER GOLDSMITH.

12

WITH COPIOUS NOTES;

And an Appendix,

CONTAINING EXPLANATIONS OF TECHNICAL TERMS, AND AN OUTLINE OF THE CUVIERIAN AND OTHER SYSTEMS,

BY

CAPTAIN THOMAS BROWN,
F.L.S., M.W.S., M.K.S.

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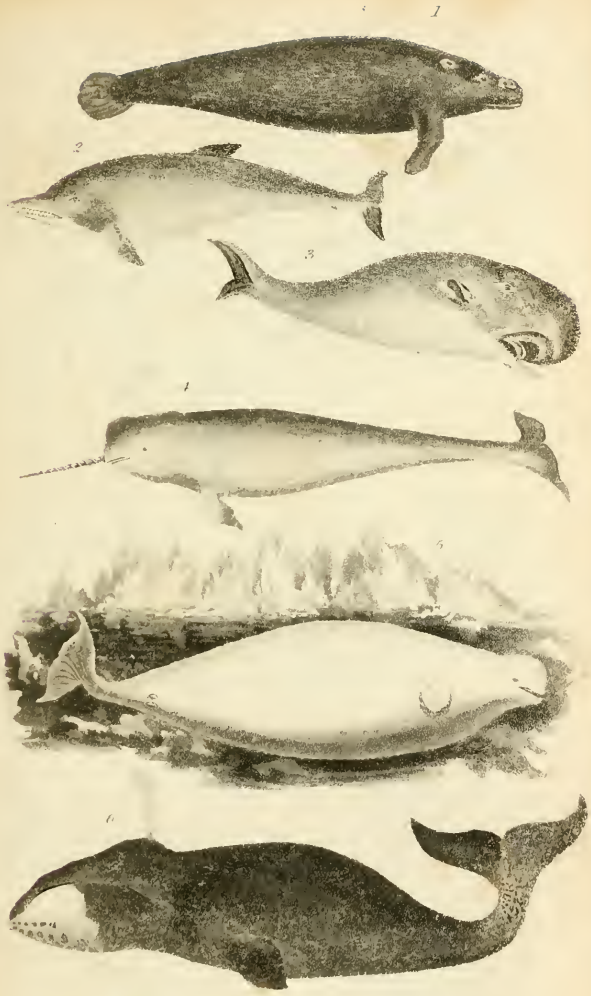

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Planaria 18 Pointed Clausilia 19 Least Carychium 20 Dwarf Vertigo 21 Moss Pupa
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Previous to putting the eggs to the hen, our philosophers first examined the cicatricula, or little spot, already mentioned; and which may be considered as the most important part of the egg. This was found in those that were impregnated by the cock to be large: but in those laid without the cock, very small. It was found by the microscope, to be a kind of bag, containing a transparent liquor, in the midst of which the embryo was seen to reside. The embryo resembled a composition of little threads, which the warmth of future incubation tended to enlarge by varying and liquefying the other fluids contained within the shell, and thus pressing them either into the pores or tubes of their substance.

Upon placing the eggs in a proper warmth,[3] either under the sun or in a stove, after six hours the vital speck begins to dilate, like the pupil of the eye. The head of the chicken is distinctly seen, with the back bone, something resembling a tadpole, floating in its ambient fluid, but as yet seeming to assume none of the functions of animal life. In about six hours more the little animal is seen more distinctly; the head becomes more plainly visible, and the vertebræ of the back more easily perceivable. All these signs of preparation for life are increased in six hours more: and at the end of twenty-four, the ribs begin to take their places, the neck begins to lengthen, and the head to turn to one side.

At this time,[4] also, the fluids in the egg seem to have changed place; the yolk which was before in the centre of the shell, approaches nearer to the broad end. The watery part of the white is in some measure evaporated through the shell, and the grosser part sinks to the small end. The little animal appears to turn towards the part of the broad end, in which a cavity has been described, and with its yolk seems to adhere to the membrane there. At the end of forty hours the great work of life seems fairly begun, and the animal plainly appears to move; the backbone, which is of a whitish colour, thickens; the head is turned still more on one side; the first rudiments of the eyes begin to appear, the heart beats, and the blood begins already to circulate. The parts, however, as yet are fluid; but by degrees, become more and more tenacious, and harden into a kind of jelly. At the end of two days, the liquor in which the chicken swims, seems

3 Malpighi. 4 Harvey.

to increase; the head appears with two little bladders, in the place of eyes; the heart beats in the manner of every embryo where the blood does not circulate through the lungs. In abo fourteen hours after this, the chicken is grown more strong; head however is still bent downwards; the veins and arteries beg to branch, in order to form the brain; and the spinal marrow seen stretching along the backbone. In three days the wh body of the chicken appears bent; the head with its two e balls with their different humours, now distinctly appear; a five other vesicles are seen, which soon unite to form the ru ments of the brain. The outlines also of the thighs and wi begin to be seen, and the body begins to gather flesh. At end of the fourth day, the vesicles, that go to form the bra approach each other; the wings and thighs appear more sol the whole body is covered with a jelly-like flesh; the heart was hitherto exposed, is now covered up within the body, b very thin transparent membrane; and, at the same time, t umbilical vessels, that unite the animal to the yolk, now app to come forth from the abdomen. After the fifth and s days, the vessels of the brain begin to be covered over; wings and thighs lengthen; the belly is closed up and tur the liver is seen within it very distinctly, not yet grown red of a very dusky white; both the ventricles of the heart are cerned, as if they were two separate hearts, beating distinct the whole body of the animal is covered over; and the tr of the incipient feathers are already to be seen. The sev day, the head appears very large; the brain is covered enti over; the bill begins to appear betwixt the eyes; and the wi the thighs and the legs, have acquired their perfect figu Hitherto, however, the animal appears as if it had two bodie the yolk is joined to it by the umbilical vessels that come fro the belly, and is furnished with its vessels, through which t blood circulates, as through the rest of the body of the chicke making a bulk greater than that of the animal itself. But to wards the end of incubation, the umbilical vessels shorten th yolk, and with it the intestines are thrust up into the body of th chicken by the action of the muscles of the belly; and the tw bodies are thus formed into one. During this state, all the o

1 Haller.

gans are found to perform their secretions; the bile is found to be separated as in grown animals; but it is fluid, transparent, and without bitterness: and the chicken then also appears to have lungs. On the tenth the muscles of the wings appear, and the feathers begin to push out. On the eleventh, the heart, which hitherto had appeared divided, begins to unite; the arteries which belong to it join into it, like the fingers into the palm of the hand. All these appearances only come more into view, because the fluids the vessels had hitherto secreted were more transparent; but as the colour of the fluids deepen, their operations and circulations are more distinctly seen. As the animal thus, by the eleventh day completely formed, begins to gather strength, it becomes more uneasy in its situation, and exerts its animal powers with increasing force. For some time before it is able to break the shell in which it is imprisoned, it is heard to chirrup, receiving a sufficient quantity of air for this purpose, from that cavity which lies between the membrane and the shell, and which must contain air to resist the external pressure. At length upon the twentieth day, in some birds sooner, in later in others, the enclosed animal breaks the shell, within which it has been confined, with its beak; and by repeated efforts, at last procures its enlargement.

From this little history we perceive, that those parts which are most conducive to life are the first that are begun; the head and the back-bone, which no doubt enclose the brain and spinal marrow, though both are too limpid to be discerned, the first that are seen to exist: the beating of the heart is perceived soon after: the less noble parts seem to spring from these; the wings, the thighs, the feet, and lastly the bill. Whatever, therefore, the animal has double, or whatever it can live without the use of, these are latest in production; Nature first sedulously applying to the formation of the nobler organs, without which life would be of short continuance, and would be begun in vain.

The resemblance between the beginning animal in the egg, and the embryo in the womb, is very striking; and this similitude has induced many to assert, that all animals are produced from eggs in the same manner. They consider an egg excluded from the body by some, and separated into the womb by others, to be actions merely of one kind; with this only difference, that

the nourishment of the one is kept within the body of the parent, and increases as the embryo happens to want the supply; the nourishment of the other is prepared all at once, and sent out with the beginning animal, as entirely sufficient for its future support. But leaving this to the discussion of anatomists, let us proceed rather with facts than dissertations; and, as we have seen the progress of an oviparous animal, or one produced from the shell, let us likewise trace that of a viviparous animal, which is brought forth alive. In this investigation, Graaf has, with a degree of patience characteristic of his nation, attended the progress and increase of various animals in the womb, and minutely marked the changes they undergo. Having dissected a rabbit, half an hour after impregnation, he perceived the horns of the womb, that go to embrace and communicate with the ovary, to be more red than before; but no other change in the rest of the parts. Having dissected another six hours after, he perceived the follicules, or the membrane covering the eggs contained in the ovary, to become reddish. In a rabbit dissected after twenty four hours, he perceived in one of the ovaries, three follicules, and, in the other, five, that were changed; having become, from transparent, dark and reddish. In one dissected after three days, he perceived the horns of the womb very strictly to embrace the ovaries; and he observed three of the follicules in one of them, much longer and harder than before; pursuing his inquisition, he also found two of the eggs actually separated into the horns of the womb, and each about the size of a grain of mustard-seed; these little eggs were each of them inclosed in a double membrane, the inner parts being filled with a very limpid liquor. After four days, he found in one of the ovaries four, and, in the other, five follicules, emptied of their eggs; and, in the horns correspondent to these, he found an equal number of eggs thus separated: these eggs were now grown larger than before, and somewhat of the size of sparrow-shot. In five days, the eggs were grown to the size of duck-shot, and could be blown from the part of the womb where they were, by the breath. In seven days, these eggs were found of the size of a pistol-bullet, each covered with its double membrane, and these much more distinct than before. In nine days, having examined the liquor contained in one of these eggs, he found it from a limpid colour less fluid, to have got a light cloud floating upon it. In ten

days, this cloud began to thicken, and to form an oblong body, of the figure of a little worm: and, in twelve days, the figure of the embryo was distinctly to be perceived, and even its parts came into view. In the region of the breast he perceived two bloody specks; and two more that appeared whitish. Fourteen days after impregnation, the head of the embryo was become large and transparent, the eyes prominent, the mouth open, and the rudiments of the ears beginning to appear; the back-bone, of a whitish colour, was bent towards the breast; the two bloody specks being now considerably increased, appeared to be nothing less than the outlines of the two ventricles of the heart; and the two whitish specks on each side, now appeared to be the rudiments of the lungs; towards the region of the belly, the liver began to be seen, of a reddish colour, and a little intricate mass, like ravelled thread, discerned, which soon appeared to be the stomach and the intestines; the legs soon after began to be seen, and to assume their natural positions: and from that time forth, all the parts being formed, every day only served to develope them still more, until the thirty-first day, when the rabbit brought forth her young, completely fitted for the purposes of their humble happiness.

Having thus seen the stages of generation in the meaner animals, let us take a view of its progress in man; and trace the feeble beginnings of our own existence. An account of the lowliness of our own origin, if it cannot amuse, will at least serve to humble us; and it may take from our pride, though it fails to gratify our curiosity. We cannot here trace the variations of the beginning animal, as in the former instances; for the opportunities of inspection are but few and accidental: for this reason, we must be content often to fill up the blanks of our history with conjecture. And, first, we are entirely ignorant of the state of the infant in the womb, immediately after conception; but we have good reason to believe, that it proceeds, as in most other animals, from the egg.[1] Anatomists inform us, that four days after conception, there is found in the womb an oval substance, about the size of a small pea, but longer one way than the other; this little body is formed by an

1 This history of the child in the womb is translated from Mr Buffon with some alterations.

extremely fine membrane, inclosing a liquor a good deal resembling the white of an egg: in this may, even then, be perceived, several small fibres, united together, which form the first rudiments of the embryo. Beside these, are seen another set of fibres, which soon after become the placenta, or that body by which the animal is supplied with nourishment.

Seven days after conception, we can readily distinguish by the eye, the first lineaments of the child in the womb. However, they are as yet without form; showing at the end of seven days pretty much such an appearance as that of the chicken after four and twenty hours, being a small jelly-like mass, yet exhibiting the rudiments of the head; the trunk is barely visible: there likewise is to be discerned a small assemblage of fibres issuing from the body of the infant, which afterwards become the blood-vessels that convey nourishment from the placenta to the child, while inclosed in the womb.

Fifteen days after conception, the head becomes distinctly visible, and even the most prominent features of the visage begin to appear. The nose is a little elevated: there are two black specks in the place of eyes; and two little holes where the ears are afterwards seen. The body of the embryo also is grown larger; and both above and below, are seen two little protuberances, which mark the places from whence the arms and thighs are to proceed. The length of the whole body at this time is less than half an inch.

At the end of three weeks, the body has received very little increase; but the legs and feet, with the hands and arms, are become apparent. The growth of the arms is more speedy than that of the legs; and the fingers are sooner separated than the toes. About this time the internal parts are found, upon dissection, to become distinguishable. The places of the bones are marked by small thread-like substances, that are yet more fluid even than a jelly. Among them, the ribs are distinguishable, like threads also, disposed on each side of the spine; and even the fingers and toes scarcely exceed hairs in thickness.

In a month, the embryo is an inch long; the body is bent forward, a situation which it almost always assumes in the womb, either because a posture of this kind is the most easy, or be-

cause it takes up the least room. The human figure is now no longer doubtful: every part of the face is distinguishable; the body is sketched out; the bowels are to be distinguished as threads; the bones are still quite soft, but in some places beginning to assume a greater rigidity; the blood-vessels that go to the placenta, which, as was said, contributes to the child's nourishment, are plainly seen issuing from the navel (being therefore called the *umbilical vessels*,) and going to spread themselves upon the placenta. According to Hippocrates, the male embryo developes sooner than the female: he adds, that at the end of thirty days, the parts of the body of the male are distinguishable; while those of the female are not equally so till ten days after.

In six weeks, the embryo is grown two inches long; the human figure begins to grow every day more perfect; the head being still much larger, in proportion to the rest of the body; and the motion of the heart is perceived almost by the eye. It has been seen to beat in an embryo of fifty days old, a long time after it had been taken out of the womb.

In two months, the embryo is more than two inches in length. The ossification is perceivable in the arms and thighs, and in the point of the chin, the under jaw being greatly advanced before the upper. These parts, however, may as yet be considered as bony points, rather than as bones. The umbilical vessels, which before went side by side, are now begun to be twisted, like a rope, one over the other, and go to join with the placenta, which, as yet, is but small.

In three months, the embryo is above three inches long, and weighs about three ounces. Hippocrates observes, that not till then the mother perceives the child's motion: and he adds, that in female children, the motion is not observable till the end of four months. However, this is no general rule, as there are women who assert, that they perceived themselves to be quick with child, as their expression is, at the end of two months; so that this quickness seems rather to arise from the proportion between the child's strength and the mother's sensibility, than from any determinate period of time. At all times, however, the child is equally alive; and, consequently, those juries of matrons that are to determine upon the pregnancy of criminals should not inquire whether the woman be quick, but whether

she be with child; if the latter be perceivable, the former follows of course.

Four months and a half after conception, the embryo is from six to seven inches long. All the parts are so augmented, that even their proportions are now distinguishable. The very nails begin to appear upon the fingers and toes: and the stomach and intestines already begin to perform their functions of receiving and digesting. In the stomach is found a liquor similar to that in which the embryo floats: in one part of the intestines, a milky substance; and, in the other, an excrementitious. There is found, also, a small quantity of bile in the gall bladder; and some urine in its own proper receptacle. By this time, also, the posture of the embryo seems to be determined. The head is bent forward, so that the chin seems to rest upon its breast; the knees are raised up towards the head, and the legs bent backward, somewhat resembling the posture of those who sit on their haunches. Sometimes the knees are raised so high as to touch the cheeks, and the feet are crossed over each other; the arms are laid upon the breast, while one of the hands, and often both, touch the visage; sometimes the hands are shut, and sometimes also the arms are found hanging down by the body. These are the most usual postures which the embryo assumes; but these it is frequently known to change; and it is owing to these alterations that the mother so frequently feels those twitches, which are usually attended with pain.

The embryo, thus situated, is furnished by nature with all things proper for its support; and, as it increases in size, its nourishment also is found to increase with it. As soon as it first begins to grow in the womb, that receptacle, from being very small, grows larger; and, what is more surprising, thicker every day. The sides of a bladder, as we know, the more they are distended, the more they become thin. But here the larger the womb grows, the more it appears to thicken. Within this the embryo is still farther involved, in two membranes called the *chorion* and *amnios;* and floats in a thin transparent fluid, upon which it seems, in some measure, to subsist. However, the great storehouse, from whence its chief nourishment is supplied, is called the *placenta;* a red substance somewhat resembling a sponge, that adheres to the inside of the womb, and communicates, by the umbilical vessels, with the embryo. These umbi-

lical vessels, which consist of a vein and two arteries, issue from the navel of the child, and are branched out upon the placenta; where they, in fact, seem to form its substance; and, if I may so express it, to suck up their nourishment from the womb, and the fluids contained therein. The blood thus received from the womb, by the placenta, and communicated by the umbilical vein to the body of the embryo, is conveyed to the heart; where, without ever passing into the lungs, as in the born infant, it takes a shorter course; for entering the right auricle of the heart, instead of passing up into the pulmonary artery, it seems to break this partition, and goes directly through the body of the heart, by an opening called the *foramen ovale*, and from thence to the aorto, or great artery; by which it is driven into all parts of the body. Thus we see the placenta, in some measure, supplying the place of lungs; for as the little animal can receive no air by inspiration, the lungs are therefore useless. But we see the placenta converting the fluid of the womb into blood, and sending it, by the umbilical vein, to the heart; from whence it is despatched by a quicker and shorter circulation through the whole frame.

In this manner the embryo reposes in the womb; supplied with that nourishment which is fitted to its necessities, and furnished with those organs that are adapted to its situation. As its sensations are but few, its wants are in the same proportion; and it is probable that a sleep, with scarcely any intervals, marks the earliest period of human life. As the little creature, however, gathers strength and size, it seems to become more wakeful and uneasy; even in the womb it begins to feel the want of something it does not possess; a sensation that seems coeval with man's nature, and never leaves him till he dies. The embryo even then begins to struggle for a state more marked by pleasure and pain, and, from about the sixth month, begins to give the mother warning of the greater pain she is yet to endure. The continuation of pregnancy, in woman, is usually nine months; but there have been many instances when the child has lived that was born at seven; and some are found to continue pregnant a month above the usual time. When the appointed time approaches, the infant, that has for some months been giving painful proofs of its existence, now begins to increase its efforts for liberty. The head is applied downward, to the aper-

ture of the womb, and by reiterated efforts it endeavours to extend the same: these endeavours produce the pain, which all women, in labour, feel in some degree; those of strong constitutions the least, those most weakly the most severely; since we learn, that the women of Africa always deliver themselves, and are well a few hours after; while those of Europe require assistance, and recover more slowly. Thus the infant, still continuing to push with its head forward, by the repetition of its endeavours, at last succeeds, and issues into life. The blood which had hitherto passed through the heart, now takes a wider circuit; and the foramen ovale closes; the lungs, that had till this time been inactive, now first begin their functions; the air rushes in to distend them; and this produces the first sensation of pain, which the infant expresses by a shriek: so that the beginning of our lives, as well as the end, is marked with anguish.[1]

From comparing these accounts, we perceive that the most laboured generation is the most perfect; and that the animal, which, in proportion to its bulk, takes the longest time for production, is always the most complete when finished. Of all others, man seems the slowest in coming into life, as he is the slowest in coming to perfection; other animals, of the same bulk, seldom remain in the womb above six months, while he continues nine; and even after his birth, appears more than any other to have his state of imbecility prolonged.

We may observe also, that that generation is the most complete, in which the fewest animals are produced: Nature, by attending to the production of one at a time, seems to exert all her efforts in bringing it to perfection; but, where this attention is divided, the animals so produced come into the world with partial advantages. In this manner twins are never, at least while infants, so large, or so strong, as those that come singly into the world; each having, in some measure, robbed the other of its right; as that support, which Nature meant for one, has been prodigally divided.

In this manner, as those animals are the best that are produced singly, so we find that the noblest animals are ever the least fruitful. These are seen usually to bring forth but one at

1 Bonnet Contemplat. de la Nature, vol. i. p. 212.

a time, and to place all their attention upon that alone. On the other hand, all the oviparous kinds produce in amazing plenty; and even the lower tribes of viviparous animals increase in a seeming proportion to their minuteness and imperfection. Nature seems lavish of life in the lower orders of the creation; and, as if she meant them entirely for the use of the nobler races, she appears to have bestowed greater pains in multiplying the number than in completing the kind. In this manner, while the elephant and the horse bring forth but one at a time, the spider and the beetle are seen to produce a thousand: and even among the smaller quadrupeds, all the inferior kinds are extremely fertile; any one of these being found, in a very few months, to become the parent of a numerous progeny.

In this manner, therefore, the smallest animals multiply in the greatest proportion; and we have reason to thank Providence that the most formidable animals are the least fruitful. Had the lion and the tiger the same degree of fecundity with the rabbit or the rat, all the arts of man would be unable to oppose these fierce invaders; and we should soon perceive them become the tyrants of those who claim the lordship of the creation. But Heaven, in this respect, has wisely consulted the advantage of all. It has opposed to man only such enemies as he has art and strength to conquer; and as large animals require proportional supplies, nature was unwilling to give new life, where it, in some measure, denied the necessary means of subsistence.

In consequence of this pre-established order, the animals that are endowed with the most perfect methods of generation, and bring forth but one at a time, seldom begin to procreate till they have almost acquired their full growth. On the other hand, those which bring forth many, engender before they have arrived at half their natural size. The horse and the bull come almost to perfection before they begin to generate; the hog and the rabbit scarcely leave the teat before they become parents themselves. In whatever light, therefore, we consider this subject, we shall find that all creatures approach most to perfection, whose generation most nearly resembles that of man. The reptile produced from cutting is but one degree above the vegetable. The animal produced from one egg is a step higher in the scale of existence; that class of animals which are brought forth alive, are still more exalted. Of these, such as bring forth one

at a time are the most complete; and the foremost of these stands Man, *the great master of all*, who seems to have united the perfections of all the rest in his formation.

CHAP. III.

THE INFANCY OF MAN.

When we take a survey of the various classes of animals, and examine their strength, their beauty, or their structure, we shall find man to possess most of those advantages united, which the rest enjoy partially. Infinitely superior to all others in the powers of the understanding, he is also superior to them in the fitness and proportions of his form. He would, indeed, have been one of the most miserable beings upon earth, if with a sentient mind he was so formed as to be incapable of obeying its impulse; but Nature has otherwise provided; as with the most extensive intellects to command, she has furnished him with a body the best fitted for obedience.

In infancy,[1] however, that mind and this body form the most helpless union in all animated nature; and, if any thing can give us a picture of complete imbecility, it is a man when just come into the world. The infant just born stands in need of all things, without the power of procuring any. The lower races of animals, upon being produced, are active, vigorous, and capable of self-support; but the infant is obliged to wait in helpless expectation; and its cries are its only aid to procure subsistence.

An infant just born may be said to come from one element into another: for, from the watery fluid in which it was surrounded, it now immerges into air; and its first cries seem to imply how greatly it regrets the change. How much longer it could have continued in a state of almost total insensibility in the womb, is impossible to tell: but it is very probable that it could remain there some hours more. In order to throw some light upon this subject, Mr Buffon so placed a pregnant bitch, as that her puppies were brought forth in warm water, in which

1 Buffon, vol. iv. p. 173.

he kept them above half an hour at a time. However, he saw no change in the animals, thus newly brought forth; they continued the whole time vigorous; and, during the whole time, it is very probable that the blood circulated through the same channels through which it passed while they continued in the womb.

Almost all animals have their eyes closed,[1] for some days after being brought into the world. The infant opens them the instant of its birth. However, it seems to keep them fixed and idle; they want that lustre which they acquire by degrees; and if they happen to move, it is rather an accidental gaze, than an exertion of the act of seeing. The light alone seems to make the greatest impression upon them. The eyes of infants are sometimes found turned to the place where it is strongest; and the pupil is seen to dilate and diminish, as in grown persons, in proportion to the quantity it receives. But still the infant is incapable of distinguishing objects; the sense of seeing, like the rest of the senses, requires an habit before it becomes any way serviceable. All the senses must be compared with each other, and must be made to correct the defects of one another, before they can give just information. It is probable, therefore, that if the infant could express its own sensations, it would give a very extraordinary description of the illusions which it suffers from them. The sight might, perhaps, be represented as inverting objects, or multiplying them; the hearing, instead of conveying one uniform tone, might be said to bring up an interrupted succession of noises; and the touch apparently would divide one body into as many as there are fingers that grasp it. But all these errors are lost in one confused idea of existence; and it is happy for the infant that it then can make but very little use of its senses, when they could serve only to bring it false information.

If there be any distinct sensations, those of pain seem to be much more frequent and stronger than those of pleasure. The infant's cries are sufficient indications of the uneasiness it must, at every interval, endure; while, in the beginning, it has got no external marks to testify its satisfactions. It is not till after forty days that it is seen to smile; and not till that time also,

1 Buffon, vol. iv. p. 173.

that tears begin to appear, its former expressions of uneasiness being always without them. As to any other marks of the passions, the infant being as yet almost without them, it can express none of them in its visage; which, except in the act of crying and laughing, is fixed in a settled serenity. All the other parts of the body seem equally relaxed and feeble: its motions are uncertain and its postures without choice; it is unable to stand upright; its hams are yet bent, from the habit which it received from its position in the womb; it has not strength enough in its arms to stretch them forward, much less to grasp any thing with its hands; it rests just in the posture it is laid; and, if abandoned, must continue in the same position.

Nevertheless, though this be the description of infancy among mankind in general, there are countries and races among whom infancy does not seem marked with such utter imbecility, but where the children, not long after they are born, appear possessed of a greater share of self-support. The children of negroes have a surprising degree of this premature industry; they are able to walk at two months; or, at least, to move from one place to another: they also hang to the mother's back without assistance, and seize the breast over her shoulder; continuing in this posture till she thinks proper to lay them down. This is very different in the children of our countries, that seldom are able to walk under a twelvemonth.

The skin of children newly brought forth, is always red, proceeding from its transparency, by which the blood beneath appears more conspicuous. Some say that this redness is greatest in those children that are afterwards about to have the finest complexions; and it appears reasonable that it should be so, since the thinnest skins are always the fairest. The size of a newborn infant is generally about twenty inches, and its weight about twelve pounds. The head is large, and all the members delicate, soft, and puffy. These appearances alter with its age; as it grows older, the head becomes less in proportion to the rest of the body; the flesh hardens; the bones, that before birth grew very thick in proportion, now lengthen by degrees, and the human figure more and more acquires its due dimensions. In such children, however, as are but feeble or sickly, the head always continues too big for the body; the heads of dwarfs being extremely large in proportion.

Infants, when newly born, pass most of their time in sleeping, and awake with crying; excited either by sensations of pain or of hunger. Man, when come to maturity, but rarely feels the want of food, as eating twice or thrice in the four and twenty hours is known to suffice the most voracious: but the infant may be considered as a little glutton, whose only pleasure consists in its appetite; and this, except when it sleeps, it is never easy without satisfying. Thus nature has adapted different desires to the different periods of life; each as it seems most necessary for human support or succession. While the animal is yet forming, hunger excites it to that supply which is necessary for its growth; when it is completely formed, a different appetite takes place, that incites it to communicate existence. These two desires take up the whole attention of different periods, but are very seldom found to prevail strongly together in the same age; one pleasure ever serving to repress the other: and, if we find a person of full age placing a principal part of his happiness in the nature and quantity of his food, we have strong reasons to suspect, that with respect to his other appetites he still retains a part of the imbecility of his childhood.

It is extraordinary, however, that infants, who are thus more voracious than grown persons, are nevertheless more capable of sustaining hunger. We have several instances, in accidental cases of famine, in which the child has been known to survive the parent, and seen clinging to the breast of its dead mother. Their little bodies also are more patient of cold; and we have similar instances of the mother's perishing in the snow, while the infant has been found alive beside her. However, if we examine the internal structure of infants, we shall find an obvious reason for both these advantages. Their blood-vessels are known to be much larger than in adults; and their nerves much thicker and softer: thus being furnished with a more copious quantity of juices, both of the nervous and sanguinary kinds, the infant finds a temporary sustenance in this superfluity, and does not expire till both are exhausted. The circulation also being larger and quicker, supplies it with proportionable warmth, so that it is more capable of resisting the accidental rigours of the weather.

The first nourishment of infants is well known to be the mother's milk; and what is remarkable, the infant has milk in its own breasts, which may be squeezed out by compression; this

nourishment becomes less grateful as the child gathers strength; and perhaps, also, more unwholesome. However, in cold countries, which are unfavourable to propagation, and where the female has seldom above three or four children at the most, during her life, she continues to suckle the child for four or five years together. In this manner the mothers of Canada and Greenland are often seen suckling two or three children, of different ages, at a time.

The life of infants is very precarious till the age of three or four, from which time it becomes more secure; and when a child arrives at its seventh year, it is then considered as a more certain life, as Mr Buffon asserts, than at any other age whatever. It appears, from Simpson's Tables, that of a certain number of children born at the same time, a fourth part are found dead at the end of the first year; more than one-third at the end of the second: and, at least, half at the end of the third; so that those who live to be above three years old, are indulged a longer term than half the rest of their fellow-creatures. Nevertheless, life, at that period, may be considered as mere animal existence; and rather a preparation for, than an enjoyment of, those satisfactions, both of mind and body, that make life of real value: and hence it is more natural for mankind to deplore a fellow-creature, cut off in the bloom of life, than one dying in early infancy. The one, by living up to youth, and thus wading through the disadvantageous parts of existence, seems to have earned a short continuance of its enjoyments: the infant, on the contrary, has served but a short apprenticeship to pain; and when taken away, may be considered as rescued from a long continuance of misery.

There is something very remarkable in the growth of the human body.[1] The embryo in the womb continues to increase still more and more till it is born. On the other hand, the child's growth is less every year, till the time of puberty, when it seems to start up of a sudden. Thus, for instance, the embryo, which is an inch long in the first month, grows but one inch and a quarter in the second; it then grows one and a half in the third; two and a half in the fourth; and in this manner it keeps increasing till in the last month of its continuance it is

1 Buffon, vol. iv. p. 173.

actually found to grow four inches; and in the whole about eighteen inches long. But it is otherwise with the child when born: if we suppose it eighteen inches at that time, it grows in the first year six or seven inches; in the second year, it grows but four inches; in the third year about three; and so on, at the rate of about an inch and a half, or two inches each year, till the time of puberty, when nature seems to make one great last effort, to complete her work, and unfold the whole animal machine.

The growth of the mind in children seems to correspond with that of the body. The comparative progress of the understanding is greater in infants than in children of three or four years old. If we only reflect a moment on the amazing acquisitions that an infant makes in the first and second years of life, we shall have much cause for wonder. Being sent into a world where every thing is new and unknown, the first months of life are spent in a kind of torpid amazement; an attention distracted by the multiplicity of objects that press to be known. The first labour, therefore, of the little learner is, to correct the illusions of the senses, to distinguish one object from another, and to exert the memory, so as to know them again. In this manner a child of a year old has already made a thousand experiments; all which it has properly ranged, and distinctly remembers. Light, heat, fire, sweets, and bitters, sounds soft or terrible, are all distinguished at the end of a very few months. Besides this, every person the child knows, every individual object it becomes fond of, its rattles, or its bells, may be all considered as so many new lessons to the young mind, with which it has not become acquainted, without repeated exertions of the understanding. At this period of life, the knowledge of every individual object cannot be acquired without the same effort which, when grown up, is employed upon the most abstract idea; every thing the child hears or sees, all the marks and characters of nature, are as much unknown, and require the same attention to attain, as if the reader were set to understand the characters of an Ethiopic manuscript; and yet we see in how short a time the little student begins to understand them all, and to give evident marks of early industry.

It is very amusing to pursue the young mind, while employed in its first attainments. At about a year old the same necessi-

ties that first engaged its faculties, increase as its acquaintance with nature enlarges. Its studies, therefore, if I may use the expression, are no way relaxed; for having experienced what gave pleasure at one time, it desires a repetition of it from the same object; and in order to obtain this, that object must be pointed out; here therefore, a new necessity arises, which, very often, neither its little arts nor importunities can remove; so that the child is at last obliged to set about naming the objects it desires to possess or avoid. In beginning to speak, which is usually about a year old, children find a thousand difficulties. It is not without repeated trials that they come to pronounce any one of the letters; nor without an effort of the memory, that they can retain them. For this reason, we frequently see them attempting a sound which they had learned, but forgot; and when they have failed, I have often seen their attempt attended with apparent confusion. The letters soonest learned, are those which are most easily formed; thus A and B require an obvious disposition of the organs, and their pronunciation is consequently soon attained. Z and R, which require a more complicated position, are learned with greater difficulty. And this may, perhaps, be the reason why the children in some countries speak sooner than in others; for the letters mostly occurring in the language of one country, being such as are of easy pronunciation, that language is of course more easily attained. In this manner the children of the Italians are said to speak sooner than those of the Germans, the language of the one being smooth and open; that of the other, crowded with consonants, and extremely guttural.

But be this as it will, in all countries children are found able to express the greatest part of their wants by the time they arrive at two years old; and from the moment the necessity of learning new words ceases, they relax their industry. It is then that the mind like the body, seems every year to make slow advances; and, in order to spur up attention, many systems of education have been contrived.

Almost every philosopher, who has written on the education of children, has been willing to point out a method of his own, chiefly professing to advance the health, and improve the intellects at the same time. These are usually found to begin with nothing right in the common practice; and by urging a total

reformation. In consequence of this, nothing can be more wild or imaginary than their various systems of improvement. Some will have the children every day plunged in cold water, in order to strengthen their bodies; they will have them converse with the servants in nothing but the Latin language, in order to strengthen their minds; every hour of the day must be appointed for its own studies, and the child must learn to make these very studies an amusement; till about the age of ten or eleven it becomes a prodigy of premature improvement. Quite opposite to this, we have others, whom the courtesy of mankind also calls *philosophers;* and they will have the child learn nothing till the age of ten or eleven, at which the former has attained so much perfection; with them the mind is to be kept empty, until it has a proper distinction of some metaphysical ideas about truth; and the promising pupil is debarred the use of even his own faculties, lest they should conduct him into prejudice and error. In this manner, some men, whom fashion has celebrated for profound and fine thinkers, have given their hazarded and untried conjectures, upon one of the most important subjects in the world, and the most interesting to humanity. When men speculate at liberty upon innate ideas, or the abstracted distinctions between will and power, they may be permitted to enjoy their systems at pleasure, as they are harmless, although they may be wrong; but when they allege that children are to be every day plunged in cold water, and, whatever be their constitutions, indiscriminately inured to cold and moisture; that they are to be kept wet in the feet, to prevent their catching cold; and never to be corrected when young, for fear of breaking their spirits when old; these are such noxious errors, that all reasonable men should endeavour to oppose them. Many have been the children whom these opinions, begun in speculation, have injured or destroyed in practice; and I have seen many a little philosophical martyr, whom I wished, but was unable to relieve.

If any system be therefore necessary, it is one that would serve to show a very plain point; that very little system is necessary. The natural and common course of education is in every respect the best; I mean that in which the child is permitted to play among its little equals, from whose similar instructions it often gains the most useful stores of knowledge. A child is not idle because it is playing about the fields, or pursu-

ing a butterfly; it is all this time storing its mind with objects, upon the nature, the properties, and the relations of which, future curiosity may speculate.

I have ever found it a vain task to try to make a child's learning its amusement; nor do I see what good end it would answer, were it actually attained. The child, as was said, ought to have its share of play, and it will be benefited thereby, and for every reason also it ought to have its share of labour. The mind, by early labour, will be thus accustomed to fatigues and subordination; and whatever be the person's future employment in life, he will be better fitted to endure it: he will be thus enabled to support the drudgeries of office with content; or to fill up the vacancies of life with variety. The child, therefore, should by times be put to its duty; and be taught to know, that the task is to be done, or the punishment to be endured. I do not object against alluring it to duty by reward; but we well know, that the mind will be more strongly stimulated by pain; and both may, upon some occasions, take their turn to operate. In this manner, a child, by playing with its equals abroad, and labouring with them at school, will acquire more health and knowledge, than by being bred up under the wing of any speculative system-maker; and will be thus qualified for a life of activity and obedience. It is true, indeed, that when educated in this manner, the boy may not be so seemingly sensible and forward as one bred up under solitary instruction; and, perhaps, this early forwardness is more engaging than useful. It is well known, that many of those children who have been such prodigies of literature before ten, have not made an adequate progress to twenty. It should seem, that they only began learning manly things before their time; and, while others were busied in picking up that knowledge adapted to their age and curiosity, these were forced upon subjects unsuited to their years; and, upon that account alone, appearing extraordinary. The stock of knowledge in both may be equal; but with this difference, that each is yet to learn what the other knows.

But whatever may have been the acquisitions of children at ten or twelve, their greatest, and most rapid progress, is made when they arrive near the age of puberty. It is then that all the powers of nature seem at work in strengthening the mind and completing the body; the youth acquires courage, and the virgin

modesty; the mind, with new sensations, assumes new powers; it conceives with greater force, and remembers with greater tenacity. About this time, therefore, which is various in different countries, more is learned in one year than in any two of the preceding; and on this age, in particular, the greatest weight of instruction ought to be thrown.

CHAP. IV.

OF PUBERTY.

It has been often said, that the season of youth is the season of pleasures: but this can only be true in savage countries, where but little preparation is made for the perfection of human nature; and where the mind has but a very small part in the enjoyment. It is otherwise in those places where nature is carried to the highest pitch of refinement, in which this season of the greatest sensual delight is wisely made subservient to the succeeding and more rational one of manhood. Youth with us is but a scene of preparation; a drama, upon the right conduct of which all future happiness is to depend. The youth who follows his appetites too soon seizes the cup, before it has received its best ingredients; and, by anticipating his pleasures, robs the remaining parts of life of their share; so that his eagerness only produces a manhood of imbecility, and an age of pain.

The time of puberty is different in various countries, and always more late in men than in women. In the warm countries of India, the women are marriageable at nine or ten, and the men at twelve or thirteen. It is also different in cities where the inhabitants lead a more soft luxurious life, from the country, where they work harder, and fare less delicately. Its symptoms are seldom alike in different persons, but it is usually known by a swelling of the breasts in one sex, and a roughness of the voice in the other. At this season, also, the women seem to acquire new beauty, while the men lose all that delicate effeminacy of countenance which they had when boys.

All countries, in proportion as they are civilized or barbarous,

improve or degrade the nuptial satisfaction. In those miserable regions, where strength makes the only law, the stronger sex exerts its power, and becomes the tyrant over the weaker: while the inhabitant of Negroland is indolently taking his pleasure in the fields, his wife is obliged to till the ground that serves for their mutual support. It is thus in all barbarous countries, where the men throw all the laborious duties of life upon the women; and, regardless of beauty, put the softer sex to those employments that must effectually destroy it.

But, in countries that are half barbarous, particularly wherever Mahometanism prevails, the men run into the very opposite extreme. Equally brutal with the former, they exert their tyranny over the weaker sex, and consider that half of the human creation as merely made to be subservient to the depraved desires of the other. The chief, and, indeed, the only aim of an Asiatic, is to be possessed of many women; and to be able to furnish a seraglio is the only tendency of his ambition. As the savage was totally regardless of beauty, he on the contrary prizes it too highly; he excludes the person who is possessed of such personal attractions from any share in the duties or employments of life; and, as if willing to engross all beauty to himself, increases the number of his captives in proportion to the progress of his fortune. In this manner he vainly expects to augment his satisfactions, by seeking from many that happiness which he ought to look for in the society of one alone. He lives a gloomy tyrant amidst wretches of his own making; he feels none of those endearments which spring from affection, none of those delicacies which arise from knowledge. His mistresses, being shut out from the world, and totally ignorant of all that passes there, have no arts to entertain his mind, or calm his anxieties; the day passes with them in sullen silence, or languid repose; appetite can furnish but few opportunities of varying the scene; and all that falls beyond it must be irksome expectation.

From this avarice of women, if I may be allowed to express it so, has proceeded that jealousy and suspicion which ever attends the miser: hence those low and barbarous methods of keeping the women of those countries guarded, and of making and procuring eunuchs to attend them. These unhappy creatures are of two kinds, the white and the black. The white are generally made in the country where they reside, being but partly deprived

of the marks of virility; the black are generally brought from the interior parts of Africa, and are made entirely bare. These are chiefly chosen for their deformity; the thicker the lips, the flatter the nose, and the more black the teeth, the more valuable the eunuch; so that the vile jealousy of mankind here inverts the order of nature, and the poor wretch finds himself valued in proportion to his deficiencies. In Italy, where this barbarous custom is still retained, and eunuchs are made in order to improve the voice, the laws are severely aimed against such practice; so that being entirely prohibited, none but the poorest and most abandoned of the people, still secretly practise it upon their children. Of those served in this manner, not one in ten is found to become a singer; but such is the luxurious folly of the times, that the success of one amply compensates for the failure of the rest. It is very difficult to account for the alterations which castration makes in the voice, and the other parts of the body. The eunuch is shaped differently from others. His legs are of an equal thickness above and below; his knees weak; his shoulders narrow, and his beard thin and downy. In this manner his person is rendered more deformed; but his desires, as I am told, still continue the same; and actually, in Asia, some of them are found to have their seraglios, as well as their masters. Even in our country, we have an instance of a very fine woman being married to one of them whose appearance was the most unpromising; and what is more extraordinary still, I am told, that this couple continue perfectly happy in each other's society.

The mere necessities of life seem the only aim of the savages the sensual pleasures are the only study of the semi-barbarian; but the refinement of sensuality by reason, is the boast of real politeness. Among the merely barbarous nations, such as the natives of Madagascar, or the inhabitants of Congo, nothing is desired so ardently as to prostitute their wives or daughters to strangers, for the most trifling advantages; they will account it a dishonour not to be among the foremost who are thus received into favour: on the other hand, the Mahometan keeps his wife faithful, by confining her person; and would instantly put her to death, if he but suspected her chastity. With the politer inhabitants of Europe both these barbarous extremes are avoided; the woman's person is left free, and no constraint is imposed but upon

her affections. The passion of love, which may be considered as the nice conduct of ruder desire, is only known and practised in this part of the world; so that what other nations guard as their right, the more delicate European is contented to ask as a favour. In this manner the concurrence of mutual appetite contributes to increase mutual satisfaction; and the power on one side of refusing makes every blessing more grateful when obtained by the other. In barbarous countries woman is considered merely as a useful slave; in such as are somewhat more refined she is regarded as a desirable toy; in countries entirely polished she enjoys juster privileges, the wife being considered as a useful friend and an agreeable mistress. Her mind is still more prized than her person; and without the improvement of both, she can never expect to become truly agreeable; for her good sense alone can preserve what she has gained by her beauty.

Female beauty, as was said, is always seen to improve about the age of puberty: but if we should attempt to define in what this beauty consists, or what constitutes its perfection, we should find nothing more difficult to determine. Every country has its peculiar way of thinking, in this respect; and even the same country thinks differently at different times. The ancients had a different taste from what prevails at present. The eyebrows joining in the middle was considered as a very peculiar grace by Tibullus, in the enumeration of the charms of his mistress. Narrow foreheads were approved of and scarce any of the Roman ladies, that are celebrated for their other perfections, but are also praised for the redness of their hair. The nose of the Grecian Venus, was such as would appear at present an actual deformity; as it fell in a straight line from the forehead without the smallest sinking between the eyes, without which we never see a face at present.

Among the moderns, every country seems to have peculiar ideas of beauty.[1] The Persians admire large eyebrows, joining in the middle; the edges and corners of the eyes are tinctured with black, and the size of the head is increased by a great variety of bandages, formed into a turban. In some parts of India black teeth and white hair are desired with ardour; and one of

1 Buffon.

the principal employments of the women of Thibet, is to redden the teeth with herbs, and to make their hair white by a certain preparation. The passion for coloured teeth obtains also in China and Japan; where, to complete their idea of beauty, the object of desire must have little eyes, nearly closed. feet extremely small, and a waist far from being shapely. There are nations of the American Indians that flatten the heads of their children, by keeping them while young squeezed between two boards, so as to make the visage much larger than it would naturally be Others flatten the head at top; and others make it as round as they possibly can. The inhabitants along the western coasts of Africa have a very extraordinary taste for beauty. A flat nose, thick lips, and a jet black complexion, are there the most indulgent gifts of Nature. Such, indeed, they are all, in some degree, found to possess. However, they take care by art to increase their natural deformities, as they should seem to us; and they have many additional methods of rendering their persons still more frightfully pleasing. The whole body and visage is often scarred with a variety of monstrous figures; which is not done without a great pain, and repeated incision: and even sometimes parts of the body are cut away. But it would be endless to remark the various arts which caprice or custom has employed to distort and disfigure the body, in order to render it more pleasing; in fact, every nation, how barbarous soever, seems unsatisfied with the human figure, as Nature has left it, and has its peculiar arts of heightening beauty. Painting, powdering, cutting, boring the nose and the ears, lengthening the one and depressing the other, are arts practised in many countries; and, in some degree, admired in all. These arts might have been at first introduced to hide epidemic deformities: custom, by degrees, reconciles them to the view; till, from looking upon them with indifference, the eye at length begins to gaze with pleasure.

CHAP. V.

OF THE AGE OF MANHOOD.*

THE human body attains to its full height during the age of puberty; or, at least, a short time after. Some young people are found to cease growing at fourteen or fifteen; others continue their growth till two or three and twenty. During this period they are all of a slender make; their thighs and legs small, and the muscular parts are yet unfilled. But by degrees the fleshy fibres augment; the muscles swell, and assume their figure; the limbs become proportioned, and rounder; and before the age of thirty, the body in men has acquired the most perfect symmetry. In women, the body arrives at perfection much sooner, as they arrive at the age of maturity more early; the muscles, and all the other parts, being weaker, less compact and solid, than those of man, they require less time in coming to perfection: and as they are less in size, that size is sooner completed. Hence the persons of women are found to be as complete at twenty, as those of men are found to be at thirty.

The body of a well shaped man ought to be square; the muscles should be expressed with boldness, and the lines of the face strongly marked. In the woman, all the muscles should be rounder, the lines softer, and the features more delicate. Strength and majesty belong to the man; grace and softness are the peculiar embellishments of the other sex. In both every part of their form declares their sovereignty over other creatures. Man supports his body erect; his attitude is that of command; and his face, which is turned towards the heavens, displays the dignity of his station. The image of his soul is painted in his visage; and the excellence of his nature penetrates through the material form in which it is inclosed. His majestic port, his sedate and resolute step, announce the nobleness of his rank. He touches the earth only with his extremity; and beholds it as it

* This chapter is translated from Mr Buffon, whose description is very excellent. Whatever I have added is marked by inverted commas, "thus." And in whatever trifling points I have differed, the notes will serve to show.

at a disdainful distance. His arms are not given him, as to other creatures, for pillars of support; nor does he lose, by rendering them callous against the ground, that delicacy of touch which furnishes him with so many of his enjoyments. His hands are made for very different purposes; to second every intention of his will, and to perfect the gifts of Nature.

When the soul is at rest, all the features of the visage seem settled in a state of profound tranquillity. Their proportion, their union, and their harmony, seem to mark the sweet serenity of the mind, and give a true information of what passes within. But when the soul is excited, the human visage becomes a living picture; where the passions are expressed with as much delicacy as energy, where every motion is designed by some correspondent feature, where every impression anticipates the will, and betrays those hidden agitations, that he would often wish to conceal.

It is particularly in the eyes that the passions are painted; and in which we may most readily discover their beginning. The eye seems to belong to the soul more than any other organ; it seems to participate of all its emotions; as well the most soft and tender as the most tumultuous and forceful. It not only receives, but transmits them by sympathy; the observing eye of one catches the secret fire from another; and the passion thus often becomes general.

Such persons as are short-sighted, labour under a particular disadvantage in this respect. They are, in a manner, entirely cut off from the language of the eyes; and this gives an air of stupidity to the face, which often produces very unfavourable prepossessions. However intelligent we find such persons to be, we can scarcely be brought back from our first prejudice, and often continue in the first erroneous opinion. In this manner we are too much induced to judge of men by their physiognomy; and having perhaps, at first, caught up our judgments prematurely, they mechanically influence us all our lives after. This extends even to the very colour or the cut of people's clothes; and we should for this reason be careful, even in such trifling particulars, since they go to make up a part of the total judgment which those we converse with may form to our advantage.

The vivacity, or the languid motion of the eyes, give the strongest marks of physiognomy; and their colour contri-

butes still more to enforce the expression. The different colours of the eye are the dark hazel, the light hazel, the green, the blue and gray, the whitish gray, "and also the red." These different colours arise from the different colours of the little muscles that serve to contract the pupil; "and they are very often found to change colour with disorder, and with age."

The most ordinary colours are the hazel and the blue, and very often both these colours are found in the eyes of the same person. Those eyes which are called black, are only of the dark hazel, which may be easily seen upon close inspection; however, those eyes are reckoned the most beautiful where the shade is deepest: and either in these, or the blue eyes, the fire which gives its finest expression to the eye is more distinguishable in proportion to the darkness of the tint. For this reason, the black eyes, as they are called, have the greatest vivacity; but probably the blue have the most powerful effect in beauty, as they reflect a greater variety of lights, being composed of more various colours.

This variety, which is found in the colour of the eyes is peculiar to man, and one or two other kinds of animals; but, in general, the colour in any one individual is the same in all the rest. The eyes of oxen are brown; those of sheep of a water colour; those of goats are gray: "and it may also be, in general, remarked that the eyes of most white animals are red; thus the rabbit, the ferret, and, even in the human race, the white Moor, all have their eyes of a red colour."

Although the eye, when put into motion, seems to be drawn on one side, yet it only moves round the centre; by which its coloured part moves nearer or farther from the angle of the eyelids, or is elevated or depressed. The distance between the eyes is less in man than in any other animal; and in some of them it is so great, that it is impossible that they should ever view the same object with both eyes at once, unless it be very far off. "This, however, in them is rather an advantage than an inconvenience, as they are thus able to watch round them, and guard against the dangers of their precarious situation."

Next to the eyes, the features, which must give a character to the face, are the eye-brows; which being, in some measure, more apparent than the other features, are most readily distinguished at a distance. "Le Brun, in giving a painter directions, with

regard to the passions, places the principal expression of the face in the eye-brows." From their elevation or depression, most of the furious passions are characterized; and such as have this feature extremely moveable, are usually known to have an expressive face. By means of these we can imitate all the other passions, as they are raised or depressed at command; the rest of the features are generally fixed; or, when put into motion, they do not obey the will: the mouth and eyes, in an actor, for instance, may, by being violently distorted, give a very different expression from what he would intend; but the eye-brows can scarcely be exerted improperly; their being raised denotes all those passions which pride or pleasure inspire; and their depression marks those which are the effects of contemplation and pain; and such who have this feature, therefore, most at command, are often found to excel as actors."

The eye-lashes have an effect, in giving expression to the eye, particularly when long and close: they soften its glances, and improve its sweetness. Man and apes are the only animals that have eye-lashes both upon the upper and lower lids; all other animals want them on the lid below.

The eye-lids serve to guard the ball of the eye, and to furnish it with a proper moisture. The upper lid rises and falls; the lower has scarcely any motion; and although their being moved depends on the will, yet it often happens that the will is unable to keep them open, when sleep, or fatigue, oppresses the mind. In birds and amphibious quadrupeds, the lower lid alone has motion; fishes and insects have no eye-lids whatsoever.

The forehead makes a large part of the face, and a part which chiefly contributes to its beauty. It ought to be justly proportioned; neither too round nor too flat; neither too narrow nor too low; and the hair should come thick upon its extremities. It is known to every body how much the hair tends to improve the face; and how much the being bald serves to take away from beauty. The highest part of the head is that which becomes bald the soonest, as well as that part which lies immediately above the temples. The hair under the temples, and at the back of the head, is very seldom known to fail, "and women are much less apt to become bald than men: Mr Buffon seems to think they never become bald at all; but we have too many instances of the contrary among us, not to contradict very

easily the assertion. Of all parts or appendages of the body, the hair is that which is found most different, in different climates; and often not only contributes to mark the country, but also the disposition of the man. It is in general thickest where the constitution is strongest; and more glossy and beautiful, where the health is most permanent. The ancients held the hair to be a sort of excrement, produced like the nails; the part next the root pushing out that immediately contiguous. But the moderns have found that every hair may be truly said to live, to receive nutriment, to fill and distend itself, like the other parts of the body. The roots, they observe, do not turn gray sooner than the extremities, but the whole hair changes colour at once; and we have many instances of persons who have grown gray in one night's time.[1] Each hair, if viewed with a microscope, is found to consist of five or six lesser ones, all wrapped up in one common covering; it appears knotted, like some sorts of grass, and sends forth branches at the joints. It is bulbous at the root, by which it imbibes its moisture from the body: and it is split at the points; so that a single hair, at its end, resembles a brush. Whatever be the size or the shape of the pore, through which the hair issues, it accommodates itself to the same; being either thick, as they are large; small, as they are less; round, triangular, and variously formed, as the pores happen to be various. The hair takes its colour from the juices flowing through it, and it is found that this colour differs in different tribes and races of people. The Americans, and the Asiatics, have their hair black, thick, straight, and shining. The inhabitants of the torrid climates of Africa have it black, short, and woolly. The people of Scandinavia have it red, long, and curled; and those of our own and the neighbouring countries, are found with hair of various colours. However, it is supposed by many, that every man resembles in his disposition the inhabitants of those countries whom he resembles in the colour and the nature of his hair; so that the black are said, like the Asiatics, to be grave and acute; the red, like the Gothic nations, to be choleric and bold. However this may be, the length and the strength of the hair is a general mark of a good

1 Mr Buffon says, that the hair begins to grow gray at the points; but the fact is otherwise.

constitution; and as that hair which is strongest is most commonly curled, so curled hair is generally regarded among us as a beauty. The Greeks, however, had a very different idea of beauty in this respect; and seem to have taken one of their peculiar national distinctions from the length and the straightness of the hair."

The nose is the most prominent feature in the face; but, as it has scarcely any motion, and that only in the strongest passions, it rather adds to the beauty than to the expression of the countenance. However, I am told, by the skilful in this branch of knowledge, that wide nostrils add a great deal to the bold and resolute air of the countenance; and where they are narrow, though it may constitute beauty, it seldom improves expression." The form of the nose, and its advanced position, are peculiar to the human visage alone. Other animals, for the most part, have nostrils, with a partition between them; but none of them have an elevated nose. Apes themselves have scarcely any thing else of this feature but the nostrils; the rest of the feature lying flat upon the visage, and scarcely higher than the cheek-bones. "Among all the tribes of savage men, also, the nose is very flat; and I have seen a Tartar who had scarcely any thing else but two holes through which to breathe."

The mouth and lips, next to the eyes, are found to have the greatest expression. The passions have great power over this part of the face; and the mouth marks its different degrees by its different forms. The organ of speech still more animates this part, and gives it more life than any other feature in the countenance. The ruby colour of the lips, and the white enamel of the teeth, give it such a superiority over every other feature, that it seems to make the principal object of our regards. In fact, the whole attention is fixed upon the lips of the speaker: however rapid his discourse, however various the subject, the mouth takes correspondent situations; and deaf men have been often found to see the force of those reasonings which they could not hear, understanding every word as it was spoken.

"The under jaw in man possesses a great variety of motions; while the upper has been thought, by many, to be quite immoveable.[2] However, that it moves in man, a very easy experi-

2 Mr Buffon is of this opinion. He says that the upper jaw is immoveable

ment will suffice to convince us. If we keep the head fixed, with any thing between our teeth, the edge of a table for instance, and then open our mouths, we shall find that both jaws recede from it at the same time; the upper jaw rises, the lower falls, and the table remains untouched between them. The upper jaw has motion as well as the under; and, what is remarkable, it has its proper muscles behind the head for thus raising and depressing it. Whenever, therefore, we eat, both jaws move at the same time, though very unequally; for the whole head moving with the upper jaw, of which it makes a part, its motions are thus less observable." In the human embryo, the under jaw is very much advanced before the upper. "In the adult, it hangs a good deal more backward; and those whose upper and under row of teeth are equally prominent, and strike directly against each other, are what the painters call underhung; and they consider this as a great defect in beauty.[1] The under jaw in a Chinese face falls greatly more backward than with us; and I am told the difference is half an inch, when the mouth is shut naturally." In instances of the most violent passion, the under jaw has often an involuntary quivering motion; and often also, a state of languor produces another, which is that of yawning. "Every one knows how very sympathetic this kind of languid motion is; and that for one person to yawn, is sufficient to set all the rest of the company a-yawning. A ridiculous instance of this was commonly practised upon the famous M'Laurin, one of the professors at Edinburgh. He was very subject to have his jaw dislocated; so that when he opened his mouth wider than ordinary, or when he yawned, he could not shut it again. In the midst of his harangues, therefore, if any of his pupils began to be tired of his lecture, he had only to gape or yawn, and the professor instantly caught the sympathetic affection; so that he thus continued to stand speechless, with his mouth wide open, till his servant, from the next room, was called in to set his jaw again."[2]

in all animals. However, the parrot is an obvious exception; and so is man himself, as shown above.

1 Mr Buffon says, that both jaws, in a perfect face, should be on a level: but this is denied by the best painters.

2 Since the publication of this work, the editor has been credibly informed, that the professor had not the defect here mentioned.

When the mind reflects with regret upon some good unattained or lost, it feels an internal emotion, which acting upon the diaphragm, and that upon the lungs, produces a sigh; this, when the mind is strongly affected, is repeated; sorrow succeeds these first emotions, and tears are often seen to follow: sobbing is the sigh still more invigorated; and lamentation, or crying, proceeds from the continuance of the plaintive tone of the voice, which seems to implore pity. "There is yet a silent agony, in which the mind appears to disdain all external help, and broods over its distresses with gloomy reserve. This is the most dangerous state of mind: accidents or friendship may lessen the louder kinds of grief; but all remedies for this, must be had from within; and there despair too often finds the most deadly enemy."

Laughter is a sound of the voice, interrupted and pursued for some continuance. The muscles of the belly, and the diaphragm, are employed in the slightest exertions; but those of the ribs are strongly agitated in the louder; and the head sometimes is thrown backward, in order to raise them with greater ease. The smile is often an indication of kindness and good will: it is also often found used as a mark of contempt and ridicule.

Blushing proceeds from different passions; being produced by shame, anger, pride, and joy. Paleness is often also the effect of anger; and almost ever attendant on fright and fear. These alterations in the colour of the countenance are entirely involuntary: all the other expressions of the passions are, in some small degree, under control; but blushing and paleness betray our secret purposes; and we might as well attempt to stop them, as the circulation of the blood, by which they are caused.

The whole head, as well as the features of the face, takes peculiar attitudes from its passions: it bends forward, to express humility, shame, or sorrow; it is turned to one side, in languor or in pity; it is thrown with the chin forward, in arrogance and pride; erect in self-conceit and obstinacy: it is thrown backwards in astonishment; and combines its motions to the one side and the other, to express contempt, ridicule, anger, and resentment. "Painters, whose study leads to the contemplation of external forms, are much more adequate judges of these than any naturalist can be; and it is with these a general remark, that no one passion is regularly expressed on different countenances in the same manner; but that grief often sits upon

the face like joy, and pride assumes the air of passion. It would be vain, therefore, in words, to express their general effect, since they are often as various as the countenances they sit upon; and in making this distinction nicely, lies all the skill of the physiognomist. In being able to distinguish what part of the face is marked by nature, and what by the mind; what part has been originally formed, and what is made by habit; constitutes this science, upon which the ancients so much valued themselves, and which we at present so little regard. Some, however, of the most acute men among us have paid great attention to this art; and by long practice, have been able to give some character of every person whose face they examined. Montaigne is well known to have disliked those men who shut one eye in looking upon any object; and Fielding asserts that he never knew a person with a steady glavering smile, but he found him a rogue. However, most of these observations, tending to a discovery of the mind by the face, are merely capricious; and Nature has kindly hid our hearts from each other, to keep us in good humour with our fellow-creatures."

The parts of the head which give the least expression to the face, are the ears: and they are generally found hidden under the hair. These, which are immovable, and make so small an appearance in man, are very distinguishing features in quadrupeds. These serve in them as the principal marks of the passions; the ears discover their joys or their terrors, with tolerable precision; and denote all their internal agitations. The smallest ears in men, are said to be the most beautiful; but the largest are found to be the best for hearing. There are some savage nations who bore their ears, and so draw that part down, that the tips of the ears are seen to rest upon their shoulders.

The strange variety in the different customs of men appears still more extravagant in their manner of wearing their beards. Some, and among others the Turks, cut the hair off their heads, and let their beards grow. The Europeans on the contrary, shave their beards and wear their hair. The negroes shave their heads in figures at one time, in stars at another, in the manner of friars; and still more commonly in alternate stripes; and their little boys are shaved in the same manner. The Talapoins, of Siam, shave the heads and the eye-brows of such children as are committed to their care. Every nation seems to have en-

tertained different prejudices, at different times, in favour of one part or another of the beard. Some have admired the hair upon the cheeks on each side, as we see with some low-bred men among ourselves, who want to be fine. Some like the hair lower down; some choose it curled; and others like it straight. "Some have it cut into a peak; and others shave all but the whisker. This particular part of the beard was highly prized among the Spaniards; till of late, a man without whiskers was considered as unfit for company; and where Nature had denied them, Art took care to supply the deficiency. We are told of a Spanish general, who, when he borrowed a large sum of money from the Venetians, pawned his whisker, which he afterwards took proper care to release. Kingson assures us, that a considerable part of the religion of the Tartars consists in the management of their whiskers: and that they waged a long and bloody war with the Persians, declaring them infidels, merely because they would not give their whiskers the orthodox cut.—The kings of Persia carried the care of their beards to a ridiculous excess, when they chose to wear them matted with gold thread: and even the kings of France, of the first races, had them knotted and buttoned with gold. But of all nations, the Americans take the greatest pains in cutting their hair, and plucking their beards. The under part of the beard, and all but the whisker, they take care to pluck up by the roots, so that many have supposed them to have no hair naturally growing on that part; and even Linnæus has fallen into that mistake. Their hair is also cut into bands; and no small care employed in adjusting the whisker. In fact we have a very wrong idea of savage finery; and are apt to suppose that, like the beasts of the forest, they rise and are dressed with a shake, but the reverse is true; for no birth-night beauty takes more time or pains in the adorning her person than they. I remember, when the Cherokee kings were over here, that I have waited for three hours during the time they were dressing. They never would venture to make their appearance till they had gone through the tedious ceremonies of the toilet: they had their boxes of oil and ochre, their fat and their perfumes, like the most effeminate beau, and generally took up four hours in dressing before they considered themselves as fit to be seen. We must not, therefore, consider a delicacy in point of dress, as a mark of refinement, since

savages are much more difficult in this particular than the most fashionable or tawdry European. The more barbarous the people, the fonder of finery. In Europe, the lustre of jewels, and the splendour of the most brilliant colours, are generally given up to women, or to the weakest part of the other sex, who are willing to be contemptibly fine: but in Asia, these trifling fineries are eagerly sought after, by every condition of men, and as the proverb has it, we find the richest jewels in an Ethiop's ear. The passion for glittering ornaments is still stronger among the absolute barbarians, who often exchange their whole stock of provisions, and whatever else they happen to be possessed of, with our seamen, for a glass-bead, or a looking-glass.

Although fashions have arisen in different countries from fancy and caprice, these, when they become general, deserve examination. Mankind have always considered it as a matter of moment, and they will ever continue desirous of drawing the attention of each other, by such ornaments as mark the riches, the power, or courage of the wearer. The value of those shining stones, which have at all times been considered as precious ornaments, is entirely founded upon their scarceness or their brilliancy. It is the same likewise with respect to those shining metals, the weight of which is so little regarded, when spread over our clothes. These ornaments are rather designed to draw the attention of others, than to add to any enjoyments of our own; and few there are, that these ornaments will not serve to dazzle, and who can coolly distinguish between the metal and the man.

All things rare and brilliant will, therefore, ever continue to be fashionable, while men derive greater advantage from opulence than virtue; while the means of appearing considerable, are more easily acquired, than the title to be considered. The first impression we generally make, arises from our dress; and this varies, in conformity to our inclinations, and the manner in which we desire to be considered. The modest man, or he who would wish to be thought so, desires to show the simplicity of his mind by the plainness of his dress; the vain man, on the contrary, takes a pleasure in displaying his superiority, "and is willing to incur the spectator's dislike, so he does but excite his attention."

Another point of view which men have in dressing, is to in

crease the size of their figure; and to take up more room in the world than Nature seems to have allotted them. We desire to swell out our clothes by the stiffness of art, and raise our heels, while we add to the largeness of our heads. How bulky soever our dress may be, our vanities are still more bulky. The largeness of the doctor's wig arises from the same pride with the smallness of the beau's queue. Both want to have the size of their understanding measured by the size of their heads.

There are some modes that seem to have a more reasonable origin, which is to hide or to lessen the defects of nature. To take men all together, there are many more deformed and plain than beautiful and shapely. The former, as being the most numerous, give law to fashion; and their laws are generally such as are made in their own favour. The women begin to colour their cheeks with red, when the natural roses are faded; and the younger are obliged to submit, though not compelled by the same necessity. In all parts of the world, this custom prevails more or less; and powdering and frizzing the hair, though not so general, seems to have risen from a similar control.

But leaving the draperies of the human picture, let us return to the figure, unadorned by art. Man's head, whether considered externally or internally, is differently formed from that of all other animals, the monkey-kind only excepted, in which there is a striking similitude.—There are some differences, however, which we shall take notice of in another place. The bodies of all quadruped animals are covered with hair; but the head of man seems the part most adorned, and that more abundantly than in any other animal.

There is a very great variety in the teeth of all animals: some have them above and below; others have them in the under jaw only; in some they stand separate from each other; while in some they are continued and united. The palate of some fishes is nothing else but a bony plate studded with points, which perform the offices of teeth. All these substances, in every animal, derive their origin from the nerves; the substance of the nerves hardens by being exposed to the air; and the nerves that terminate in the mouth, being thus exposed, acquire a bony solidity. In this manner the teeth and nails are formed in man; and in this manner also, the beak, the hoofs, the horns, and the talons, of other animals, are found to be produced

The neck supports the head, and unites it to the body. This part is much more considerable in the generality of quadrupeds, than in man. But fishes, and other animals that want lung similar to ours, have no neck whatsoever. Birds, in general, have the neck longer than any other kind of animals; those of them which have short claws, have also short necks; those, on the contrary, that have them long, are found to have the neck in proportion.—"In men, there is a lump upon the wind-pipe, formed by the thyroid cartilage, which is not to be seen in women: an Arabian fable says, that this is a part of the original apple, that has stuck in the man's throat by the way, but that the woman swallowed her part of it down."

The human breast is outwardly formed in a very different manner from that of other animals. It is larger in proportion to the size of the body; and none but man, and such animals as make use of their fore-feet as hands, such as monkeys, bats, and squirrels, and such quadrupeds as climb trees, are found to have those bones called the *clavicles*, or, as we usually term them, the *collar bones*.[1] The breasts in women are larger than in men; however, they seem formed in the same manner; and, sometimes, milk is found in the breasts of men, as well as in those of women. Among animals, there is a great variety in this part of the body. The teats of some, as in the ape and the elephant, are like those of men, being but two, and placed on each side of the breast. The teats of the bear amount to four. The sheep has but two, placed between the hinder legs. Other animals, such as the bitch and the sow, have them all along the belly; and, as they produce many young, they have a great many teats for their support. The form also of the teats varies in different animals; and in the same animal at different ages. The bosom, in females, seems to unite all our ideas of beauty, where the outline is continually changing, and the gradations are soft and regular.*

1 Mr Buffon says, that none but monkeys have them, but this is an oversight.

* Darwin supports the curious theory, that our idea of the waving line of beauty originates from our early familiarity with the female bosom. "When the babe," says he, "soon after it is born into this cold world, is applied to its mother's bosom, its sense of perceiving warmth is first agreeably affected; next its sense of smell is delighted with the odour of her milk; then its taste

" The graceful fall of the shoulders, both in man and woman, constitute no small part of beauty. In apes, though otherwise made like us, the shoulders are high, and drawn up on each side towards the ears. In man they fall by a gentle declivity; and the more so, in proportion to the beauty of his form. In fact, being high-shouldered, is not without reason considered as a deformity, for we find very sickly persons are always so, and people when dying are ever seen with their shoulders drawn up in a surprising manner. The muscles that serve to raise the ribs, mostly rise near the shoulders; and the higher we raise the

is gratified by the flavour of it; afterwards the appetites of hunger and of thirst afford pleasure by the possession of their objects, and by the subsequent digestion of the aliment; and lastly, the sense of touch is delighted by the softness and smoothness of the milky fountain, the source of such variety of happiness. All those various kinds of pleasure at length become associated with the form of the mother's breast; which the infant embraces with its hands, presses with its lips, and watches with its eyes; and thus acquires more accurate ideas of the form of its mother's bosom, than of the odour and flavour, or warmth, which it perceives by other senses. And hence at our maturer years, when any object of vision is represented to us, which by its waving or spiral lines bears any similitude to the form of the female bosom, whether it be found in a landscape, with soft gradations of rising and descending surface, or in the form of some antique vases, or in other works of the pencil or the chisel, we feel a general glow of delight, which seems to influence all our senses; and if the object be not too large, we experience an attraction to embrace it with our arms, and salute it with our lips, as we did in our early infancy the bosom of our mothers. And thus we find, according to the ingenious idea of Hogarth, that the waving lines of beauty were originally taken from the Temple of Venus.

" If the wide eye the wavy lawns explores,
The bending woodlands, or the winding shores,
Hills, whose green sides with soft protuberance rise,
Or the blue concave of the vaulted skies;—
Or scans with nicer gaze the pearly swell
Of spiral volutes round the twisted shell:
Or undulating sweep, whose graceful turns
Bound the smooth surface of Etrurian urns,
When on fine forms the waving lines impress'd
Give the nice curves, which swell the female breast;
The countless joys the tender mother pours,
Round the soft cradle of our infant hours,
In lively trains of unextinct delight
Rise in our bosoms, *recognized by sight*;
Fond Fancy's eye recalls the form divine,
And TASTE sits smiling upon Beauty's shrine."*

* Temple of Nature, page 101

shoulders, we the more easily raise the ribs likewise. It happens, therefore, in the sickly and the dying, who do not breathe without labour, that to raise the ribs, they are obliged to call in the assistanee of the shoulders; and thus their bodies assume, from habit, that form which they are so frequently obliged to assume. Women with child, also, are usually seen to be high-shouldered; for the weight of the inferior parts drawing down the ribs, they are obliged to use every effort to elevate them, and thus they raise their shoulders of course. During pregnancy, also, the shape, not only of the shoulders, but also of the breast, and even the features of the face, are greatly altered; for the whole upper fore-part of the body is covered with a broad thin skin, called the myoides; which being, at that time, drawn down, it also draws down with it the skin, and, consequently, the features of the face. By these means the visage takes a particular form; the lower eye-lids and the corners of the mouth, are drawn downwards; so that the eyes are enlarged, and the mouth lengthened: and women in these circumstances, are said by the midwives, to be "*all mouth and eyes.*"

The arms of men but very little resemble the fore-feet or quadrupeds, and much less the wings of birds. The ape is the only animal that is possessed of hands and arms; but these are much more rudely fashioned, and with less exact proportion, than in men; "the thumb not being so well opposed to the rest of the fingers, in their hands, as in ours."

The form of the back is not much different in man from that of other quadruped animals, only that the reins are more muscular in him, and stronger. The buttock, however, in man, is different from that of all other animals whatsoever. What goes by that name in other creatures, is only the upper part of the thigh; man being the only animal that supports himself perfectly erect, the largeness of this part is owing to the peculiarity of his position.

Man's feet, also, are different from those of all other animals, those even of apes not excepted. The foot of the ape is rather a kind of awkward hand; its toes, or rather fingers, are long, and that of the middle longest of all. This foot also wants the heel, as in man; the sole is narrower, and less adapted to maintain the equilibrium of the body, in walking, dancing, or running.

The nails are less in man than in any other animal. If they

were much longer than the extremities of the fingers, they would rather be prejudicial than serviceable, and obstruct the management of the hand. Such savages as let them grow long make use of them in flaying animals, in tearing their flesh, and such like purposes; however, though their nails are considerably larger than ours, they are by no means to be compared to the hoofs or the claws of other animals. "They may sometimes be seen longer, indeed, than the claws of any animal whatsoever; as we learn that the nails of some of the learned men in China are longer than their fingers. But these want that solidity which might give force to their exertions, and could never, in a state of nature, have served them for annoyance or defence."

There is little known exactly with regard to the proportion of the human figure; and the beauty of the best statues is better conceived by observing than by measuring them. The statues of antiquity, which were at first copied after the human form, are now become the models of it; nor is there one man found whose person approaches to those inimitable performances that have thus, in one figure, united the perfections of many. It is sufficient to say, that from being at first models, they are now become originals; and are used to correct the deviations in that form from whence they were taken. I will not, however, pretend to give the proportions of the human body as taken from these, there being nothing more arbitrary, and which good painters themselves so much contemn. Some, for instance, who have studied after these, divide the body into ten times the length of the face; and others into eight. Some pretend to tell us, that there is a similitude of proportion in different parts of the body. Thus, that the hand is the length of the face; the thumb the length of the nose; the space between the eyes is the breadth of an eye; that the breadth of the thigh, at thickest, is double that of the thickest part of the leg, and treble the smallest; that the arms extended are as long as the figure is high; that the legs and thighs are half the length of the figure. All this, however, is extremely arbitrary; and the excellence of a shape, or the beauty of a statue, results from the attitude and position of the whole, rather than any established measurements, begun without experience, and adopted by caprice. In general, it may be remarked, that the proportions alter in every age, and are obviously different in the two sexes. In women, the shoulders

are narrower, and the neck proportionably longer, than in men. The hips also are considerably larger, and the thighs much shorter, than in men. These proportions, however, vary greatly at different ages. In infancy, the upper parts of the body are much larger than the lower; the legs and thighs do not constitute any thing like half the height of the whole figure; in proportion as the child increases in age, the inferior parts are found to lengthen; so that the body is not equally divided until it has acquired its full growth.

The size of men varies considerably. Men are said to be tall who are from five feet eight inches to six feet high. The middle stature is from five feet five to five feet eight: and those are said to be of small stature who fall under these measures. "However, it ought to be remarked, that the same person is always taller when he rises in the morning, than upon going to bed at night; and sometimes there is an inch difference; and I have seen more. Few persons are sensible of this remarkable variation; and I am told, it was first perceived in England by a recruiting officer. He often found that those men whom he had enlisted for soldiers, and answered to the appointed standard at one time, fell short of it when they came to be measured before the colonel at the head-quarters. This diminution in their size proceeded from the different times of the day, and the different states of the body, when they happened to be measured. If, as was said, they were measured in the morning, after the night's refreshment, they were found to be commonly half an inch, and very often a whole inch, taller than if measured after the fatigues of the day; if they were measured when fresh in the country, and before a long fatiguing march to the regiment, they were found to be an inch taller than when they arrived at their journey's end. All this is now well known among those who recruit for the army, and the reason of this difference of stature is obvious. Between all the joints of the back-bone, which is composed of several pieces, there is a glutinous liquor deposited, which serves, like oil in a machine, to give the parts an easy play upon each other. This lubricating liquor, or synovia, as the anatomists call it, is poured in during the season of repose, and is consumed by exercise and employment; so that in a body, after hard labour, there is scarce any of it remaining; but all the joints grow stiff, and their motion becomes hard and painful

It is from hence, therefore, that the body diminishes in stature. For this moisture being drained away from between the numerous joints of the back-bone, they lie closer upon each other; and their whole length is thus very sensibly diminished; but sleep, by restoring the fluid again, swells the spaces between the joints, and the whole is extended to its former dimensions

"As the human body is thus often found to differ from itself in size, so it is found to differ in its weight also; and the same person, without any apparent cause, is found to be heavier at one time than another. If, after having eaten a hearty dinner, or having drank hard, the person should find himself thus heavier, it would appear no way extraordinary; but the fact is, the body is very often found heavier some hours after eating a hearty meal than immediately succeeding it. If, for instance, a person, fatigued by a day's hard labour, should eat a plentiful supper, and then get himself weighed upon going to bed; after sleeping soundly, if he is again weighed, he will find himself considerably heavier than before; and this difference is often found to amount to a pound, or sometimes to a pound and a half. From whence this adventitious weight is derived is not easy to conceive; the body, during the whole night, appears rather plentifully perspiring than imbibing any fluid, rather losing than gaining moisture: however, we have no reason to doubt, but that either by the lungs, or perhaps by a peculiar set of pores, it is all this time inhaling a quantity of fluid, which thus increases the weight of the whole body, upon being weighed the next morning."[1]

Although the human body is externally more delicate than any of the quadruped kind, it is, notwithstanding, extremely muscular; and, perhaps, for its size, stronger than that of any other animal. If we should offer to compare the strength of the lion with that of man, we should consider that the claws of this animal give us a false idea of its power; we ascribe to its force what is only the effect of its arms. Those which man has received from Nature are not offensive, happy had art never furnished him with any more terrible than those which arm the paws of the lion.

But there is another manner[2] of comparing the strength of

1 From this experiment also, the learned may gather upon what a weak foundation the whole doctrine of Sanctorian perspiration is built: but this disquisition more properly belongs to medicine than natural history.

2 Mr Buffon calls it a better manner; but this is not the case.

man with that of other animals; namely, by the weights which either can carry. We are assured that the porters of Constantinople carry burdens of nine hundred pounds weight. Mr Desaguliers tells us of a man, who by distributing weights in such a manner as that every part of his body bore its share, he was thus able to raise a weight of two thousand pounds. A horse, which is about seven times our bulk, would be thus able to raise a weight of fourteen thousand pounds, if its strength were in the same proportion.[1] "But the truth is, a horse will not carry upon its back above a weight of two or three hundred pounds; while a man of confessedly inferior strength is thus able to support two thousand. Whence comes this seeming superiority? The answer is obvious. Because the load upon the man's shoulders is placed to the greatest advantage; while, upon the horse's back, it is placed at the greatest disadvantage. Let us suppose for a moment the man standing as upright as possible, under the great load above mentioned. It is obvious that all the bones of his body may be compared to a pillar supporting a building, and that his muscles have scarce any share in this dangerous duty. However, they are not entirely inactive; as man, let him stand never so upright, will have some bending in different parts of his body. The muscles, therefore, give the bones some assistance, and that with the greatest possible advantage. In this manner, a man has been found to support two thousand weight; but may be capable of supporting a still greater. The manner in which this is done, is by strapping the load round the shoulders of the person who is to bear it, by a machine, something like that by which milk-vessels or water-buckets are carried. The load being thus placed on a scaffold, on each side, contrived for that purpose, and the man standing erect in the midst, all parts of the scaffold, except that where the man stands, are made to sink; and thus the man maintaining his position, the load whatever it is, becomes suspended, and the column of his bones may be fairly said to support it. If, however, he should but ever so little give way, he must inevitably drop; and no power of his can raise the weights again. But the case is very different with regard to a load laid upon a horse. The column

1 Mr Buffon carries this subject no farther; and thus far, without explanation, it is erroneous.

of the bones there lies a different way; and a weight of five hundred pounds, as I am told, would break the back of the strongest horse that could be found. The great force of a horse, and other quadrupeds, is exerted when the load is in such a position as that the column of the bones can be properly applied, which is lengthwise. When, therefore, we are to estimate the comparative strength of a horse, we are not to try what he can carry, but what he can draw; and in this case, his amazing superiority over man is easily discerned; for one horse can draw a load that ten men cannot move. And in some cases it happens that a draught horse draws the better for being somewhat loaded; for, as the peasants say, the load upon the back keeps him the better to the ground."

There is still another way of estimating human strength, by the perseverance and agility of our motions. Men who are exercised in running, outstrip horses; or, at least, hold their speed for a longer continuance. In a journey, also, a man will walk down a horse; and, after they have both continued to proceed for several days, the horse will be quite tired, and the man will be fresher, than in the beginning.* The king's messengers of Ispahan, who are runners by profession, go thirty-six leagues in fourteen hours. Travellers assure us, that the Hottentots outstrip lions in the chase; and that the savages who hunt the elk, pursue with such speed, that they at last tire down and take it. We are told many very surprising things of the great swiftness of the savages, and of the long journeys they undertake on foot, through the most craggy mountains, where there are no paths to direct, nor houses to entertain them. They are said to perform a journey of twelve hundred leagues in less than six weeks. "But notwithstanding what travellers report of this matter, I have been assured from many of our officers and soldiers who compared their own swiftness with that of the native Americans during the last war, that although the savages held out, and as

* This may be flattering to humanity; but in justice to the poor horse it may be stated, that a fair trial has never been made of the respective powers of man and horse in regard to pedestrianism. If there were, there can be little doubt but that the horse would prove his superiority. Arab horses, for example, are known to carry their riders and accoutrements across the desert for many successive days, at the rate of 70 and 80 miles a day. How far they might go without weight, may be imagined, but has never been tried.

the phrase is, had better bottoms, yet, for a spurt, the Englishmen were more nimble and speedy."

Nevertheless, in general, civilized man is ignorant of his own powers: he is ignorant how much he loses by effeminacy; and what might be acquired by habit and exercise. Here and there, indeed, men are found among us of extraordinary strength; but that strength, for want of opportunity, is seldom called into exertion. "Among the ancients it was a quality of much greater use than at present; as in war the same man that had strength sufficient to carry the heaviest armour, had strength sufficient also to strike the most fatal blow. In this case, his strength was at once his protection and his power. We ought not to be surprised, therefore, when we hear of one man terrible to an army, and irresistible in his career, as we find some generals represented in ancient history. But we may be very certain that this prowess was exaggerated by flattery, and exalted by terror. An age of ignorance is ever an age of wonder. At such times, mankind, having no just ideas of the human powers, are willing rather to represent what they wish, than what they know; and exalt human strength, to fill up the whole sphere of their limited conceptions. Great strength is an accidental thing; two or three in a country may possess it; and these may have a claim to heroism. But what may lead us to doubt of the veracity of these accounts is, that the heroes of antiquity are represented as the sons of heroes; their amazing strength is delivered down from father to son; and this we know to be contrary to the course of nature. Strength is not hereditary, although titles are: and I am very much induced to believe, that this great tribe of heroes, who are all represented as the descendants of heroes, are more obliged to their titles than to their strength, for their characters. With regard to the shining characters in Homer, they are all represented as princes, and as the sons of princes; while we are told of scarce any share of prowess in the meaner men of the army; who are only brought into the field for these to protect, or to slaughter. But nothing can be more unlikely than that those men, who were bred in the luxury of courts, should be strong; while the whole body of the people, who received a plainer and simpler education, should be comparatively weak. Nothing can be more contrary to the general laws of nature, than that all the sons of heroes should thus

inherit not only the kingdoms, but the strength of their forefathers; and we may conclude, that they owe the greatest share of their imputed strength rather to the dignity of their stations than the force of their arms; and, like all fortunate princes, their flatterers happened to be believed. In later ages, indeed, we have some accounts of amazing strength, which we can have no reason to doubt of. But in these, nature is found to pursue her ordinary course; and we find their strength accidental. We find these strong men among the lowest of the people, and gradually rising into notice, as this superiority had more opportunity of being seen. Of this number was the Roman tribune, who went by the name of the second Achilles; who, with his own hand, is said to have killed, at different times, three hundred of the enemy; and when treacherously set upon, by twenty-five of his own countrymen, although then past his sixtieth year, killed fourteen of them before he was slain. Of this number was Milo, who, when he stood upright, could not be forced out of his place. Pliny also tells us of one Athanatus, who walked across the stage at Rome, loaded with a breastplate weighing five hundred pounds, and buskins of the same weight. But of all the prodigies of strength, of whom we have any accounts in Roman history, Maximin, the emperor, is to be reckoned the foremost. Whatever we are told relative to him is well attested; his character was too exalted not to be thoroughly known; and that very strength, for which he was celebrated, at last procured him no less a reward than the empire of the world. Maximin was above nine feet in height, and the best proportioned man in the whole empire. He was by birth a Thracian; and, from being a simple herdsman, rose through the gradations of office, until he came to be emperor of Rome. The first opportunity he had of exerting his strength, was in the presence of all the citizens, in the theatre, where he overthrew twelve of the strongest men in wrestling, and out-stript two of the fleetest horses in running, all in one day. He could draw a chariot loaden, that two strong horses could not move; he could break a horse's jaw with a blow of his fist, and its thigh with a kick. In war he was always foremost and invincible: happy had it been for him and his subjects if, from being formidable to his enemies, he had not become still more so to his subjects; he reigned, for some time, with all the world his

enemy; all mankind wishing him dead, yet none daring to strike the blow. As if fortune had resolved that through life he should continue unconquerable, he was killed at last by his own soldiers while he was sleeping. We have many other instances, in later ages, of very great strength, and not fewer of amazing swiftness; but these, merely corporeal perfections, are now considered as of small advantage, either in war or in peace. The invention of gunpowder has, in some measure, levelled all force to one standard: and has wrought a total change in martial education through all parts of the world. In peace also the invention of new machines every day, and the application of the strength of the lower animals to the purposes of life, have rendered human strength less valuable. The boast of corporeal force is, therefore, consigned to savage nations, where those arts not being introduced, it may still be needful; but in more polite countries, few will be proud of that strength which other animals can be taught to exert to as useful purposes as they.

"If we compare the largeness and thickness of our muscles with those of any other animal, we shall find that, in this respect, we have the advantage; and if strength, or swiftness depended upon the quantity of muscular flesh alone, I believe that, in this respect, we should be more active and powerful than any other. But this is not the case; a great deal more than the size of the muscles goes to constitute activity or force; and it is not he who has the thickest legs that can make the best use of them. Those therefore who have written elaborate treatises on muscular force, and have estimated the strength of animals by the thickness of their muscles, have been employed to very little purpose. It is in general observed, that thin and raw-boned men are always stronger and more powerful, than such as are seemingly more muscular; as in the former all the parts have better room for their exertions.

Women want much of the strength of men; and in some countries the stronger sex have availed themselves of the superiority, in cruelly and tyrannically enslaving those who were made with equal pretensions to a share in all the advantages life can bestow. Savage nations oblige their women to a life of continual labour; upon them rest all the drudgeries of domestic duty, while the husband, indolently reclined in his hammock, is first served from the fruits of her industry. From this negligent

situation he is seldom roused, except by the calls of appetite, when it is necessary, either by fishing or hunting, to make a variety in his entertainments. A savage has no idea of taking pleasure in exercise; he is surprised to see a European walk forward for his amusement, and then return back again. As for his part, he could be contented to remain for ever in the same situation, perfectly satisfied with sensual pleasures and undisturbed repose. The women of these countries are the greatest slaves upon earth: sensible of their weakness, and unable to resist, they are obliged to suffer those hardships which are naturally inflicted by such as have been taught that nothing but corporeal force ought to give pre-eminence. It is not, therefore, till after some degree of refinement, that women are treated with lenity; and not till the highest degree of politeness, that they are permitted to share in all the privileges of man. The first impulse of savage nature is to confirm their slavery; the next of half barbarous nations, is to appropriate their beauty; and that of the perfectly polite, to engage their affections. In civilized countries, therefore, women have united the force of modesty to the power of their natural charms; and thus obtain that superiority over the mind, which they are unable to extort by their strength.

CHAP. VI.

OF SLEEP AND HUNGER.

As man, in all the privileges he enjoys, and the powers he is invested with, has a superiority over all other animals, so in his necessities, he seems inferior to the meanest of them all. Nature has brought him into life with a greater variety of wants and infirmities than the rest of her creatures, unarmed in the midst of enemies. The lion has natural arms; the bear natural clothing; but man is destitute of all such advantages; and from the superiority of his mind alone, he is to supply the deficiency. The number of his wants, however, were merely given, in order to multiply the number of his enjoyments; since the possibility

of being deprived of any good, teaches him the value of its possession. Were men born with those advantages which he learns to possess by industry, he would very probably enjoy them with a blunter relish; it is by being naked that he knows the value of a covering; it is by being exposed to the weather, that he learns the comforts of a habitation. Every want thus becomes a means of pleasure, in the redressing; and the animal that has most desires, may be said to be capable of the greatest variety of happiness.

Besides the thousand imaginary wants peculiar to man, there are two, which he has in common with all other animals; and which he feels in a more necessary manner than they. These are the wants of sleep and hunger. Every animal that we are acquainted with, seems to endure the want of these with much less injury to health than man; and some are most surprisingly patient in sustaining both. The little domestic animals that we keep about us, may often set a lesson of calm resignation, in supporting want and watchfulness, to the boasted philosopher. They receive their pittance at uncertain intervals, and wait its coming with cheerful expectation. We have instances of the dog and the cat living in this manner, without food, for several days; and yet still preserving their attachment to the tyrant that oppresses them; still ready to exert their little services for his amusement or defence. But the patience of these is nothing to what the animals of the forest endure. As these mostly live upon accidental carnage, so they are often known to remain without food for several weeks together. Nature, kindly solicitous for their support, has also contracted their stomachs, to suit them for their precarious way of living: and kindly, while it abridges the banquet, lessens the necessity of providing for it.

But the meaner tribes of animals are made still more capable of sustaining life without food, many of them remaining in a state of torpid indifference, till their prey approaches, when they jump upon and seize it. In this manner, the snake, or the spider, continue, for several months together, to subsist upon a single meal; and some of the butterfly kinds live upon little or nothing. But it is very different with man: his wants daily make their importunate demands; and it is known that he cannot continue to live many days without eating, drinking, and sleeping.

Hunger is a much more powerful enemy to man than watchfulness, and kills him much sooner. It may be considered as a disorder that food removes; and that would quickly be fatal, without its proper antidote. In fact, it is so terrible to man, that to avoid it he even encounters certain death; and, rather than endure its tortures, he exchanges them for immediate destruction. However, by what I have been told, it is much more dreadful in its approaches, than in its continuance; and the pains of a famishing wretch decrease, as his strength diminishes. In the beginning the desire of food is dreadful indeed, as we know by experience, for there are few who have not, in some degree, felt its approaches. But, after the first or second day, its tortures become less terrible, and a total insensibility at length comes kindly in to the poor wretch's assistance. I have talked with the captain of a ship, who was one of six that endured it in its extremities; and who was the only person that had not lost his senses, when they received accidental relief. He assured me, his pains at first were so great, as to be often tempted to eat a part of one of the men who died; and which the rest of his crew actually for some time lived upon: he said that during the continuance of this paroxysm, he found his pains insupportable; and was desirous, at one time, of anticipating that death which he thought inevitable: but his pains, he said, gradually decreased, after the sixth day, (for they had water in the ship, which kept them alive so long,) and then he was in a state rather of languor than desire; nor did he much wish for food, except when he saw others eating; and that for a while revived his appetite, though with diminished importunity. The latter part of the time, when his health was almost destroyed, a thousand strange images rose upon his mind; and every one of his senses began to bring him wrong information. The most fragrant perfumes appeared to him to have a fœtid smell; and every thing he looked at took a greenish hue, and sometimes a yellow. When he was presented with food by the ship's company that took him and his men up, four of whom died shortly after, he could not help looking upon it with loathing instead of desire; and it was not till after four days, that his stomach was brought to its natural tone, when the violence of his appetite returned, with a sort of canine eagerness.

Thus dreadful are the effects of hunger; and yet when we

come to assign the cause that produces them, we find the subject involved in doubt and intricacy. This longing eagerness is, no doubt, given for a very obvious purpose; that of replenishing the body, wasted by fatigue and perspiration. Were not men stimulated by such a pressing monitor, they might be apt to pursue other amusements, with a perseverance beyond their power; and forget the useful hours of refreshment, in those more tempting ones of pleasure. But hunger makes a demand that will not be refused; and, indeed, the generality of mankind seldom await the call.

Hunger has been supposed by some to arise from the rubbing of the coats of the stomach against each other, without having any intervening substance to prevent their painful attrition. Others have imagined that its juices, wanting their necessary supply, turn acrid, or, as some say, pungent; and thus fret its internal coats, so as to produce a train of the most uneasy sensations. Boerhaave, who established his reputation in physic, by uniting the conjectures of all those that preceded him, ascribes hunger to the united effect of both these causes; and asserts, that the pungency of the gastric juices, and the attrition of its coats against each other, cause those pains, which nothing but food can remove. These juices continuing still to be separated in the stomach, and every moment becoming more acrid, mix with the blood, and infect the circulation: the circulation being thus contaminated, becomes weaker, and more contracted; and the whole nervous frame sympathizing, a hectic fever, and sometimes madness, is produced; in which state the faint wretch expires. In this manner, the man who dies of hunger may be said to be poisoned by the juices of his own body; and is destroyed less by the want of nourishment, than by the vitiated qualities of that which he had already taken.

However this may be, we have but few instances of men dying, except at sea, of absolute hunger. The decline of those unhappy creatures who are destitute of food, at land, being more slow and unperceived. These, from often being in need, and as often receiving an accidental supply, pass their lives between surfeiting and repining; and their constitution is impaired by insensible degrees. Man is unfit for a state of precarious expectation. That share of provident precaution which incites him to lay up stores for a distant day, becomes his torment, when totally un-

provided against an immediate call. The lower race of animals, when satisfied, for the instant moment, are perfectly happy: but it is otherwise with man; his mind anticipates distress, and feels the pangs of want even before it arrests him. Thus the mind, being continually harassed by the situation, it at length influences the constitution, and unfits it for all its functions. Some cruel disorder, but no way like hunger, seizes the unhappy sufferer; so that almost all those men who have thus long lived by chance, and whose every day may be considered as a happy escape from famine, are known at last to die in reality of a disorder caused by hunger; but which, in the common language, is often called a *broken heart*. Some of these I have known myself, when very little able to relieve them: and I have been told by a very active and worthy magistrate, that the number of such as die in London for want, is much greater than one would imagine—I think he talked of two thousand in a year!

But how numerous soever those who die of hunger may be, many times greater, on the other hand, are the number of those who die by repletion. It is not the province of the present page to speculate, with the physician, upon the danger of surfeits; or, with the moralist, upon the nauseousness of gluttony: it will only be proper to observe, that as nothing is so prejudicial to health as hunger by constraint, so nothing is more beneficial to the constitution than voluntary abstinence. It was not without reason that religion enjoined this duty; since it answered the double purpose of restoring the health oppressed by luxury, and diminished the consumption of provisions, so that a part might come to the poor. It should be the business of the legislature, therefore, to enforce this divine precept; and thus, by restraining one part of mankind in the use of their superfluities, to consult for the benefit of those who want the necessaries of life. The injunctions for abstinence are strict over the whole Continent; and were rigorously observed even among ourselves, for a long time after the Reformation. Queen Elizabeth, by giving her commands upon this head the air of a political injunction, lessened, in a great measure, and in my opinion very unwisely, the religious force of the obligation. She enjoined that her subjects should fast from flesh on Fridays and Saturdays; but at the same time declared, that this was not commanded from motives of religion, as if there were any differences in meats, but

merely to favour the consumption of fish, and thus to multiply the number of mariners; and also to spare the stock of sheep, which might be more beneficial in another way. In this manner the injunction defeated its own force; and this most salutary law become no longer binding, when it was supposed to come purely from man. How far it may be enjoined in the Scriptures I will not take upon me to say; but this may be asserted, that if the utmost benefit to the individual, and the most extensive advantage to society, serve to mark any institution as of Heaven this of abstinence may be reckoned among the foremost.

' Were we to give an history of the various benefits that have arisen from this command, and how conducive it has been to long life, the instances would fatigue with their multiplicity. It is surprising to what a great age the primitive Christians of the East, who retired from persecution in the deserts of Arabia, continued to live, in all the bloom of health, and yet all the rigours of abstemious discipline. Their common allowance, as we are told, for four and twenty hours, was twelve ounces of bread, and nothing but water. On this simple beverage, St Anthony is said to have lived a hundred and five years: James, the hermit, a hundred and four; Arsenius, tutor to the emperor Arcadius, a hundred and twenty; St Epiphanius, a hundred and fifteen; Simeon, a hundred and twelve; and Rombald, a hundred and twenty. In this manner did these holy temperate men live to an extreme old age, kept cheerful by strong hopes, and healthful by moderate labour.

Abstinence, which is thus voluntary, may be much more easily supported than constrained hunger. Man is said to live without food for seven days; which is the usual limit assigned him; and perhaps, in a state of constraint, this is the longest time he can survive the want of it. But in cases of voluntary abstinence, of sickness, or sleeping, he has been known to live much longer.

In the records of the Tower, there is an account of a Scotchman imprisoned for felony, who for the space of six weeks took not the least sustenance, being exactly watched during the whole time; and for this he received the king's pardon.*

* It is a pity Goldsmith was not more explicit on this extraordinary and incredible case. We do not recollect of ever having seen it adverted to elsewhere, and we are inclined to suppose it a gratuitous illustration of the old English creed regarding the hunger-enduring capabilities of the Scotch. It

When the American Indians undertake long journeys, and when, consequently, a stock of provisions sufficient to support them the whole way, would be more than they could carry; in order to obviate this inconvenience, instead of carrying the necessary quantity, they contrive a method of palliating their hunger by swallowing pills, made of calcined shells and tobacco. These pills take away all appetite, by producing a temporary disorder in the stomach; and, no doubt, the frequent repetition of this wretched expedient must at last be fatal. By these means, however, they continue several days without eating, cheerfully bearing such extremes of fatigue and watching, as would quickly destroy men bred up in a greater state of delicacy. For those arts by which we learn to obviate our necessities, do not fail to unfit us for their accidental encounter.

Upon the whole, therefore, man is less able to support hunger than any other animal; and he is not better qualified to support a state of watchfulness. Indeed, sleep seems much more necessary to him, than to any other creature: as, when awake, he may be said to exhaust a greater proportion of the nervous fluid; and, consequently, to stand in need of an adequate supply Other animals, when most awake, are but little removed from a state of slumber; their feeble faculties, imprisoned in matter, and rather exerted by impulse than deliberation, require sleep, rather as a cessation from motion, than from thinking. But it is otherwise with man; his ideas, fatigued with their various excursions, demand a cessation, not less than the body, from toil: and he is the only creature that seems to require sleep from double motives; not less for the refreshment of the mental than of the bodily frame.

There are some lower animals, indeed, that seem to spend the greatest part of their lives in sleep; properly speaking, the sleep of such may be considered as a kind of death; and their waking, a resurrection. Flies and insects are said to be asleep, at a time that all the vital motions have ceased, without respiration, without any circulation of their juices; if cut in pieces, they do not awake, nor does any fluid ooze out at the wound. These may be considered rather as congealed than as sleep-

is not to be denied, however, that many wonderful instances of abstinence from food for months, and even years, are on record, but these were always occasioned or accompanied by fever torpor, or other diseased states of body.

ing animals; and their rest, during winter, rather as a cessation from life, than a necessary refreshment; but in the higher races of animals, whose blood is not thus congealed, and thawed by heat, these all bear want of sleep much better than man; and some of them continue a long time without seeming to take any refreshment from it whatsoever.

But man is more feeble; he requires its due return; and if it fails to pay the accustomed visit, his whole frame is in a short time thrown into disorder: his appetite ceases; his spirits are dejected; his pulse becomes quicker and harder; and his mind, abridged of its slumbering visions, begins to adopt waking dreams. A thousand strange phantoms arise, which come and go without his will: these, which are transient in the beginning, at last take firm possession of the mind, which yields to their dominion, and after a long struggle, runs into confirmed madness. In that horrid state, the mind may be considered as a city without walls, open to every insult, and paying homage to every invader; every idea that then starts with any force, becomes a reality; and the reason, over fatigued with its former importunities, makes no head against the tyrannical invasion, but submits to it from mere imbecility.

But it is happy for mankind, that this state of inquietude is seldom driven to an extreme; and that there are medicines which seldom fail to give relief. However, man finds it more difficult than any other animal to procure sleep: and some are obliged to court its approaches for several hours together, before they incline to rest. It is in vain that all light is excluded; that all sounds are removed; that warmth and softness conspire to invite it; the restless and busy mind still retains its former activity; and Reason, that wishes to lay down the reins, in spite of herself is obliged to maintain them. In this disagreeable state, the mind passes from thought to thought, willing to lose the distinctness of perception, by increasing the multitude of the images. At last, when the approaches of sleep are near, every object of the imagination begins to mix with that next it; their outlines become, in a manner, rounder; a part of their distinctions fades away; and sleep, that ensues, fashions out a dream from the remainder.

If then it should be asked, from what cause this state of repose proceeds, or in what manner sleep thus binds us for seve-

:at hours together? I must fairly confess my ignorance; although it is easy to tell what philosophers say upon the subject. Sleep, says one of them,[1] consists in a scarcity of spirits, by which the orifices or pores of the nerves in the brain, through which the spirits used to flow into the nerves, being no longer kept open by the frequency of the spirits, shut of themselves; thus the nerves, wanting a new supply of spirits, become lax, and unfit to convey any impression to the brain. All this, however, is explaining a very great obscurity by somewhat more obscure; leaving, therefore, those spirits to open and shut the entrances to the brain, let us be contented with simply enumerating the effects of sleep upon the human constitution.

In sleep, the whole nervous frame is relaxed, while the heart and the lungs seem more forcibly exerted. This fuller circulation produces also a swelling of the muscles, as they always find who sleep with ligatures on any part of their body. This increased circulation also, may be considered as a kind of exercise, which is continued through the frame; and by this, the perspiration becomes more copious, although the appetite for food is entirely taken away. Too much sleep dulls the apprehension, weakens the memory, and unfits the body for labour. On the contrary, sleep too much abridged, emaciates the frame, produces melancholy, and consumes the constitution. It requires some care, therefore, to regulate the quantity of sleep, and just to take as much as will completely restore nature, without oppressing it. The poor, as Otway says, sleep little; forced by their situation, to lengthen out their labour to their necessities, they have but a short interval for this pleasing refreshment; and I have ever been of opinion, that bodily labour demands a less quantity of sleep than mental. Labourers and artizans are generally satisfied with about seven hours; but I have known some scholars who usually slept nine, and perceived their faculties no way impaired by oversleeping.

The famous Philip Barrettiere, who was considered as a prodigy of learning at the age of fourteen, was known to sleep regularly twelve hours in the twenty-four; the extreme activity of his mind, when awake, in some measure called for an ade-

1 Rohault.

quate alternation of repose: and, I am apt to think, that when students stint themselves in this particular, they lessen the waking powers of the imagination, and weaken its most strenuous exertions. Animals that seldom think, as was said, can very easily dispense with sleep; and of men, such as think least, will, very probably, be satisfied with the smallest share. A life of study, it is well known, unfits the body for receiving this gentle refreshment; the approaches of sleep are driven off by thinking: when, therefore, it comes at last, we should not be too ready to interrupt its continuance.

Sleep is indeed, to some, a very agreeable period of their existence: and it has been a question in the schools, Which was most happy, the man who was a beggar by night, and a king by day; or he who was a beggar by day, and a king by night? It is given in favour of the nightly monarch, by him who first started the question: "For the dream," says he, "gives the full enjoyment of the dignity, without its attendant inconveniences; while, on the other hand, the king, who supposes himself degraded, feels all the misery of his fallen fortune, without trying to find the comforts of his humble situation. Thus, by day, both states have their peculiar distresses: but, by night, the exalted beggar is perfectly blessed, and the king completely miserable." All this, however, is rather fanciful than just; the pleasure dreams can give us, seldom reaches to our waking pitch of happiness: the mind often, in the midst of its highest visionary satisfactions, demands of itself, whether it does not owe them to a dream; and frequently awakes with the reply.

But it is seldom, except in cases of the highest delight, or the most extreme uneasiness, that the mind has power thus to disengage itself from the dominion of fancy. In the ordinary course of its operations, it submits to those numberless fantastic images that succeed each other, and which, like many of our waking thoughts, are generally forgotten. Of these, however, if any, by their oddity, or their continuance, affect us strongly, they are then remembered; and there have been some who felt their impressions so strongly, as to mistake them for realities, and to rank them among the past actions of their lives.

There are others upon whom dreams seem to have a very different effect; and who, without seeming to remember their impressions the next morning, have yet shown, by their actions

during sleep, that they were very powerfully impelled by their dominion. We have numberless instances of such persons who, while asleep, have performed many of the ordinary duties to which they had been accustomed when waking; and, with a ridiculous industry, have completed by night, what they failed doing by day. We are told, in the German Ephemerides, of a young student, who being enjoined a severe exercise by his tutor, went to bed, despairing of accomplishing it. The next morning awaking, to his great surprise, he found the task fairly written out, and finished in his own hand-writing.

He was at first, as the account has it, induced to ascribe this strange production to the operations of an infernal agent; but his tutor, willing to examine the affair to the bottom, set him another exercise, still more severe than the former, and took precautions to observe his conduct the whole night. The young gentleman, upon being so severely tasked, felt the same inquietude that he had done on the former occasion; went to bed gloomy and pensive, pondering on the next day's duty, and, after some time, fell asleep. But shortly after, his tutor, who continued to observe him from a place that was concealed, was surprised to see him get up, and very deliberately go to the table; where he took out pen, ink, and paper, drew himself a chair, and sat very methodically to thinking: it seems, that his being asleep, only served to strengthen the powers of his imagination; for he very quickly and easily went through the task assigned him; put his chair aside, and then returned to bed to take out the rest of his nap. What credit we are to give to this account, I will not pretend to determine; but this may be said, that the book from whence it was taken, has some good marks of veracity; for it is very learned, and very dull; and is written in a country noted, if not for truth, at least for want of invention.*

The ridiculous story of Arlotto is well known, who has had a volume written, containing a narrative of the actions of his life, not one of which was performed while he was awake. He was an Italian Franciscan friar, extremely rigid in his manners, and remarkably devout and learned in his daily conversation. By night, however, and during his sleep, he played a very different

* This admirable hit at the Germans, it need scarcely be said, does no *now* apply to them, as, since Goldsmith's time, they have proved themselves by their literary works, to be a people of the most fertile fancy.

character from what he did by day, and was often detected in very atrocious crimes. He was at one time detected in actually attempting a rape, and did not awake till the next morning, when he was surprised to find himself in the hands of justice. His brothers of the convent often watched him while he went very deliberately into the chapel, and there attempted to commit sacrilege. They sometimes permitted him to carry the chalice and the vestments away into his own chamber, and the next morning amused themselves at the poor man's consternation for what he had done. But of all his sleeping transgressions, that was the most ridiculous, in which he was called to pray for the soul of a person departed. Arlotto, after having devoutly performed his duty, retired to a chamber which was shown him, to rest; but there he had no sooner fallen asleep, than he began to reflect that the dead body had got a ring upon one of the fingers, which might be useful to him: accordingly, with a pious resolution of stealing it, he went down, undressed as he was, into a room full of women, and, with great composure, endeavoured to seize the ring. The consequence was, that he was taken before the inquisition for witchcraft; and the poor creature had like to have been condemned, till his peculiar character accidentally came to be known: however, he was ordered to remain for the rest of life in his own convent, and upon no account whatsoever to stir abroad.

What are we to say to such actions as these? or how account for this operation of the mind in dreaming? It should seem that the imagination, by day, as well as by night, is always employed; and that often against our wills, it intrudes, where it is least commanded or desired. While awake, and in health, this busy principle cannot much delude us: it may build castles in the air, and raise a thousand phantoms before us; but we have every one of the senses alive to bear testimony to its falsehood. Our eyes show us that the prospect is not present; our hearing and our touch depose against its reality; and our taste and smelling are equally vigilant in detecting the imposture. Reason, therefore, at once gives judgment upon the cause, and the vagrant intruder, Imagination, is imprisoned, or banished from the mind. But in sleep it is otherwise; having, as much as possible, put our senses from their duty, having closed the eyes from seeing, and the ears, taste, and smelling, from their peculiar functions,

and having diminished even the touch itself, by all the arts of softness, the imagination is then left to riot at large, and to lead the understanding without an opposer. Every incursive idea then becomes a reality; and the mind, not having one power that can prove the illusion, takes them for truths. As in madness, the senses, from struggling with the imagination, are at length forced to submit; so, in sleep, they seem for a while soothed into the like submission: the smallest violence exerted upon any one of them, however, rouses all the rest in their mutual defence; and the imagination, that had for a while told its thousand falsehoods, is totally driven away, or only permitted to pass under the custody of such as are every moment ready to detect its imposition.

CHAP. VII.

OF SEEING. [1]

"HAVING mentioned the senses as correcting the errors of the imagination, and, as forcing it, in some measure, to bring us just information, it will naturally follow, that we should examine the nature of those senses themselves: we shall thus be enabled to see how far they also impose on us, and how far they contribute to correct each other. Let it be observed, however, that in this we are neither giving a treatise of optics or phonics, but a history of our own perceptions: and to those we chiefly confine ourselves."

The eyes very soon begin to be formed in the human embryo, and in the chicken also. Of all the parts which the animal has double, the eyes are produced the soonest, and appear the most prominent. It is true, indeed, that in viviparous animals, and particularly in man, they are not so large in proportion, at first, as in the oviparous kinds; nevertheless, they are more speedily developed, when they begin to appear, than any other parts of

1 This chapter is taken from Mr Buffon. I believe the reader will readily excuse any apology; and, perhaps, may wish that I had taken this liberty much more frequently. What I add is marked, as in a former instance, with inverted commas.

the body. It is the same with the organ of hearing; the little bones that compose the internal parts of the ear are entirely formed before the other bones, though much larger, have acquired any part of their growth or solidity. Hence it appears, that those parts of the body which are furnished with the greatest quantity of nerves, are the first in forming. Thus the brain and the spinal-marrow, are the first seen begun in the embryo; and, in general, it may be said, that wherever the nerves go, or send their branches in great numbers, there the parts are soonest begun, and the most completely finished.

If we examine the eyes of a child some hours, or even some days after its birth, it will be easily discerned that it as yet makes no use of them. The humour of the organ not having acquired a sufficient consistence, the rays of light strike but confusedly upon the retina, or expansion of nerves at the back of the eye. It is not till about a month after they are born, that children fix them upon objects; for, before that time, they turn them indiscriminately everywhere, without appearing to be affected by any. At six or seven weeks old, they plainly discover a choice in the objects of their attention; they fix their eyes upon the most brilliant colours, and seem peculiarly desirous of turning them towards the light. Hitherto, however, they only seem to fortify the organ for seeing distinctly; but they have still many illusions to correct.

The first great error in vision is, that the eye inverts every object: and it in reality appears to the child, until the touch has served to undeceive it, turned upside down. A second error in vision is, that every object appears double. The same object forms itself distinctly upon each eye; and is consequently seen twice. This error, also, can only be corrected by the touch; and although, in reality, every object we see appears inverted and double, yet the judgment and habit have so often corrected the sense, that we no longer submit to its imposition, but see every object in its just position, the very instant it appears. Were we therefore, deprived of feeling, our eyes would not only misrepresent the situation, but also the number, of all things around us.

To convince us that we see objects inverted, we have only to observe the manner in which images are represented, coming through a small hole in a darkened room. If such a small hole be made in a

dark room, so that no light can come in, but through it, all the objects without will be painted on the wall behind, but in an inverted position, their heads downwards. For as all the rays which pass from the different parts of the object without, cannot enter the hole in the same extent which they had in leaving the object; since, if so, they would require the aperture to be as large as the object; and, as each part and every point of the object sends forth the image of itself on every side, and the rays which form these images pass from all points of the object as from so many centres, so such only can pass through the small aperture as come in opposite directions. Thus the little aperture becomes a centre for the entire object; through which the rays from the upper parts, as well as from the lower parts of it, pass in converging directions; and consequently, they must cross each other, in the central point, and thus paint the objects behind, upon the wall, in an inverted position.

It is in like manner, easy to conceive, that we see all objects double, whatever our present sensations may seem to tell us to the contrary. For to convince us of this, we have only to compare the situation of any one object on shutting one eye, and then compare the same situation by shutting the other. If, for instance, we hold up a finger and shut the right eye, we shall find it hide a certain part of the room; if again re-shutting the other eye, we shall find that part of the room visible, and the finger seeming to cover a part of the room that had been visible before. If we open both eyes, however, the part covered will appear to lie between the two extremes. But the truth is, we see the object our finger had covered, one image of it to the right, and the other to the left; but, from habit, suppose that we see but one image placed between both; our sense of feeling having corrected the errors of sight. And thus, also, if instead of two eyes, we had two hundred, we should, at first, fancy the objects increased in proportion, until one sense had corrected another.

"The having two eyes might thus be said to be rather an inconvenience than a benefit; since one eye would answer the purposes of sight as well, and be less liable to illusion. But it is otherwise; two eyes greatly contribute, if not to distinct, at least to extensive vision.[1] When an object is placed at a mo

1 Leonardo da Vinci.

derate distance, by the means of both eyes we see a larger share of it than we possibly could with one, the right eye seeing a greater portion of its right side, and the left eye of its corresponding side. Thus both eyes, in some measure, see round the object; and it is this that gives it, in nature, that bold relievo, or swelling, with which they appear; and which no painting, how exquisite soever, can attain to. The painter must be contented with shading on a flat surface; but the eyes, in observing nature, do not behold the shading only, but a part of the figure also, that lies behind those very shadings which give it that swelling which painters so ardently desire, but can never fully imitate.

"There is another defect, which either of the eyes taken singly would have, but which is corrected, by having the organ double. In either eye there is a point, which has no vision whatsoever; so that if one of them only is employed in seeing, there is a part of the object to which it is always totally blind This is that part of the optic nerve where its vein and artery run; which being insensible, that point of the object that is painted there must continue unseen. To be convinced of this we have only to try a very easy experiment. If we take three black patches, and stick them upon a white wall, about a foot distant from each other, each about as high as the eye that is to observe them; then retiring six or seven feet back, and shutting one eye, by trying for some time, we shall find, that while we distinctly behold the black spots that are to the right and left, that which is in the middle remains totally unseen. Or, in other words when we bring that part of the eye, where the optic artery runs, to fall upon the object, it will then become invisible. This defect, however, in either eye, is always corrected by both, since the part of the object that is unseen by one, will be very distinctly perceived by the other."

Beside the former defects, we can have no idea of distances from the sight without the help of touch. Naturally every object we see appears to be within our eyes; and a child, who has as yet made but little use of the sense of feeling, must suppose that every thing it sees makes a part of itself. Such objects are only seen more or less bulky, as they approach or recede from its eyes; so that a fly that is near will appear larger than an ox at a distance. It is experience alone that can rectify this mistake;

and a long aquaintance with the real size of every object quickly assures us of the distance at which it is seen. The last man in a file of soldiers appears in reality much less, perhaps ten times more diminutive, than the man next to us; however, we do not perceive this difference, but continue to think him of equal stature; for the numbers we have seen thus lessened by distance, and have found, by repeated experience, to be of the natural size when we come closer, instantly correct the sense, and every object is perceived with nearly its natural proportion. But it is otherwise, if we observe objects in such situations as we have not had sufficient experience to correct the errors of the eye; if, for instance, we look at men from the top of a high steeple, they, in that case, appear very much diminished, as we have not had a habit of correcting the sense in that position.

Although a small degree of reflection will serve to convince us of the truth of these positions, it may not be amiss to strengthen them by an authority which cannot be disputed. Mr Cheselden having couched a boy of thirteen for a cataract, who had hitherto been blind, and thus at once having restored him to sight, curiously marked the progress of his mind upon that occasion. This youth, though he had been till then incapable of seeing, yet was not totally blind, but could tell day from night, as persons in his situation always may. He could also, with a strong light, distinguish black from white, and either from the vivid colour of scarlet: however he saw nothing of the form of bodies; and without a bright light, not even colours themselves. He was at first couched only in one of his eyes; and when he saw for the first time, he was so far from judging of distances, that he supposed his eye touched every object that he saw, in the same manner as his hands might be said to feel them. The objects that were most agreeable to him were such as were of plain surfaces and regular figures: though he could as yet make no judgment whatever of their different forms, nor give a reason why one pleased him more than another. Although he could form some idea of colours during his state of blindness, yet that was not sufficient to direct him at present; and he could scarcely be persuaded that the colours he now saw were the same with those he had formerly conceived such erroneous ideas of. He delighted most in green; but black objects as if giving him an idea of his former blindness, he regarded with

horror. He had, as was said, no idea of forms; and was unable to distinguish one object from another, though never so different. When those things were shown him, which he had been formerly familiarized to by his feeling, he beheld them with earnestness, in order to remember them a second time: but as he had too many to recollect at once, he forgot the greatest number; and for one he could tell, after seeing, there was a thousand he was totally unacquainted with. He was very much surprised to find, that those things and persons he loved best, were not the most beautiful to be seen; and even testified displeasure in not finding his parents so handsome as he conceived them to be. It was near two months before he could find that a picture resembled a solid body. Till then he only considered it as a flat surface variously shadowed; but when he began to perceive that these kind of shadings actually represented human beings, he then began to examine, by his touch whether they had not the usual qualities of such bodies, and was greatly surprised to find, what he expected a very unequal surface, to be smooth and even. He was then shown a miniature-picture of his father, which was contained in his mother's watch-case, and he readily perceived the resemblance; but asked with great astonishment, how so large a face could be contained in so small a compass? It seemed as strange to him, as if a bushel was contained in a pint vessel. At first he could bear but a very small quantity of light, and he saw every object much greater than the life; but in proportion as he saw objects that were really large, he seemed to think the former were diminished; and although he knew the chamber where he was contained in the house, yet, until he saw the latter, he could not be brought to conceive how a house could be larger than a chamber. Before the operation, he had no great expectations from the pleasure he should receive from a new sense; he was only excited by the hopes of being able to read and write; he said, for instance, that he could have no greater pleasure in walking in the garden with his sight, than he had without it, for he walked there at his ease, and was acquainted with all the walks. He remarked also, with great justice, that his former blindness gave him one advantage over the rest of mankind, which was that of being able to walk in the night with confidence and security. But when he began to make use of his new sense, he seemed transported beyond measure

He said, that every object was a new source of delight, and that his pleasure was so great as to be past expression. About a year after, he was brought to Epsom, where there is a very fine prospect, with which he seemed greatly charmed; and he called the landscape before him a new method of seeing. He was couched in the other eye, a year after the former, and the operation succeeded equally well: when he saw with both eyes, he said that objects appeared to him twice as large as when he saw but with one; however, he did not see them doubled, or, at least, he showed no marks as if he saw them so. Mr Cheselden mentions instances of many more that were restored to sight in this manner; they all seemed to concur in their perceptions with this youth; and they all seemed particularly embarrassed in learning how to direct their eyes to the objects they wished to observe.

In this manner it is that our feeling corrects the sense of seeing, and that objects which appear of very different sizes at different distances, are all reduced, by experience, to their natural standard. "But not the feeling only, but also the colour and brightness of the object, contributes, in some measure, to assist us in forming an idea of the distance at which it appears. [1] Those which we see most strongly marked with light and shade, we readily know to be nearer than those on which the colours are more faintly spread, and that, in some measure, take a part of their hue from the air between us and them.—Bright objects also are seen at a greater distance than such as are obscure, and, most probably, for this reason, that being less similar in colour, to the air which interposes, their impressions are less effaced by it, and they continue more distinctly visible. Thus a black and distant object is not seen so far off as a bright and glittering one, and a fire by night is seen much farther off than by day."

The power of seeing objects at a distance is very rarely equal in both eyes. When this inequality is in any great degree, the person so circumstanced then makes use only of one eye, shutting that which sees the least, and employing the other with all its power. And hence proceeds that awkward look which is known by the name of *strabism*.

1 Mr Buffon gives a different theory, for which I must refer the reader to the original. That I have given, I take to be easy and satisfactory enough.

There are many reasons to induce us to think that such as are near-sighted see objects larger than other persons; and yet the contrary is most certainly true, for they see them less. Mr Buffon informs us that he himself is short-sighted, and that his left eye is stronger than his right. He has very frequently experienced, upon looking at any object, such as the letters of a book, that they appear less to the weakest eye; and that when he places the book, so as that the letters appear double, the images of the left eye, which is strongest, are greater than those of the right, which is the most feeble. He has examined several others, who were in similar circumstances, and has always found that the best eye saw every object the largest. This he ascribes to habit; for near-sighted people being accustomed to come close to the object, and view but a small part of it at a time, the habit ensues, when the whole of an object is seen, and it appears less to them than to others.

Infants having their eyes less than those of adults, must see objects also smaller in proportion. For the image formed on the back of the eye will be large, as the eye is capacious; and infants having it not so great, cannot have so large a picture of the object. This may be a reason also why they are unable to see so distinctly, or at such distances, as persons arrived at maturity.

Old men, on the contrary, see bodies close to them very indistinctly, but bodies at a great distance from them with more precision; and this may happen from an alteration in the coats, or perhaps, humours of the eye; and not, as is supposed, from their diminution. The cornea, for instance, may become too rigid to adapt itself, and take a proper convexity for seeing minute objects; and its very flatness will be sufficient to fit it for distant vision.

When we cast our eyes upon an object extremely brilliant, or when we fix and detain them too long upon the same object, the organ is hurt and fatigued, its vision becomes indistinct, and the image of the body which has thus too violently or perseveringly employed us, is painted upon every thing we look at, and mixes with every object that occurs. "And this is an obvious consequence of the eye taking in too much light, either immediately, or by reflection. Every body exposed to the light, for a time, drinks in a quantity of its rays, which being brought into darkness, it cannot

instantly discharge. Thus the hand, if it be exposed to broad day-light for some time, and then immediately snatched into a dark room, will appear still luminous: and it will be some time before it is totally darkened. It is thus with the eye; which either by an instant gaze at the sun, or a steady continuance upon some less brilliant object, has taken in too much light; its humours are, for a while, unfit for vision, until that be discharged, and room made for rays of a milder nature." How dangerous the looking upon bright and luminous objects is to the sight may be easily seen, from such as live in countries covered for most part of the year with snow, who become generally blind before their time. Travellers who cross these countries are obliged to wear a crape before their faces, to save their eyes, which would otherwise be rendered totally unserviceable; and it is equally dangerous in the sandy plains of Africa. The reflection of the light is there so strong, that it is impossible to sustain the effect, without incurring the danger of losing one's sight entirely. Such persons, therefore, as read or write for any continuance, should choose a moderate light, in order to save their eyes; and all though it may seem insufficient at first, the eye will accustom itself to the shade, by degrees, and be less hurt by the want of light than the excess.

"It is, indeed, surprising how far the eye can accommodate itself to darkness, and make the best of a gloomy situation. When first taken from the light, and brought into a dark room, all things disappear; or, if any thing is seen, it is only the remaining radiations that still continue in the eye. But, after a very little time, when these are spent, the eye takes the advantage of the smallest ray that happens to enter; and this alone would, in time, serve for many of the purposes of life. There was a gentleman of great courage and understanding, who was a major under King Charles I; this unfortunate man, sharing in his master's misfortunes, and being forced abroad, ventured at Madrid to do his king a signal service; but unluckily failed in the attempt. In consequence of this, he was instantly ordered to a dark and dismal dungeon, into which the light never entered, and into which there was no opening but by a hole at the top, down which the keeper put his provisions, and presently closed it again on the other side. In this manner the unfortunate loyalist continued for some weeks, distressed and disconsolate; but at last

he began to think he saw some little glimmering of light. This internal dawn seemed to increase from time to time, so that he could not only discover the parts of his bed, and such other large objects, but, at length, he even began to perceive the mice that frequented his cell; and saw them as they ran about the floor, eating the crumbs of bread that happened to fall. After some months' confinement he was at last set free; but such was the effect of the darkness upon him, that he could not, for some days venture to leave his dungeon, but was obliged to accustom himself by degrees to the light of the day."

CHAP. VIII.

OF HEARING.[1]

As the sense of hearing, as well as of sight, gives us notice of remote objects, so, like that, it is subject to similar errors, being capable of imposing on us upon all occasions, where we cannot rectify it by the sense of feeling. We can have from it no distinct intelligence of the distance from whence a sounding body is heard; a great noise far off, and a small one very near, produce the same sensation: and unless we receive information from some other sense, we can never distinctly tell whether the sound be a great or a small one. It is not till we have learned, by experience, that the particular sound which is heard, is of a peculiar kind; then we can judge of the distance from whence we hear it. When we know the tone of the bell, we can then judge how far it is from us.

Every body that strikes against another produces a sound, which is simple, and but one in bodies which are not elastic, but which is often repeated in such as are. If we strike a bell, or a stretched string, for instance, which are both elastic, a single blow produces a sound, which is repeated by the undulations of the sonorous body, and which is multiplied as often as it happens to undulate or vibrate. These undulations each strike

1 This chapter is taken from Mr Buffon, except where marked by inver commas.

their own peculiar blow: but they succeed so fast, one behind the other, that the ear supposes them one continued sound: whereas, in reality, they make many. A person who should, for the first time, hear the toll of the bell, would, very probably, be able to distinguish these breaks of sound; and, in fact, we can readily ourselves perceive an intention and premission in the sound.

In this manner, sounding bodies are of two kinds; those unelastic ones, which, being struck, return but a single sound; and those more elastic, returning a succession of sounds; which uniting together, form a tone. This tone may be considered as a great number of sounds, all produced one after the other, by the same body, as we find in a bell, or the string of a harpsichord, which continues to sound for some time after it is struck. A continuing tone may also be produced from a non-elastic body, by repeating the blow quick and often, as when we beat a drum, or when we draw a bow along the string of a fiddle.

Considering the subject in this light, if we should multiply the number of blows, or repeat them at quicker intervals upon the sounding body, as upon the drum, for instance, it is evident that this will have no effect in altering the tone; it will only make it either more even, or more distinct. But it is otherwise, if we increase the force of the blow: if we strike the body with double weight, this will produce a tone twice as loud as the former. If, for instance, I strike a table with a switch, this will be very different from the sound produced by striking it with a cudgel. Hence, therefore, we may infer, that all bodies give a louder and graver tone, not in proportion to the number of times they are struck, but in proportion to the force that strikes them. And, if this be so, those philosophers who make the tone of a sonorous body, of a bell, or the string of a harpsichord, for instance, to depend upon the number only of its vibrations, and not the force, have mistaken what is only an effect for a cause. A bell, or an elastic string, can only be considered as a drum beaten; and the frequency of the blows can make no alteration whatever in the tone. The largest bells, and the longest and thickest strings, have the most forceful vibrations; and, therefore, their tones are the most loud and the most grave.

To know the manner in which sounds thus produced become pleasing, it must be observed, no one continuing tone, how loud and swelling soever, can give us satisfaction; we must have a

succession of them, and those in the most pleasing proportion. The nature of this proportion may be thus conceived. If we strike a body incapable of vibration with a double force, or, what amounts to the same thing, with a double mass of matter, it will produce a sound that will be doubly grave. Music has been said by the ancients to have been first invented from the blows of different hammers on an anvil. Suppose then we strike an anvil with a hammer of one pound weight, and again with a hammer of two pounds, it is plain that the two-pound hammer will produce a sound twice as grave as the former. But if we strike with a two-pound hammer, and then with a three-pound, it is evident that the latter will produce a sound one-third more grave than the former. If we strike the anvil with a three-pound hammer, and then with a four-pound, it will likewise follow that the latter will be a quarter part more grave than the former. Now, in the comparing between all those sounds, it is obvious that the difference between one and two is more easily perceived, than between two and three, three and four, or any numbers succeeding in the same proportion. The succession of sounds will be, therefore, pleasing in proportion to the ease with which they may be distinguished. That sound which is double the former, or, in other words, the octave to the preceding tone, will, of all others, be the most pleasing harmony. The next to that, which is as two or three, or, in other words, the third, will be most agreeable. And thus, universally, those sounds whose difference may be most easily compared, are the most agreeable.

"Musicians, therefore, have contented themselves with seven different proportions of sound, which are called *notes*, and which sufficiently answer all the purposes of pleasure. Not but that they might adopt a greater diversity of proportions; and some have actually done so; but, in these, the differences of the proportion are so imperceptible, that the ear is rather fatigued than pleased in making the distinction. In order, however, to give variety, they have admitted half tones; but in all the countries where music is yet in its infancy, they have rejected such; and they can find music in none but the obvious ones. The Chinese, for instance, have neither flats nor sharps in their music; but the intervals between their other notes, are in the same proportion with ours.

"Many more barbarous nations have their peculiar instru-

ments of music ; and, what is remarkable, the proportion between their notes is in all the same as in ours. This is not the place for entering into the nature of these sounds, their effects upon the air, or their consonances with each other. We are not now giving a history of sound, but of human perception.

" All countries are pleased with music ; and if they have not skill enough to produce harmony, at least they seem willing to substitute noise. Without all question, noise alone is sufficient to operate powerfully on the spirits ; and, if the mind be already p redisposed to joy, I have seldom found noise fail of increasing it into rapture. The mind feels a kind of distracted pleasure in such powerful sounds, braces up every nerve, and riots in the excess. But, as in the eye, an immediate gaze upon the sun will disturb the organs, so, in the ear, a loud unexpected noise disorders the whole frame, and sometimes disturbs the sense ever after. The mind must have time to prepare for the expected shock, and to give its organs the proper tension for its arrival.

" Musical sounds, however, seem of a different kind. Those are generally most pleasing which are most unexpected. It is not from bracing up the nerves, but from the grateful succession of the sounds, that these become so charming. There are few, how indifferent soever, but have at times felt their pleasing impression ; and, perhaps, even those who have stood out against the powerful persuasion of sounds, only wanted the proper tune, or the proper instrument, to allure them.

" The ancients give us a thousand strange instances of the effects of music, upon men and animals. The story of Arion's harp, that gathered the dolphins to the ship side, is well known ; and what is remarkable, Schotteus assures us,[1] that he saw a similar instance of fishes being allured by music. They tell us of diseases that have been cured, unchastity corrected, seditions quelled, passions removed, and sometimes excited even to madness. Dr Wallis has endeavoured to account for these surprising effects, by ascribing them to the novelty of the art. For my own part, I can scarcely hesitate to impute them to the exaggeration of the writers. They are as hyperbolical in the effects of their oratory ; and yet, we well know, there is nothing in the

[1] Quod oculis meis spectavi. Schotti Magic. universalis, pars. ii. lib. 1. p. 26.

orations which they have left us, capable of exciting madness, or of raising the mind to that ungovernable degree of fury which they describe. As they have exaggerated, therefore, in one instance, we may naturally suppose that they have done the same in the other; and, indeed, from the few remains we have of their music, collected by Meibomius, one might be apt to suppose there was nothing very powerful in what is lost. Nor does any one of the ancient instruments, such as we see them represented in statues, appear comparable to our fiddle.

"However this be, we have many odd accounts, not only among them, but the moderns, of the power of music; and it must not be denied, but that on some particular occasions, musical sounds may have a very powerful effect. I have seen all the horses and cows in a field, where there were above a hundred, gathered round a person that was blowing a French horn, and seeming to testify an awkward kind of satisfaction. Dogs are well known to be very sensible of different tones in music; and I have sometimes heard them sustain a very ridiculous part in a concert, where their assistance was neither expected nor desired.

"We are told of Henry IV. of Denmark,[1] that being one day desirous of trying in person whether a musician, who boasted that he could excite men to madness, was not an impostor, he submitted to the operation of his skill: but the consequence was much more terrible than he expected; for, becoming actually mad, he killed four of his attendants in the midst of his transports. A contrary effect of music we have,[2] in the cure of a madman of Alais, in France, by music. This man, who was a dancing-master, after a fever of five days, grew furious, and so ungovernable that his hands were obliged to be tied to his sides: what at first was rage, in a short time was converted into silent melancholy, which no arts could exhilarate, nor no medicines remove. In this sullen and dejected state, an old acquaintance accidentally came to inquire after his health; he found him sitting up in bed, tied, and totally regardless of every external object round him. Happening, however, to take up a fiddle that lay in the room, and touching a favourite air, the poor madman instantly seemed to brighten up at the sound; from a recumbent posture, he began to sit up; and, as the musician continued

1 Olai Magni, l. 15. hist. c. 28. 2 Hist. de Acad. 1708. p. 22.

playing, the patient seemed desirous of dancing to the sound: but he was tied, and incapable of leaving his bed, so that he could only humour the tune with his head, and those parts of his arms which were at liberty. Thus the other continued playing, and the dancing-master practised his own art, as far as he was able, for about a quarter of an hour, when suddenly falling into a deep sleep, in which his disorder came to a crisis, he awaked perfectly recovered.

"A thousand other instances might be added, equally true: let it suffice to add one more, which is not true; I mean that of the tarantula. Every person who has been in Italy now well knows, that the bite of that animal, and its being cured by music, is all a deception. When strangers come into that part of the country, the country people are ready enough to take money for dancing to the tarantula. A friend of mine had a servant who suffered himself to be bit; the wound, which was little larger than the puncture of a pin, was uneasy for a few hours, and then became well without any farther assistance. Some of the country people, however, still make a tolerable livelihood of the credulity of strangers, as the musician finds his account in it not less than the dancer."

Sounds, like light, are not only extensively diffused, but are frequently reflected. The laws of this reflection, it is true, are not as well understood as those of light; all we know is, that sound is principally reflected by hard bodies; and their being hollow, also, sometimes increases the reverberation. "No art, however, can make an echo; and some who have bestowed great labour and expense upon such a project, have only erected shapeless buildings, whose silence was a mortifying lecture upon their presumption."

The internal cavity of the ear seems to be fitted up for the purpose of echoing sound with the greatest precision. This part is fashioned out of the temporal bone, like a cavern cut into a rock. "In this the sound is repeated and articulated; and, as some anatomists tell us, (for we have as yet but very little knowledge on this subject,) is beaten against the tympanum, or drum of the ear, which moves four little bones joined thereto; and these move and agitate the internal air which lies on the other side; and lastly, this air strikes and affects the auditory nerves, which carry the sound to the brain."

One of the most common disorders in old age is deafness; which probably proceeds from the rigidity of the nerves in the labyrinth of the ear. This disorder, also, sometimes proceeds from a stoppage of the wax, which art may easily remedy. In order to know whether the defect be an internal, or an external one, let the deaf person put a repeating watch into his mouth, and if he hears it strike, he may be assured that his disorder proceeds from an external cause, and is, in some measure, curable: "for there is a passage from the ears into the mouth, by what anatomists call the *eustachian tube;* and, by this passage, people often hear sounds, when they are utterly without hearing through the larger channel: and this also is the reason that we often see persons who listen with great attention, hearken with their mouths open, in order to catch all the sound at every aperture."

It often happens, that persons hear differently with one ear from the other; and it is generally found that these have what is called, by musicians, *a bad ear.* Mr Buffon, who has made many trials upon persons of this kind, always found that their defect in judging properly of sounds proceeded from the inequality of their ears; and receiving by both, at the same time, unequal sensations, they form an unjust idea. In this manner, as those people hear false, they also, without knowing it, sing false. Those persons also frequently deceive themselves with regard to the side from whence the sound comes, generally supposing the noise to come on the part of the best ear.

Such as are hard of hearing, find the same advantage in the trumpet made for this purpose, that short-sighted persons do from glasses. These trumpets might be easily improved so as to increase sounds, in the same manner that the telescope does objects; however, they could be used to advantage only in a place of solitude and stillness, as the neighbouring sounds would mix with the more distant, and the whole would produce in the ear nothing but tumult and confusion.

Hearing is a much more necessary sense to man than to animals. With these it is only a warning against danger, or an encouragement to mutual assistance. In man, it is the source of most of his pleasure; and without which the rest of his senses would be of little benefit. A man born deaf, must necessarily be dumb; and his whole sphere of knowledge must be bounded

only by sensual objects. We have an instance of a young man, who, being born deaf, was restored at the age of twenty-four to perfect hearing: the account is given in the Memoirs of the Academy of Sciences, 1703, page 18.

A young man, of the town of Chartres, between the age of twenty-three and twenty four, the son of a tradesman, and deaf and dumb from his birth, began to speak all of a sudden, to the great astonishment of the whole town. He gave them to understand, that about three or four months before, he had heard the sound of the bells for the first time, and was greatly surprised at this new and unknown sensation. After some time, a kind of water issued from his left ear, and he then heard perfectly well with both. During these three months, he was sedulously employed in listening, without saying a word, and accustoming himself to speak softly (so as not to be heard) the words pronounced by others. He laboured hard also in perfecting himself in the pronunciation, and in the ideas attached to every sound. At length, having supposed himself qualified to break silence, he declared, that he could now speak, although as yet but imperfectly. Soon after, some able divines questioned him concerning his ideas of his past state; and principally with respect to God, his soul, the morality or turpitude of actions. The young man, however, had not driven his solitary speculations into that channel. He had gone to mass indeed with his parents, and learned to sign himself with the cross, to kneel down and assume all the grimaces of a man that was praying; but he did all this without any manner of knowledge of the intention or the cause; he saw others do the like, and that was enough for him; he knew nothing even of death, and it never entered into his head; he led a life of pure animal instinct; entirely taken up with sensible objects, and such as were present, he did not seem even to make as many reflections upon these, as might reasonably be expected from his improving situation: and yet the young man was not in want of understanding; but the understanding of a man deprived of all commerce with others, is so very confined, that the mind is in some measure totally under the control of its immediate sensations.

Notwithstanding, it is very possible to communicate ideas to deaf men, which they previously wanted, and even give them very precise notions of some abstract subjects, by means of signs

and of letters. A person born deaf, may, by time, and sufficient pains, be taught to write and read, to speak, and by the motions of the lips, to understand what is said to him;* however, it is probable that, as most of the motions of speech are made within the mouth by the tongue, the knowledge from the motion of the lips is but very confined; "nevertheless, I have conversed with a gentleman thus taught, and in all the commonly occurring questions, and the usual salutations, he was ready enough, merely by attending to the motion of the lips alone. When I ventured to speak for a short continuance, he was totally at a loss, although he understood the subject, when written, extremely well." Persons taught in this manner, were at first considered as prodigies; but there have been so many instances of success of late, and so many are skilful in the art of instructing in this way, that though still a matter of some curiosity, it ceases to be an object of wonder.†

* Mr Thomas Braidwood, late of Edinburgh, was perhaps the first who ever brought this surprising art to any degree of perfection. He began with a single pupil in 1764, and after that period taught great numbers of people born deaf, to speak distinctly, to read, to write, to understand figures, the principles of religion and morality, &c.

† In the Transactions of the Royal Society of Edinburgh, Professor Stewart gives an interesting account of a boy born blind and deaf.

James Mitchell, the son of a clergyman lately deceased, in the county of Nairn in Scotland, was born on the 11th November, 1795. His mother soon noticed his blindness, from his discovering no desire to turn his eyes to the light, or to any bright object; and in early infancy also she ascertained his deafness, from observing that the loudest noises did not disturb his sleep. The deafness was from the beginning complete; but the defect of sight, as in other cases of cataract, did not amount to a total absence of vision. At the time of life when this boy began to walk, he seemed to be attracted by bright and dazzling colours; and though every thing connected with his history appears to prove that he derived little *information* from that organ, yet he received from it much *sensual gratification*. He used to hold between his eye and luminous objects, such bodies as he had found to increase, by their interposition, the quantity of light; and it was one of his chief amusements, to concentrate the sun's rays by means of pieces of glass, transparent pebbles, or similar substances, which he held between his eye and the light, and turned about in various directions

He early showed an extraordinary acuteness of the senses of touch and smell. When a stranger arrived, his smell immediately and invariably informed him of the circumstance, and directed him to the place where the stranger was, whom he proceeded to *survey* by the sense of touch. In the remote situation where he resided, male visitors were most frequent; and, therefore, the first thing he generally did, was to examine whether or not the stranger wore boots; if so he immediately went to the lobby, felt for,

CHAP. IX.

OF SMELLING, FEELING, AND TASTING.

An animal may be said to fill up that sphere, which he can reach by his senses; and is actually large in proportion to the sphere to which its organ extends. By sight, man's enjoyments are diffused into a wide circle; that of hearing, though less

and accurately examined his whip; then proceeded to the stable, and handled his horse with great care, and with the utmost seeming attention. It occasionally happened, that visitors arrived in a carriage; and, on such occasions, he never failed to go to the place where the carriage stood, examined the whole of it with much anxiety, and tried innumerable times the elasticity of the springs. In all this he was undoubtedly guided by the smell and touch only.

From his childhood he had been accustomed to strike his fore teeth with a key, or any instrument that gives a sharp sound. His chief pleasures were obviously derived from taste and smell; and he often eat with a disagreeable voracity. He found amusement also in the exercise of touch; and often employed himself for hours, in gathering from the bed of a river, round and smooth stones, which he afterwards arranged in a circular form, seating himself in the midst of the circle. He explored by touch a space of about two hundred yards round the parsonage, to every part of which he walked fearlessly, and without a guide; and scarcely a day elapsed in which he did not cautiously feel his way into ground which he had not explored before. In one of these excursions of discovery, his father observed him creeping on his hands and knees, along a narrow wooden bridge which crossed a neighbouring river, at a point where the stream was deep and rapid. He was immediately stopped; and to deter him from the repetition of such perilous experiments, he was once or twice plunged into the river, which had the desired effect. The servants were instructed to prevent his visits to the horses of strangers in the stable; and after his wishes in this respect had been repeatedly thwarted, he had the ingenuity to lock the door of the kitchen on the servants, in the hopes that he might accomplish unmolested his visits to the stable. The information of his understanding and the guidance of his conduct, seemed entirely to depend either on touch, or on the organs of smell and taste, which, in perfectly formed men, have almost dwindled into mere instruments of sensual gratification. His docility and contrivance often indicated a degree of understanding which (if due allowance be made for his privations) was superior to that of many in whom every inlet is unobstructed through which the materials of knowledge enter the mind. He had received a severe wound in his foot, and during its cure, he usually sat by the fire-side, with his foot resting on a small foot-stool. More than a year afterwards, a servant boy with whom he used to play, was obliged to confine himself to a chair from a similar cause. Young Mitchell perceiving that his companion remained longer in one situation than he used to do, examined him attentively

widely diffused, nevertheless extends his powers ; the sense of smelling is more contracted still ; and the taste and touch are the most confined of all. Thus man enjoys very distant objects but with one sense only ; more nearly he brings two senses at once to

and seemed quickly to discover by the bandages on his foot, the reason of his confinement. He immediately walked up stairs to a garret, sought out, amidst several other pieces of furniture, the little foot-stool which had formerly supported his own wounded limb, brought it down in his hand to the kitchen, and gently placed the servant-boy's foot upon it.

Having appeared to distinguish, by feeling, a horse which his mother had sold a few weeks before, the rider dismounted to put his knowledge to the test, and MITCHELL immediately led the horse to his mother's stable, took off his saddle and bridle, put corn before him, and then withdrew, locking the door, and putting the key in his pocket. He knew the use of most ordinary utensils ; and was pleased with every addition which he made to this sort of knowledge. One of his amusements was, to visit the shops of carpenters and other mechanics, obviously with a view to understand the nature of their tools and operations. He assisted the farm servants, to whom he was attached, in their work, particularly in cleaning the stable. He himself endeavoured to repair breaches in the farm houses, and even attempted to build small houses with turf, leaving little openings like windows. Means were used to teach him to make baskets ; but he seemed to want the perseverance necessary to finish his work.

His sister devised some means for establishing that communication between him and other beings, from which nature seemed for ever to have cut him off. By various modifications of touch, she conveyed to him her satisfaction or displeasure at his conduct. Touching his head with her hand was her principal method. This she did with various degrees of force, and in various manners ; and he readily understood the intimation intended to be conveyed. When she signified her highest approbation, she patted him much, and cordially, on the head, back, or hand. This expression more sparingly used, signified simple assent, and she only refused him these signs of her approbation entirely, and repelled him gently, to convey to him in the most effectual manner the notice of her displeasure. In this manner she contrived a language of touch, which was not only the means of communication, but the instrument of some moral discipline. To supply its obvious and great defects she had recourse to a language of *action*, representing those ideas which none of the simple natural signs cognizable by the sense of touch could convey. When his mother was from home, his sister allayed his anxiety for her return, by laying his head gently down on a pillow once for each night that his mother was to be absent ; implying that he would sleep so many times before her return, It was once signified to him that he must wait two days for a suit of new clothes, and this also was effectually done by shutting his eyes and bending down his head twice. In the mode of communicating his ideas to others, there was a very remarkable peculiarity. When he wished for meat, he pointed to the place where he knew it to be : and when he was desirous of informing his friends that he was going to a shoemaker's shop, he imitated the action of making shoes. But though no information was intentionally communicated to him without touching some part of his

bear upon them ; his sense of smelling assists the other two, at its own distance ; and of such objects, as a man, he may be said to be in perfect possession.

Each sense, however, the more it acts at a distance, the more

body, he did not attempt, in any of these cases, to touch that of others. To say that he addressed these signs to their sight would be incorrect; but he must have been conscious that they were endowed with some means of interpreting signs, without contact, by an incomprehensible faculty which nature had refused to him.

He seems to have had no conception of any beings superior to human, and was consequently without any appearance of those religious feelings which are among the most general characteristics of our species. His only attempts at utterance were the uncouth bellowings by which he sometin es laboured to vent that violent anger to which his situation rendered him prone. His tears were most commonly shed from disappointment in his wishes; but they sometimes flowed from affectionate sorrow. No account of any being, doomed from birth to a privation so nearly complete both of sight and hearing, has hitherto been discovered in the records of science. The case of MITCHELL must therefore be regarded as among the most interesting anomalies in the natural history of the human species.

As the materials of all human thought and reasoning enter the mind, or arise in it at a period which is prior to the operation of memory, and under the simultaneous action of *all* the senses, it is extremely difficult to ascertain what perceptions belong originally and exclusively to each of the organs of external sense. Our notion of every object is made up of the impressions which it makes on all the organs. Whatever may be thought of the mental act which originally unites these various impressions, it seems evident, that, in the actual state of every human understanding, the labour is to disunite them. Every common man thinks of them, and employs them in their compound state. To analyze them is an operation suggested by philosophy ; and which, in the usual state of things, must always be most imperfectly performed. A man who, from the beginning, had all his senses complete, must have had all these impressions ; and never can banish any of them from his mind. He can indeed attend to some of them so much more than to others, that he may seem to himself to exclude altogether that which he neglects. But to the perceptions of which he is conscious much will adhere, composed of ingre dients so minute and subtle, as to elude the power of will, and to escape the grasp of consciousness. He can approach analysis only by efforts of attention very imperfectly successful, and by suppositions often precarious ; and when pressed to their ultimate consequences, often also repugnant and inconceivable. For such purposes some philosophers have imagined intelligent beings with no other sense than that of vision ; and others have represented their own hypothesis respecting the origin and progress of perception under the history of a statue *successively* endowed with the various organs of sense. It is evident, however, that such suppositions can do no more than illustrate the peculiar opinions of the supposer, and cannot prove that which, in the nature of things, they presuppose. But when one inlet of perception is entirely blocked up, we then really see the variation in the state of the compound, produced by the absence of part of its ingredients ; and hence

capable it is of making combinations, and is, consequently, the more improveable. Refined imaginations, and men of strong minds, take more pleasure, therefore, in improving the delights of the distant senses, than in enjoying such as are scarce capable of improvement.

By combining the objects of the extensive senses, all the arts of poetry, painting, and harmony, have been discovered; but the closer senses, if I may so call them, such as smelling, tasting, and touching, are, in some measure, as simple as they are limited, and admit of little variety. The man of imagination makes a great and an artificial happiness by the pleasure of altering and combining; the sensualist just stops where he began, and cultivates only those pleasures which he cannot improve. The sensualist is contented with those enjoyments that are already made to his hand; but the man of pleasure is best pleased with growing happiness.

it has happened, that the cure and education of the deaf and blind, besides their higher character among the triumphs of civilized benevolence, acquire a considerable though subordinate value, as almost the only great experiments which metaphysical philosophy can perform. Even these experiments are incomplete. Knowledge, opinion, and prejudice, are infused into the blind through the ear; and when they are accustomed to employ the mechanism of language, they learn the use of words as signs of things unknown, and speak with coherence and propriety on subjects where they may have no ideas. To fix the limits of the thoughts of a blind man who hears and speaks, is a problem beyond the reach of our present attainments in philosophy. That Sanderson and Blacklock could use words correctly and consistently, without correspondent ideas, seems to be certain; but how far their privation of thought extended beyond the province of light and colours we do not seem yet to possess the means of determining. On the other hand, the deaf employ the sense of sight, the most rapid and comprehensive of the subordinate faculties, of the highest importance for the direct original information which it conveys, as well for the great variety of natural signs of which it takes cognizance, and for the conventional signs which the abbreviation of its natural language suppues. *Massieu*, evidently a mind of a far higher order than that of the poet or the mathematician whom we have mentioned, is also excluded from less knowledge; and if he were to reason on the theory of sound, there appears no ground for expecting that he might not employ his words with as much exactness as Sanderson displayed in the employment of algebraic signs. The information conveyed by the ear respecting the condition of outward objects, is comparatively small. But its great importance consists in being the organ which renders it possible to use a conventional language on an extensive scale, and under almost all circumstances. The eye is the grand interpreter of natural signs. A being almost entirely deprived of both, was a new object of philosophical examination; and the case could not have fallen into better hands than Dugald Stewart.

Of all the senses, perhaps, there is not one in which man is more inferior to other animals than in that of smelling. With man, it is a sense that acts in a narrow sphere, and disgusts almost as frequently as it gives him pleasure. With many other animals it is diffused to a very great extent; and never seems to offend them. Dogs not only trace the steps of other animals, but also discover them by the scent at a very great distance; and while they are thus exquisitely sensible of all smells, they seem no way disgusted by any.

But, although this sense is, in general, so very inferior in man, it is much stronger in those nations that abstain from animal food, than among Europeans. The Bramins of India have a power of smelling, as I am informed, equal to what it is in other creatures. They can smell the water which they drink, that to us seems quite inodorous; and have a word, in their language, which denotes a country of fine water. We are told also, that the negroes of the Antilles, by the smell alone, can distinguish between the footsteps of a Frenchman and a negro. It is possible, therefore, that we may dull this organ by our luxurious way of living; and sacrifice to the pleasures of taste, those which might be received from perfume.

However, it is a sense that we can, in some measure, dispense with; and I have known many that wanted it entirely, with but very little inconvenience from its loss In a state of nature it is said to be useful in guiding us to proper nourishment, and deterring us from that which is unwholesome; but, in our present situation, such information is but little wanted; and, indeed, but little attended to. In fact, the sense of smelling gives us very often false intelligence. Many things that have a disagreeable odour, are, nevertheless, wholesome and pleasant to the taste; and such as make eating an art, seldom think a meal fit to please the appetite, till it begins to offend the nose. On the other hand, there are many things that smell most gratefully, and yet are noxious, or fatal to the constitution. Some physicians think that perfumes in general are unwholesome; that they relax the nerves, produce headaches, and even retard digestion. The manchineel apple, which is known to be deadly poison, is possessed of the most grateful odour. Some of those mineral vapours that are often found fatal in the stomach, smell like the sweetest flowers, and continue thus to flatter

till they destroy. This sense, therefore, as it should seem, was never meant to direct us in the choice of food, but appears rather as an attendant than a necessary pleasure.

Indeed, if we examine the natives of different countries, or even different natives of the same, we shall find no pleasure in which they differ so widely as that of smelling. Some persons are pleased with the smell of a rose: while I have known others that could not abide to have it approach them. The savage nations are highly delighted with the smell of assafœtida, which is to us the most nauseous stink in nature. It would in a manner seem that our delight in perfumes was made by habit; and that a very little industry could bring us totally to invert the perception of odours.

Thus much is certain, that many bodies which at one distance are an agreeable perfume, when nearer are a most ungrateful odour. Musk and ambergrise, in small quantities, are considered by most persons as highly fragrant; and yet when in larger masses, their scent is insufferable. From a mixture of two bodies, each whereof is, of itself, void of all smell, a very powerful smell may be drawn. Thus, by grinding quick-lime with sal-ammoniac, may be produced a very fœtid mixture. On the contrary, from a mixture of two bodies, that are separately disagreeable, a very pleasant aromatic odour may be gained. A mixture of aqua-fortis with spirit of wine produces this effect. But not only the alterations of bodies by each other, but the smallest change in us, makes a very great alteration in this sense, and frequently deprives us of it totally. A slight cold often hinders us from smelling; and as often changes the nature of odours. Some persons, from disorder, retain an incurable aversion to those smells which most pleased them before: and many have been known to have an antipathy to some animals whose presence they instantly perceived by the smell. From all this, therefore, the sense of smelling appears to be an uncertain monitor, easily disordered, and not much missed when totally wanting.

The sense most nearly allied to smelling is that of tasting. This some have been willing to consider merely as a niser kind of touch, and have undertaken to account, in a very mechanical manner, for the difference of savour. "Such bodies," said they, "as are pointed, happening to be applied to the papillæ of the

tongue, excite a very powerful sensation, and give us the idea of saltness. Such, on the contrary, as are of a rounder figure, slide smoothly along the papillæ, and are perceived to be sweet." In this manner they have with minute labour, gone through the variety of imagined forms in bodies, and have given them as imaginary effects. All we can precisely determine upon the nature of tastes is, that the bodies to be tasted must be either somewhat moistened, or, in some measure, dissolved by the saliva, before they can produce a proper sensation: when both the tongue itself and the body to be tasted are extremely dry, no taste whatever ensues. The sensation is then changed; and the tongue, instead of tasting, can only be said, like any other part of the body, to feel the object.

It is for this reason that children have a stronger relish of taste than those who are more advanced in life. This organ with them, from the greater moisture of their bodies, is kept in greater perfection; and is, consequently, better adapted to perform its functions. Every person remembers how great a pleasure he found in sweets, while a child; but his taste growing more obtuse with age, he is obliged to use artificial means to excite it. It is then that he is found to call in the assistance of poignant sauces, and strong relishes of salts and aromatics; all which the delicacy of his tender organ in childhood was unable to endure. His taste grows callous to the natural relishes, and is artificially formed to others more unnatural; so that the highest epicure may be said to have the most depraved taste; as it is owing to the bluntness of his organ, that he is obliged to have recourse to such a variety of expedients to gratify his appetite.

As smells are often rendered agreeable by habit, so also tastes may be. Tobacco and coffee, so pleasing to many, are yet, at first, very disagreeable to all. It is not without perseverance that we begin to have a relish for them; we force nature so long, that what was constraint in the beginning, at last becomes inclination.

The grossest, and yet the most useful of all the senses, is that of feeling. We are often seen to survive under the loss of the rest; but of this we can never be totally deprived, but with life. Although this sense is diffused over all parts of the body, yet it most frequently happens that those parts which are most exercised in touching, acquire the greatest degree of accuracy.

Thus the fingers, by long habit, become greater masters in the art than any other, even where the sensation is more delicate and fine.[1] It is from this habit, therefore, and their peculiar formation, and not, as is supposed, from their being furnished with a greater quantity of nerves, that the fingers are thus perfectly qualified to judge of forms. Blind men, who are obliged to use them much oftener, have this sense much finer; so that the delicacy of the touch arises rather from the habit of constantly employing the fingers, than from any fancied nervousness in their confirmation.

All animals that are furnished with hands[2] seem to have more understanding than others. Monkeys have so many actions like those of men, that they appear to have similar ideas of the form of bodies. All other creatures, deprived of hands, can have no distinct ideas of the shape of the objects by which they are surrounded, as they want this organ, which serves to examine and measure their forms, their risings, and depressions. A quadruped, probably, conceives as erroneous an idea of any thing near him, as a child would of a rock or a mountain that it be held at a distance.

It may be for this reason, that we often see them frighted at things with which they ought to be better acquainted. Fishes, whose bodies are covered with scales, and who have no organs for feeling, must be the most stupid of all animals. Serpents, that are likewise destitute, are yet, by winding round several bodies, better capable of judging of their form. All these, however, can have but very imperfect ideas from feeling; and we have already seen, when deprived of this sense, how little the rest of the senses are to be relied on.

The feeling, therefore, is the guardian, the judge, and the examiner of all the rest of the senses. It establishes their information, and detects their errors. All the other senses are altered by time, and contradict their former evidence; but the touch still continues the same; and, though extremely confined in its operations, yet it is never found to deceive. The universe, to a man who had only used the rest of his senses, would be but a scene of illusion; every object misrepresented, and all its properties unknown. Mr Buffon has imagined a man just

1 Buffon, vol. vi. p. 80. 2 Ibid. vol. vi. p. 82.

newly brought into existence, describing the illusion of his first sensations, and pointing out the steps by which he arrived at reality. He considers him as just created, and awaking amidst the productions of nature; and, to animate the narrative still more strongly, has made his philosophical man a speaker. The reader will no doubt recollect Adam's speech in Milton as being similar. All that I can say to obviate the imputation of plagiarism is, that the one treats the subject more as a poet, the other more as a philosopher. The philosopher's man describes his first sensations in the following manner.[3]

I well remember that joyful anxious moment when I first became acquainted with my own existence. I was quite ignorant of what I was, how I was produced, or from whence I came. I opened my eyes; what an addition to my surprise! the light of the day, the azure vault of heaven, the verdure of the earth, the crystal of the waters, all employed me at once, and animated and filled me with inexpressible delight. I at first imagined that all those objects were within me, and made a part of myself.

Impressed with this idea, I turned my eyes to the sun; its splendour dazzled and overpowered me; I shut them once more; and, to my great concern, I supposed that during this short interval of darkness, I was again returning to nothing.

Afflicted, seized with astonishment, I pondered a moment on this great change, when I heard a variety of unexpected sounds. The whistling of the wind, and the melody of the groves, formed a concert, the soft cadence of which sunk upon my soul. I listened for some time, and was persuaded that all this music was within me.

Quite occupied with this new kind of existence, I had already forgotten the light, which was my first inlet into life; when I once more opened my eyes, and found myself again in possession of my former happiness. The gratification of the two senses at once, was a pleasure too great for utterance.

I turned my eyes upon a thousand various objects; I soon found that I could lose them, and restore them at will; and amused myself more at leisure with a repetition of this new-made power.

3 Buffon, vol. vi. p. 83.

I now began to gaze without emotion, and to hearken with tranquillity, when a light breeze, the freshness of which charmed me, wafted its perfumes to my sense of smelling, and gave me such satisfaction as even increased my self-love.

Agitated, roused by the various pleasures of my new existence, I instantly arose, and perceived myself moved along, as if by some unknown and secret power.

I had scarcely proceeded forward, when the novelty of my situation once more rendered me immoveable. My surprise returned; I supposed that every object around me had been in motion: I gave to them that agitation which I produced by changing place; and the whole creation seemed once more in disorder.

I lifted my hand to my head; I touched my forehead; I felt my whole frame: I then supposed that my hand was the principal organ of my existence; all its informations were distinct and perfect, and so superior to the senses I had yet experienced, that I employed myself for some time in repeating its enjoyments; every part of my person I touched, seemed to touch my hand in turn; and gave back sensation for sensation.

I soon found that this faculty was expanded over the whole surface of my body; and I now first began to perceive the limits of my existence, which I had in the beginning supposed spread over all the objects I saw.

Upon casting my eyes upon my body, and surveying my own form, I thought it greater than all the objects that surrounded me. I gazed upon my person with pleasure; I examined the formation of my hand, and all its motions; it seemed to me large or little in proportion as I approached it to my eyes; I brought it very near, and it then hid almost every other object from my sight. I began soon, however, to find that my sight gave me uncertain information, and resolved to depend upon my feeling for redress.

This precaution was of the utmost service; I renewed my motions, and walked forward with my face turned towards the heavens. I happened to strike lightly against a palm-tree, and this renewed my surprise: I laid my hand on this strange body; it seemed replete with new wonders, for it did not return me sensation for sensation, as my former feelings had done. I per-

ceived that there was something external, and which did not make a part of my own existence.

I now therefore, resolved to touch whatever I saw, and vainly attempted to touch the sun; I stretched forth my arm, and felt only yielding air: at every effort, I fell from one surprise into another, for every object appeared equally near me; and it was not till after an infinity of trials, that I found some objects farther removed than the rest.

Amazed with the illusions, and the uncertainty of my state, I sat down beneath a tree; the most beautiful fruits hung upon it within my reach; I stretched forth my hand, and they instantly separated from the branch. I was proud of being able to grasp a substance without me; I held them up, and their weight appeared to me like an animated power that endeavoured to draw them to the earth. I found a pleasure in conquering their resistance.

I held them near to eye; I considered their form and beauty; their fragrance still more allured me to bring them nearer; I approached them to my lips, and drank in their odours; the perfume invited my sense of tasting, and I soon tried a new sense—How new! how exquisite! Hitherto I had tasted only of pleasure; but now it was luxury. The power of tasting gave me the idea of possession.

Flattered with this new acquisition, I continued its exercise, till an agreeable languor stealing upon my mind, I felt all my limbs become heavy, and all my desires suspended. My sensations were now no longer vivid and distinct; but seemed to lose every object, and presented only feeble images, confusedly marked. At that instant I sunk upon the flowery bank, and slumber seized me. All now seemed once more lost to me. It was then as if I was returning to my former nothing. How long my sleep continued, I cannot tell; as I yet had no perception of time. My awaking appeared like a second birth; and I then perceived that I had ceased for a time to exist. This produced a new sensation of fear; and from this interruption in life, I began to conclude that I was not formed to exist for ever.

In this state of doubt and perplexity, I began to harbour new suspicions; and to fear that sleep had robbed me of some of my late powers; when turning on one side, to resolve my doubts, what was my amazement, to behold another being like myself.

stretched by my side! New ideas now began to arise; new passions, as yet unperceived, with fears and pleasures, all took possession of my mind, and prompted my curiosity: love served to complete that happiness which was begun in the individual; and every sense was gratified in all its varieties.

CHAP. X.

OF OLD AGE AND DEATH.[1]

Every thing in nature has its improvement and decay. The human form is no sooner arrived at its state of perfection, than it begins to decline. The alteration is at first insensible; and often several years are elapsed before we find ourselves grown old. The news of this disagreeable change too generally comes from without; and we learn from others that we grow old, before we are willing to believe the report.

When the body has come to its full height and is extended into its just dimensions, it then also begins to receive an additional bulk which rather loads than assists it. This is formed from fat; which generally at the age of thirty-five, or forty, covers all the muscles, and interrupts their activity. Every action is then performed with greater labour, and the increase of size only serves as a fore-runner of decay.

The bones also become every day more solid. In the embryo they are as soft almost as the muscles of the flesh; but by degrees they harden, and acquire their natural vigour; but still, howevever, the circulation is carried on through them, and how hard soever the bones may seem, yet the blood holds its current through them, as through all other parts of the body. Of this we may be convinced by an experiment, which was first accidentally discovered by our ingenious countryman, Mr Belcher. Perceiving at a friend's house, that the bones of hogs, which were fed upon madder, were red, he tried it upon various animals by mixing this root with their usual food; and he found

1 This chapter is taken from Mr Buffon, except where it is marked by inverted commas.

that it tinctured the bones in all; an evident demonstration that the juices of the body had a circulation through the bones. He fed some animals alternately upon madder and their common food, for some time, and he found their bones tinctured with alternate layers, in conformity to their manner of living. From all this he naturally concluded, that the blood circulated through the bones, as it does through every other part of the body; and that, how solid soever they seemed, yet like the softest parts, they were furnished through all their substance, with their proper canals. Nevertheless, these canals are of very different capacities, during the different stages of life. In infancy they are capacious; and the blood flows almost as freely through the bones as through any other part of the body: in manhood their size is greatly diminished; the vessels are almost imperceptible; and the circulation through them is proportionably slow. But, in the decline of life, the blood which flows through the bones, no longer contributing to their growth, must necessarily serve to increase their hardness. The channels that every where run through the human frame, may be compared to those pipes that we every where see crusted on the inside, by the water for a long continuance running through them. Both every day grow less and less, by the small rigid particles which are deposited within them. Thus as the vessels are by degrees diminished, the juices also, which were necessary for the circulation through them are diminished in proportion; till at length, in old age, those props of the human frame are not only more solid, but more brittle.

The cartilages, or gristles, which may be considered as bones beginning to be formed, grow also more rigid. The juices circulating through them, for there is a circulation through all parts of the body, every day contribute to render them harder; so that these substances, which in youth are elastic and pliant, in age become hard and bony. As these cartilages are generally placed near the joints, the motion of the joints also must of consequence become more difficult. Thus, in old age, every action of the body is performed with labour; and the cartilages, formerly so supple, will now sooner break than bend.

"As the cartilages acquire hardness, and unfit the joints for motion, so also that mucous liquor, which is always separated between the joints, and which serves, like oil to a hinge, to give

them an easy and ready play, is now grown more scanty. It becomes thicker and more clammy, more unfit for answering the purposes of motion; and from thence, in old age, every joint is not only stiff, but awkward. At every motion this clammy liquor is heard to crack; and it is not without the greatest effort of the muscles that its resistance is overcome. I have seen an old person, who never moved a single joint, that did not thus give notice of the violence done to it."

The membranes that cover the bones, the joints, and the rest of the body, become as we grow old, more dense and more dry. Those which surround the bones, soon cease to be ductile. The fibres, of which the muscles and flesh is composed, become every day more rigid; and while to the touch the body seems, as we advance in years, to grow softer, it is in reality, increasing in hardness. It is the skin, and not the flesh, that we feel upon such occasions. The fat, and the flabbiness of that, seems to give an appearance of softness, which the flesh itself is very far from having. There are few can doubt this, after trying the difference between the flesh of young and old animals. The first is soft and tender, the last is hard and dry.

The skin is the only part of the body that age does not contribute to harden. That stretches to every degree of tension; and we have horrid instances of its pliancy, in many disorders incident to humanity. In youth, therefore, while the body is vigorous and increasing, it still gives way to its growth. But, although it thus adapts itself to our increase; it does not in the same manner conform to our decay. The skin, which, in youth was filled and glossy, when the body begins to decline has not elasticity enough to shrink entirely with its diminution. It hangs therefore in wrinkles, which no art can remove. The wrinkles of the body, in general, proceed from this cause. But those of the face seem to proceed from another; namely, from the many varieties of positions into which it is put by the speech, the food, or the passions. Every grimace, and every passion, wrinkles up the visage into different forms. These are visible enough in young persons; but what at first was accidental or transitory, becomes unalterably fixed in the visage as it grows older. "From hence we may conclude, that a freedom from passions not only adds to the happiness of the mind, but pre-

serves the beauty of the face; and the person that has not felt their influence, is less strongly marked by the decays of nature."

Hence, therefore, as we advance in age, the bones, the cartilages, the membranes, the flesh, the skin, and every fibre of the body, become more solid, more brittle, and more dry. Every part shrinks, every motion becomes more slow: the circulation of the fluids is performed with less freedom; perspiration diminishes; the secretions alter; the digestion becomes slow and laborious; and the juices no longer serving to convey their accustomed nourishment, those parts may be said to live no longer when the circulation ceases. Thus the body dies by little and little; all its functions are diminished by degrees; life is driven from one part of the frame to another; universal rigidity prevails; and death at last seizes upon the little that is left.

As the bones, the cartilages, the muscles, and all other parts of the body, are softer in women than in men, these parts must, of consequence, require a longer time to come to that hardness which hastens death. Women, therefore, ought to be a longer time in growing old than men; and this is actually the case. If we consult the tables which have been drawn up respecting human life, we shall find that after a certain age, they are more long-lived than men, all other circumstances the same. A woman of sixty has a better chance than a man of the same age to live till eighty. Upon the whole, we may infer, that such persons as have been slow in coming up to maturity, will also be slow in growing old; and this holds as well with regard to other animals as man.

The whole duration of the life of either vegetables or animals, may be, in some measure, determined from their manner of coming to maturity. The tree or the animal, which takes but a short time to increase to its utmost pitch, perishes much sooner than such as are less premature. In both the increase upwards is first accomplished; and not till they have acquired their greatest degree of height do they begin to spread in bulk. Man grows in stature till about the age of seventeen; but his body is not completely developed till about thirty. Dogs on the other hand, are at their utmost size in a year, and become as bulky as they usually are in another. However, man, who is so long in growing, continues to live fourscore or a hundred years; but the dog seldom above twelve or thirteen. In general also it

may be said, that large animals live longer than little ones, as they usually take a longer time to grow. But in all animals one thing is equally certain, that they carry the cause of their own decay about them; and that their deaths are necessary and inevitable. The prospects which some visionaries have formed of perpetuating life by remedies, have been often enough proved false by their own example. Such unaccountable schemes would, therefore, have died with them, had not the love of life always augmented our credulity.

When the body is naturally well formed, it is possible to lengthen out the period of life for some years by management. Temperance in diet is often found conducive to this end. The famous Cornaro, who lived to above a hundred years, although his constitution was naturally feeble, is a strong instance of the benefit of an abstemious life. Moderation in the passions also may contribute to extend the term of our existence. "Fontenelle, the celebrated writer, was naturally of a very weak and delicate habit of body. He was affected by the smallest irregularities; and had frequently suffered severe fits of illness from the slightest causes. But the remarkable equality of his temper, and his seeming want of passion, lengthened out his life to above a hundred. It was remarkable of him, that nothing could vex or make him uneasy; every occurrence seemed equally pleasing; and no event, however unfortunate, seemed to come unexpected." However, the term of life can be prolonged but for a very little time by any art we can use. We are told of men who have lived beyond the ordinary duration of human existence; such as Parr, who lived to a hundred and forty-four; and Jenkins, to a hundred and sixty-five; yet these men used no peculiar arts to prolong life; on the contrary, it appears that these, as well as others, remarkable for their longevity, were peasants accustomed to the greatest fatigues, who had no settled rules of diet, but who often indulged in accidental excesses. Indeed, if we consider that the European, the Negro, the Chinese, and the American, the civilized man and the savage, the rich and the poor, the inhabitant of the city and of the country, though all so different in other respects, are yet entirely similar in the period allotted them for living; if we consider that neither the difference of race, of climate, of nourishment, of convenience, or of soil, makes any difference in the term of life; if we consider

that those men who live upon raw flesh, or dried fishes, upon sago, or rice, upon cassava, or upon roots, nevertheless live as long as those who are fed upon bread and meat; we shall readily be brought to acknowledge, that the duration of life depends neither upon habit, customs, or the quantity of food; we shall confess, that nothing can change the laws of that mechanism which regulates the number of our years, and which can chiefly be affected only by long fasting, or great excess.

If there be any difference in the different periods of man's existence, it ought principally to be ascribed to the quality of the air. It has been observed, that in elevated situations there have been found more old people than in those that were low. The mountains of Scotland, Wales, Auvergne, and Switzerland, have furnished more instances of extreme old age, than the plains of Holland, Flanders, Germany, or Poland. But, in general, the duration of life is nearly the same in most countries. Man, if not cut off by accidental diseases, is often found to live to ninety or a hundred years. Our ancestors did not live beyond that date: and, since the times of David, this term has undergone little alteration.

If we be asked, how in the beginning men lived so much longer than at present, and by what means their lives were extended to nine hundred and thirty, or even nine hundred and sixty years; it may be answered, that the productions of the earth, upon which they fed, might be of a different nature at that time from what they are at present. "It may be answered, that the term was abridged by Divine command, in order to keep the earth from being overstocked with human inhabitants; since, if every person were now to live and generate for nine hundred years, mankind would be increased to such a degree, that there would be no room for subsistence: so that the plan of Providence would be altered; which is seen not to produce life without providing a proper supply."

But to whatever extent life may be prolonged, or however some may have delayed the effects of age, death is the certain goal to which all are hastening. All the causes of decay which have been mentioned contribute to bring on this dreaded dissolution. However, nature approaches to this awful period by slow and imperceptible degrees; life is consumed day after day; and some one of our faculties, or vital principles, is every hour

dying before the rest; so that death is only the last shade in the picture; and it is probable that man suffers a greater change in going from youth to age, than from age into the grave. When we first begin to live, our lives may scarcely be said to be our own; as the child grows, life increases in the same proportion; and is at its height in the prime of manhood. But as soon as the body begins to decrease, life decreases also; for as the human frame diminishes, and its juices circulate in smaller quantity. life diminishes and circulates with less vigour; so that as we begin to live by degrees, we begin to die in the same manner.

Why then should we fear death, if our lives have been such as not to make eternity dreadful? Why should we fear that moment, which is prepared by a thousand other moments of the same kind? the first pangs of sickness being probably greater than the last struggles of departure. Death, in most persons, is as calmly endured as the disorder that brings it on. If we inquire from those whose business it is to attend the sick and the dying, we shall find that, except in a very few acute cases, where the patient dies in agonies, the greatest number die quietly, and seemingly without pain: and even the agonies of the former rather terrify the spectators than torment the patient; for how many have we not seen who have been accidentally relieved from this extremity, and yet had no memory of what they then endured? In fact, they had ceased to live during that time when they ceased to have sensation; and their pains were only those of which they had an idea.

The greatest number of mankind die, therefore, without sensation; and of those few that still preserve their faculties entire to the last moment, there is scarcely one of them that does not also preserve the hopes of still outliving his disorder. Nature, for the happiness of man, has rendered this sentiment stronger than his reason. A person dying of an incurable disorder, which he must know to be so, by frequent examples of his case; which he perceives to be so, by the inquietude of all around him, by the tears of his friends, and the departure or the face of the physician, is, nevertheless, still in hopes of getting over it. His interest is so great, that he only attends to his own representations; the judgment of others is considered as a hasty conclusion; and while death every moment makes new inroads upon his constitution, and destroys life in some part, hope still seems

to escape the universal ruin, and is the last that submits to the blow.

Cast your eyes upon a sick man, who has a hundred times told you that he felt himself dying, that he was convinced he could not recover, and that he was ready to expire; examine what passes on his visage, when through zeal or indiscretion, any one comes to tell him that his end is at hand. You will see him change, like one who is told an unexpected piece of news. He now appears not to have thoroughly believed what he had been telling you himself: he doubted much; and his fears were greater than his hopes; but he still had some feeble expectations of living, and would not have seen the approaches of death, unless he had been alarmed by the mistaken assiduity of his attendants.

Death, therefore, is not that terrible thing which we suppose it to be. It is a spectre which frights us at a distance, but which disappears when we come to approach it more closely. Our ideas of its terrors are conceived in prejudice, and dressed up by fancy: we regard it not only as the greatest misfortune, but as also an evil accompanied with the most excruciating tortures; we have even increased our apprehensions, by reasoning on the extent of our sufferings. "It must be dreadful," say some, "since it is sufficient to separate the soul from the body: it must be long, since our sufferings are proportioned to the succession of our ideas; and these being painful, must succeed each other with extreme rapidity." In this manner has false philosophy laboured to augment the miseries of our nature; and to aggravate that period which Nature has kindly covered with insensibility. Neither the mind nor the body can suffer these calamities: the mind is, at that time, mostly without ideas; and the body too much enfeebled to be capable of perceiving its pain. A very acute pain produces either death or fainting, which is a state similar to death: the body can suffer but to a certain degree; if the torture become excessive, it destroys itself; and the mind ceases to perceive, when the body can no longer endure.

In this manner, excessive pain admits of no reflection; and wherever there are any signs of it, we may be sure that the sufferings of the patient are no greater that what we ourselves may have remembered to endure.

But, in the article of death, we have many instances in which

the dying person has shown that very reflection which presupposes an absence of the greatest pain; and, consequently, that pang which ends life cannot even be so great as those which have preceded. Thus, when Charles XII. was shot at the siege of Frederickshall, he was seen to clap his hand on the hilt of his sword; and although the blow was great enough to terminate one of the boldest and bravest lives in the world, yet it was not painful enough to destroy reflection. He perceived himself attacked; he reflected that he ought to defend himself; and his body obeyed the impulse of his mind, even in the last extremity. Thus it is the prejudice of persons in health, and not the body in pain, that makes us suffer from the approach of death; we have all our lives contracted a habit of making out excessive pleasures and pains; and nothing but repeated experience shows us how seldom the one can be suffered, or the other enjoyed to the utmost.

If there be any thing necessary to confirm what we have said concerning the gradual cessation of life, or the insensible approaches of our end, nothing can more effectually prove it than the uncertainty of the signs of death. If we consult what Winslow or Bruhier have said upon this subject, we shall be convinced, that between life and death the shade is so very undistinguishable, that even all the powers of art can scarcely determine where the one ends, and the other begins. The colour of the visage, the warmth of the body, the suppleness of the joints, are but uncertain signs of life still subsisting; while on the contrary, the paleness of the complexion, the coldness of the body, the stiffness of the extremities, the cessation of all motion, and the total insensibility of the parts, are but uncertain marks of death begun. In the same manner, also, with regard to the pulse and the breathing, these motions are often so kept under, that it is impossible to perceive them. By approaching a looking-glass to the mouth of the person supposed to be dead, people often expect to find whether he breathes or not. But this is a very uncertain experiment; the glass is frequently sullied by the vapour of the dead man's body; and often the person is still alive although the glass is no way tarnished. In the same manner, neither burning nor scarifying, neither noises in the ears nor pungent spirits applied to the nostrils, give certain signs of the discontinuance of life; and there are many instances of persons

who have endured them all, and afterwards recovered without any external assistance, to the astonishment of the spectators. How careful, therefore, should we be, before we commit those who are dearest to us to the grave, to be well assured of their departure: experience, justice, humanity, all persuade us not to hasten the funerals of our friends, but to keep their bodies unburied, until we have certain signs of their real decease.

CHAP. XI.

OF THE VARIETIES IN THE HUMAN RACE.*

HITHERTO we have compared man with other animals; we now come to compare men with each other. We have hitherto considered him as an individual, endowed with excellencies above the rest of the creation; we now come to consider the

* The indiscriminate sexual intercourse among the human race, and the consequent production of an offspring capable of propagation, seem to prove mankind to be but a single species. There are, however, certain hereditary conformations which give rise to peculiar distinctions among them, and constitute what are denominated *varieties*.

Among these varieties Goldsmith has enumerated six, but there are three which particularly merit attention, in consequence of the marked difference existing between them. These are, 1, the fair, or Caucasian variety; 2, the yellow, or Mongolian; 3, the Negro, or Ethiopian.

The Caucasian, to which Europeans belong, is chiefly distinguished by the beautiful form of the head, which approximates to a perfect oval. It is also remarkable for variations in the shade of the complexion, and colour of the hair. From this variety have sprung the most civilized nations, and such as have most generally exercised dominion over the rest of mankind.

The Mongolian variety is recognized by prominent cheek-bones, flat visage, narrow and oblique eyes, hair straight and black, scanty beard, and olive complexion. This race has formed mighty empires in China and Japan, and occasionally extended its conquests on this side of the Great Desert, but its civilization has long appeared stationary.

The negro race is confined to the south of Mount Atlas. Its characters are, black complexion, woolly hair, compressed cranium, and flattish nose. In the prominence of the lower part of the face, and the thickness of the lips, it manifestly approaches to the monkey tribe. The hordes of which this variety is composed have always remained in a state of complete barbarism.

The Caucasian variety derives its name from the group of mountains be

advantages which men have over men, and the various kinds with which our earth is inhabited.

If we compare the minute differences of mankind, there is scarce one nation upon the earth that entirely resembles ano-

tween the Caspian and the Black Sea, because tradition would seem to refer the origin of the people of this race to that part of the world. Thence, as from a central point, the different branches of this variety shot forth like the radii of a circle, and even at the present day we find its peculiar characteristics in the highest perfection among the people in the neighbourhood of Caucasus, the Georgians and Circassians, who are considered the handsomest natives of the earth. The principal branches of this race may be distinguished by the analogies of language. The Syrian division, directing its course southward, gave birth to the Assyrians, the Chaldeans, the untameable Arabs, destined to become for a period nearly masters of the world, the Phenicians, the Jews, and the Abyssinians, who were Arabian colonies, and the ancient Egyptians, who, in all probability, owe their origin to the same source. From this branch, always inclined to mysticism, have sprung those religions, the influence of which has proved the most widely extended and the most durable. Science and literature have flourished occasionally among these people, but always clothed in strange and mystic guise, and obscured by a highly figurative diction.

The Indian, German, and Pelasgic branch (for it is one and the same) is infinitely more extended than the preceding, and was subdivided at an earlier period. We may, notwithstanding, still recognise very numerous affinities between its four principal languages: these are the Sanscrit, at present the sacred language of the Hindoos, and parent of all the dialects of Hindostan; the ancient language of the Pelasgi, the common mother of the Greek, the Latin, of many tongues now extinct, and of all those spoken in the south of Europe; the Gothic or Teutonic, from which the languages of the north and north-west of Europe are derived, the German, Dutch, English, Danish, Swedish, &c.; lastly, the Sclavonian, from which come the languages of the north-east of Europe, as the Russian, Polish, Bohemian, &c.

This extensive and powerful branch of the Caucasian race may be placed with justice in the foremost rank of the sons of men. The nations which compose it have carried philosophy, science, and the arts to the greatest perfection, and for more than thirty ages have been the guardians and depositaries of human knowledge. Previously to its entrance, Europe had been occupied by the Celtic tribes, who came from the northward, and by the Cantabarians, who passed from Africa into Spain. The former, though once considerably extended, are confined at present to the most western extremities of Europe, and the latter are now nearly confounded among the numerous nations whose posterity are settled in the Spanish peninsula.

The origin of the ancient Persians is the same with that of the Indians, and their descendants at the present day bear the strongest marks of affinity with the European nations.

The Scythian or Tartarian branch, at first, extended towards the north and north-east of Asia. Accustomed to a vagabond and predatory life in those immense tracts of country, these wandering tribes left them only for the purpose of devastating the inheritance, and subverting the establishments of

ther; and there may be said to be as many different kinds of men as there are countries inhabited. One polished nation does not differ more from another, than the merest savages do from those savages that lie even contiguous to them; and

their more fortunate brethren. The Scythians, who at so remote a period of antiquity, made irruptions into upper Asia; the Parthians, who there destroyed the dominion of the Greeks and Romans; the Turks, who overturned the Saracen empire in Asia, and subdued in Europe the unhappy remnant of the Grecian people,—all sprang from this mighty branch of the Caucasian race.

The Finlanders and the Hungarians are hordes of the same division, seemingly strayed as it were into the midst of the Sclavonian and Teutonic nations. The north and the east of the Caspian Sea are still inhabited by people of the same origin, and who speak similar languages, but intermixed with a variety of petty nations of different descent, and discordant tongues. The Tartar people have remained unmixed longer than the rest, in the region extending from the mouth of the Danube to the further branch of the Irtisch, where they so long proved formidable to the Russian empire, though at length subjected to its sway. The Mongoles, however, in their conquests have mingled their blood with these nations, and we discover many traces of this intermixture more especially among the natives of lesser Tartary.

To the east of this Tartar branch of the Caucasian race, the Mongolian variety begins to be discovered, from which boundary it extends to the eastern ocean. Its branches the Calmucks, &c., are still wandering shepherds perpetually traversing the great desert. Thrice did these nations, under Attila, under Gengis, and under Tamerlane, spread far and wide the terror of their name. The Chinese belong to this variety, and are thought to have been the most early civilized, not only of this race, but of all the nations of the world. The Japanese and the Coreans, and almost all the hordes which extend to the north-east of Siberia, under the dominion of Russia, are in a great measure to be ranked under this division of mankind. With the exception of a few Chinese literati, the Mongolian nations are universally addicted to the different sects of the superstition of Fo. The origin of this mighty race seems to have been in the mountains of Altai, as that of ours was in the Caucasian. We cannot however trace the course and propagation of the branches of the one so well as those of the other. The history of these shepherd nations is as fugitive as their establishments. The records of the Chinese, confined to their own empire, throw but little light on the traditions of their neighbours; nor can the affinities of languages so little known lend much assistance to our researches, or direct our steps in this labyrinth of obscurity.

The languages of the north of the peninsula beyond the Ganges, and also that of Thibet, bear some resemblance to the Chinese, at least in their monosyllabic structure, and the people who speak them are not without traits of personal similarity to the other Mongole nations. But the south of this peninsula is inhabited by the Malays, a much handsomer people, whose race and language are spread over the sea-coast of all the islands of the Indian Archipelago, and through almost all the islands of the southern ocean. In the largest of the former, especially in the wild and uncultivated tracts, we find

it frequently happens that a river, or a mountain, divides two barbarous tribes that are unlike each other in manners, customs, features, and complexion. But these differences, however perceivable, do not form such distinctions as come within a general picture of the varieties of mankind. Custom, accident, or fashion, may produce considerable alterations in neighbouring nations; their being derived from ancestors of a different climate, or complexion, may contribute to make accidental distinctions, which every day grow less; and it may be said, that two neighbouring nations, how unlike soever at first, will assimilate by degrees; and by long continuance, the difference between them will at last become almost imperceptible. It is not, therefore, between contiguous nations we are to look for any strong marked varieties in the human species; it is by comparing the inhabitants of opposite climates and distant countries; those who live within the polar circles, with those beneath the equator; those that live on one side of the globe, with those that occupy the other.

Of all animals, the differences between mankind are the smallest. Of the lower races of creatures, the changes are so great as often entirely to disguise the natural animal, and to distort, or to disfigure, its shape. But the chief differences in man are rather taken from the tincture of his skin than the variety of his figure: as in all climates he preserves his erect deportment, and the marked superiority of his form. If we look round the

another race of men, with crisped hair, black complexion, negro countenance, and barbarous beyond measure. Those that are most known have received the name of Papuas, and it may be applied as a general denomination to them all.

It is not very easy to refer either the Malays, or the Papuas, to any one of the three grand varieties of mankind already described. It is a question, however, whether the former people can be accurately distinguished from their neighbours on either side; the Caucasian Hindoos on the one, and the Mongolian Chinese on the other. We scarcely find in them characteristics sufficiently striking for this purpose. Again, are the Papuas Negroes, who, in remote periods, may have lost their way upon the Indian ocean? We have neither figures nor descriptions sufficiently clear to reply to this question.

The natives of the north of both continents, the Samoiedes, the Laplanders, and the Esquimaux, spring, according to some authorities, from the Mongolian race. According to others, they are only degenerate off-shoots from the Scythian branch of the Caucasian variety.

world, there seem to be not above six[1] distinct varieties in the human species, each of which is strongly marked, and speaks the kind seldom to have mixed with any other. But there is nothing in the shape, nothing in the faculties, that shows their coming from different originals; and the varieties of climate, of nourishment, and custom, are sufficient to produce every change.

The first distinct race of men is found round the polar regions. The Laplanders, the Esquimaux Indians, the Samœid Tartars, the inhabitants of Nova Zembla, the Borandians, the Greenlanders, and the natives of Kamtschatka, may be considered as one peculiar race of people, all greatly resembling each other in their stature, their complexion, their customs, and their ignorance. These nations being under a rigorous climate, where the productions of nature are but few, and the provisions coarse and unwholesome, their bodies have shrunk to the nature of their food; and their complexions have suffered, from cold, almost a similar change to what heat is known to produce; their colour being a deep brown, in some places inclining to actual blackness. These, therefore, in general, are found to be a race of short stature and odd shape, with countenances as savage as their manners are barbarous. The visage in these countries, is large and broad, nose flat and short, the eyes of a yellowish brown, inclining to blackness, the eyelids drawn towards the temples, the cheek-bones extremely high, the mouth very large, the lips thick and turned outwards, the voice thin and squeaking, the head large, the hair black and straight, the colour of the skin of a dark grayish.[2] They are short in stature, the generality not being above four feet high, and the tallest not above five. Among all these nations the women are as deformed as the men, and resemble them so nearly, that one cannot at first distinguish the sexes among them.

These nations not only resemble each other in their deformity, their dwarfishness, the colour of their hair and eyes, but they have, in a great measure, the same inclinations, and the same manners, being all equally rude, superstitious, and stupid. The Danish Laplanders have a large black cat, to which they communicate their secrets, and consult in all their affairs. Among

1 I have taken four of these varieties from Linnæus; those of the Laplanders and Tartars from Mr Buffon.

2 Krantz

the Swedish Laplanders there is in every family a drum for consulting the devil; and although these nations are robust and nimble, yet they are so cowardly that they never can be brought in to the field. Gustavus Adolphus attempted to form a regiment of Laplanders, but he found it impossible to accomplish his design; for it should seem that they can live only in their own country, and in their own manner. They make use of skates, which are made of fir, of near three feet long, and half a foot broad; these are pointed and raised before, and tied to the foot by straps of leather. With these they skate on the icy snow, and with such velocity, that they very easily overtake the swiftest animals. They make use also of a pole, pointed with iron at one end, and rounded at the other. This pole serves to push them along, to direct their course, to support them from falling, to stop the impetuosity of their motion, and to kill that game which they have overtaken. Upon these skates they descend the steepest mountains, and scale the most craggy precipices: and in these exercises the women are not less skilful than the men. They have all the use of the bow and arrow, which seems to be a contrivance common to all barbarous nations; and which, however, at first, required no small skill to invent. They launch a javelin, also, with great force, and some say, that they can hit a mark no larger than a crown, at thirty yards distance, and with such force as would pierce a man through. They are all hunters; and particularly pursue the ermine, the fox, the ounce, and the martin, for the sake of their skins. These they barter with their southern neighbours, for brandy and tobacco; both which they are fond of to excess. Their food is principally dried fish, the flesh of rein-deers and bears. Their bread is composed of the bones of fishes, pounded and mixed with the inside tender bark of the pine-tree. Their drink is train-oil or brandy; and when deprived of these, water, in which juniper berries have been infused. With regard to their morals, they have all the virtues of simplicity, and all the vices of ignorance. They offer their wives and daughters to strangers; and seem to think it a particular honour if their offer be accepted. They have no idea of religion, or a Supreme Being; the greatest number of them are idolaters; and their superstition is as profound as their worship is contemptible. Wretched and ignorant as they are, yet they do not want pride; they set themselves far above the rest of man

kind; and Crantz assures us, that when the Greenlanders are got together, nothing is so customary among them as to turn the Europeans into ridicule. They are obliged, indeed, to yield them the pre-eminence in understanding and mechanic arts; but they do not know how to set any value upon these. They therefore count themselves the only civilized and well-bred people in the world; and it is common with them, when they see a quiet or a modest stranger, to say that he is almost as well bred as a Greenlander.

From this description, therefore, this whole race of people may be considered as distinct from any other.—Their long continuance in a climate the most inhospitable, their being obliged to subsist on food the most coarse and ill-prepared, the savageness of their manners, and their laborious lives, all have contributed to shorten their stature, and to deform their bodies. In proportion as we approach towards the north pole, the size of the natives appears to diminish, growing less and less as we advance higher, till we come to those latitudes that are destitute of all inhabitants whatsoever.

The wretched natives of these climates seem fitted by nature to endure the rigours of their situation. As their food is but scanty and precarious, their patience in hunger is amazing.[2] A man who has eaten nothing for four days can manage his little canoe in the most furious waves, and calmly subsist in the midst of a tempest that would quickly dash an European boat to pieces. Their strength is not less amazing than their patience: a woman among them will carry a piece of timber or a stone, near double the weight of what an European can lift. Their bodies are of a dark grey all over; and their faces brown or olive. The tincture of their skins partly seems to arise from their dirty manner of living, being generally daubed with train-oil; and partly from the rigours of climate, as the sudden alterations of cold and raw air in winter, and of burning heats in summer, shade their complexions by degrees, till in a succession of generations, they at last become almost black. As the countries in which these reside are the most barren, so the natives seem the most barbarous of any part of the earth. Their more southern neighbours of America, treat them with the same scorn that a polished

nation would treat a savage one; and we may readily judge of the rudeness of those manners, which even a nation of Canada can think more barbarous than his own.

But the gradations of nature are imperceptible; and, while the north is peopled with such miserable inhabitants, there are here and there to be found, upon the edges of these regions, people of a larger stature, and completer figure. A whole race of the dwarfish breed is often found to come down from the north, and settle more to the southward; and, on the contrary, it some times happens that southern nations are seen higher up, in the midst of these diminutive tribes, where they have continued for time immemorial. Thus the Ostiac Tartars seem to be a race that have travelled down from the north, and to be originally sprung from the minute savages we have been describing. There are also Norwegians and Finlanders, of proper stature, who are seen to inhabit in latitudes higher even than Lapland. These, however, are but accidental migrations, and serve as shades to unite the distinct varieties of mankind.

The second great variety in the human species, seem to be that of the Tartar race; from whence, probably, the little men we have been describing originally proceeded. The Tartar country, taken in general, comprehends the greatest part of Asia; and is, consequently, a general name given to a number of nations, of various forms and complexions. But, however they seem to differ from each other, they all agree in being very unlike the people of any other country. All these nations have the upper part of the visage very broad, and wrinkled even while yet in their youth. Their noses are short and flat, their eyes little, and sunk in their heads; and, in some of them, they are seen five or six inches asunder. Their cheek-bones are high, the lower part of their visage narrow, the chin long and advanced forward, their teeth of an enormous size, and growing separate from each other; their eyebrows thick, large, and covering their eyes; their eyelids thick, the face broad and flat, the complexion olive-coloured, and the hair black. They are of a middle size, extremely strong, and very robust. They have but little beard, which grows straggling on the chin. They have large thighs, and short legs. The ugliest of all are the Calmucks, in whose appearance there seems to be something frightful. They all lead an erratic life, remaining under tents of hair, or skins.

They live upon horse flesh, and that of camels, either raw or a little sodden between the horse and the saddle. They eat also fish dried in the sun. Their most usual drink is mares' milk, fermented with millet ground into meal. They all have the head shaven, except a lock of hair on the top, which they let grow sufficiently long to form into tresses, on each side of the face. The women, who are as ugly as the men, wear their hair, which they bind up with bits of copper, and other ornaments of a like nature. The majority of these nations have no religion, no settled notions of morality, no decency of behaviour. They are chiefly robbers; and the natives of Dagestan, who live near their more polished neighbours, make a traffic of Tartar slaves who have been stolen, and sell them to the Turks and the Persians. Their chief riches consist in horses, of which perhaps there are more in Tartary than in any other part of the world. The natives are taught by custom to live in the same place with their horses, they are continually employed in managing them, and at last bring them to such great obedience, that the horse seems actually to understand the rider's intention.

To this race of men, also, we must refer the Chinese and the Japanese, however different they seem in their manners and ceremonies. It is the form of the body that we are now principally considering; and there is, between these countries, a surprising resemblance. It is in general allowed, that the Chinese have broad faces, small eyes, flat noses, and scarce any beard; that they are broad and square-shouldered, and rather less in stature than Europeans. These are marks common to them and the Tartars, and they may, therefore, be considered as being derived from the same original. "I have observed," says Chardin, "that in all the people from the east and the north of the Caspian sea, to the peninsula of Malacca, that the lines of the face, and the formation of the visage, are the same. This has induced me to believe, that all these nations are derived from the same original, however different either their complexions, or their manners may appear; for as to the complexion, that proceeds entirely from the climate and the food; and as to the manners, these are generally the result of their different degrees of wealth or power." That they come from one stock, is evident also from this, that the Tartars who settle in China, quickly resemble the Chinese; and, on the contrary, the Chinese

who settle in Tartary soon assume the figure and the manners of the Tartars.

The Japanese so much resemble the Chinese, that one cannot hesitate to rank them in the same class. They only differ in being rather browner, as they inhabit a more southern climate. They are, in general, described as of a brown complexion, a short stature, a broad flat face, a very little beard, and black hair. Their customs and ceremonies are nearly the same; their ideas of beauty similar; and their artificial deformities of blackening the teeth, and bandaging the feet, entirely alike in both countries. They both, therefore, proceed from the same stock; and although they differ very much from their brutal progenitors, yet they owe their civilization wholly to the mildness of the climate in which they reside, and to the peculiar fertility of the soil. To this tribe, also, we may refer the Cochin Chinese, the Siamese, the Tonquinese, and the inhabitants of Arracan, Laos, and Pegu, who, though all differing from the Chinese and each other, nevertheless have too strong a resemblance not to betray their common original.

Another, which makes the third variety in the human species, is that of the southern Asiatics;* the form of whose features

* In the southern Asiatic, or East-Indian islands, there are two very different races of men; the first have a strong resemblance to the African Negroes, in the black colour, woolly hair, and general form of the face and skull. Their language, however, is different, and they have a copious beard. They have been considered as the aborigines of those islands, some of which they occupy altogether, but in others are found only in the mountainous and interior regions. They are met with in Sumatra, in Borneo, in the Moluccas, and the Philippines. They entirely occupy the Great Andaman Island, which Colonel Symes visited on his voyage to Ava. He describes the natives as very short, with slender limbs, large bellies, high shoulders, and large heads with woolly hair, flat noses, and thick lips. They are in a state of the most destitute misery and utter barbarism. Their persons, except in regard to beard, bespeak a descent from central Africa, but even conjecture can scarcely imagine when or how.

The rest of the people of these Indian islands are of a lighter colour, have the face more oval, the hair long, and superior figures. In their organization, language, and manners, they approximate to the natives of Malacca. They usually occupy the sea-coasts of these islands, but some of the smaller ones are entirely inhabited by them.

The Continent or Island of New Holland, for it will bear either of those appellatives with propriety, is certainly inhabited by various sets of people, as far at least as differences of general appearance, language, and territory constitute variety; but from our hitherto imperfect knowledge of this im-

and persons may be easily distinguished from those of the Tartar races. The nations that inhabit the peninsula of India, seem to be the principal stock from whence the inhabitants of the islands that lie scattered in the Indian ocean have been peopled. They

mense country, we know not to what extent these varieties run, more especially in the interior. The natives with whom we are best acquainted, inhabiting the vicinity of Botany Bay, Port Jackson, and Broken Bay, are in general of moderate stature, and ill made. Their limbs, almost universally, are very small and thin. The dwellers near the coast subsist almost exclusively on fish; those, on the other hand, who live in the woods are almost as exclusively carnivorous, but depend entirely for a supply to the uncertain produce of the chase, or rather to the casual surprise of opossums and small animals in the trees. The latter, Colonel Collins informs us, are observed to have longer arms than their compatriots of the coast The features of these people are generally pleasing, especially of the women, who are less deformed by the foreign ornament of a bone or reed thrust through the cartilage of the nose or ears Like the south Africans, and other savages, these people of both sexes anoint their bodies all over with oil or grease; a practice which probably originated as a protection against the attacks of stinging flies, musquitoes, and even the arid air. They also draw lines all over the face and body, on particular occasions of combat or ceremony, with coloured clay, in addition to the more permanent ornaments of scars or seams, the result of self-inflicted wounds. The males, on attaining the age of manhood, have one of the upper incisor teeth punched out, an operation performed on large numbers at a time and with the most ridiculous ceremonies. The women have the little finger of the right hand also mutilated by amputation of the two first phalanges. Their senses, in general, in common with all savages, are very acute; that of sight in particular has been observed with admiration by all Europeans who visit them. Parturition is also comparatively easy among their women, who are generally enabled in a few hours after to pursue their ordinary occupations. The colour of the natives in question is observed to vary, though the more than ordinary filth of some individuals among them may impart an unnatural blackness of the skin; generally the tint of the skin is that of copper when sufficiently cleansed to show it. Their hair is either curling or straight, not woolly like that of the negro. In a few it has been observed to have a reddish cast. In disposition, these savages evince the quality of general good nature, but occasionally deadly revenge, inflexible courage in bodily suffering, jealousy, idleness, independence, and cunning: to their previous bad qualities must also unhappily be added some that seem to result from their intercourse with the outcasts of European society, especially drunkenness, one of the greatest banes of civilized life. Their sorrow is evinced in the most poignant manner by tears and piercing cries; but the storm soon blows over, and their ordinary tone of mind is restored.

The inhabitants of New Zealand, (says Captain Cruise,) are in general tall, active, and well made; their colour is brown, with black hair, sometimes straight, and sometimes curling; and they have very fine teeth. There is a striking difference between the Rungateedas, that is, the chiefs and better class of people, in stature and cast, and those who are by birth *cookees*, or

are, in general, of a slender shape, with long straight black hair, and often with Roman noses. Thus they resemble the Europeans in stature and features; but greatly differ in colour and habit of body. The Indians are of an olive colour, and, in the more southern parts, quite black; although the word Mogul, in their language, signifies a white man. The women are extremely delicate, and bathe very often; they are of an olive colour, as well as the men: their legs and thighs are long, and their bodies short, which is the opposite to what is seen among the women of Europe. They are, as I am assured, by no means so fruitful as the European women; but they feel the pains of childbirth with much less sensibility, and are generally up and well the day following. In fact, these pains seem greatest in all countries where the women are most delicate, or the constitution

slaves. Many of the latter are almost black, and below the middle size. The New Zealanders exhibit as much variety in features as the Europeans; there is little national character in their countenances, which, before they come to the age for being tattooed, may be called regular and pleasing.

The natives of the Friendly Islands have a general resemblance to the New Zealanders, but are more civilized; they are of the ordinary European stature, though some are above six feet; their colour is a deep brown, verging in the better classes to a light olive; their features are various, and many have the true European cast of countenance; their hair is straight, thick, and strong. That they have made some progress in civilization is evident from the fact of their having terms to express numbers to 100,000.

The people of Otaheite, and the Society Isles, are the handsomest of the South Seas. The complexion of the higher orders is described as white, tinctured with a brownish yellow; and, in some of the women a blush is clearly distinguishable in the cheek. From this, we find among the lower orders all the intermediate hues down to the deepest brown; black is the usual colour of the hair, and of a fine texture, but brown, red, and flaxen hair has been observed among them; they are of the largest size of Europeans, and well-made; their features are good in general, but the nose is usually somewhat flattish; corpulence is common among them; their language is more harmonious, and their manners more refined than those of any other of the South Sea islanders.

The people of the Marquesas are considered the finest in the Southern Ocean; and in form are, perhaps, the finest in the world; their average stature is from five feet ten to six feet. The practice of tattooing makes the men appear dark, but the women and children are very fair; their hair, like ours, is of various colours, but red is not found among them.

It is said that the Otaheitan skull approximates to the Negro, while the colour so widely differs; on the contrary, the natives of the Friendly Islands, though very dark in colour, have more of the European cast of head and features.

enfeebled by luxury or indolence. The women of savage nations seem, in a great measure, exempt from painful labours; and even the hard-working wives of the peasants among ourselves, have this advantage from a life of industry, that their child-bearing is less painful. Over all India, the children arrive sooner at maturity, than with us of Europe. They often marry and consummate, the husband at ten years old, and the wife at eight; and they frequently have children at that age. However, the women who are mothers so soon, cease bearing before they are arrived at thirty; and at that time they appear wrinkled, and seem marked with all the deformities of age. The Indians have long been remarkable for their cowardice and effeminacy; every conqueror that has attempted the invasion of their country, having succeeded. The warmth of the climate entirely influences their manners; they are slothful, submissive, and luxurious; satisfied with sensual happiness alone, they find no pleasure in thinking; and contented with slavery, they are ready to obey any master. Many tribes among them eat nothing that has life; they are fearful of killing the meanest insect; and have even erected hospitals for the maintenance of all kinds of vermin. The Asiatic dress is a loose flowing garment, rather fitted for the purposes of peace and indolence, than of industry or war. The vigour of the Asiatics is, in general, conformable to their dress and nourishment; fed upon rice, and clothed in effeminate silk vestments, their soldiers are unable to oppose the onset of an European army; and from the times of Alexander to the present day, we have scarcely any instances of their success in arms. Upon the whole, therefore, they may be considered as a feeble race of sensualists, too dull to find rapture in any pleasures, and too indolent to turn their gravity into wisdom. To this class we may refer the Persians, and Arabians, and, in general, the inhabitants of the islands that lie scattered in the Indian ocean.

The fourth striking variety in the human species, is to be found among the negroes of Africa.* This gloomy race of

* In taking a glance at the population of the immense peninsula of Africa, the attention seems first naturally directed to what was once a most magnificent and important, though small, portion of it. The local situation of ancient Egypt, that great cradle of European civilization and learning, has, probably, induced the opinion, which has been very prevalent, that the en-

mankind is found to blacken all the southern parts of Africa, from eighteen degrees north of the line, to its extreme termination at the Cape of Good Hope. I know it is said, that the Caffres, who inhabit the southern extremity of that large continent, are not to be ranked among the negro race: however, the difference between them, in point of colour and features, is so small, that they may very easily be grouped in this general picture; and in the one or two that I have seen, I could not perceive the smallest difference. Each of the negro nations, it must be owned, differ from each other; they have their peculiar countries for beauty, like us; and different nations, as in Europe, pride themselves upon the regularity of their features. Those of Guinea, for instance, are extremely ugly, and have an insupportable scent; those of Mosambique are reckoned beautiful, and have no ill smell whatsoever. The negroes, in general, are of a black colour, with a smooth soft skin. This smoothness proceeds from the downy softness of the hair which grows upon it; the strength of which gives a roughness to the feel, in those of a white complexion. Their skins, therefore, have a velvet smoothness, and seem less braced upon the muscles than ours. The hair of their heads differs entirely from what we are accustomed to, being soft, woolly, and short. The beard also partakes of the same qualities; but in this it differs, that it soon turns gray, which the hair is seldom found to do; so that several are seen with white beards, and black hair, at the same time. Their eyes are generally of a deep hazel; their noses flat and short; their

lightened Egyptians were themselves Negroes, or from a Negro race. Physiology has, however, detected this error, for it is clear, from the examination and comparison of a great many skulls of Egyptian mummies, that these people belonged to the Caucasian division, and that their cranium and brain were very voluminous when compared with the existing African races. The fact is curious, as a collateral evidence of the position that a contrary form of head is incompatible, nationally speaking, with an enlarged mind. The Abyssinians appear to be a colony of the Arabians. So much of Africa as is within the torrid zone, is presumed to be in possession partially of the Moors, but very generally of the Negroes. Whatever individual instances may offer against the position, there seems great reason to conclude that it has pleased the Father of all to assign to these people a lower place in the intellectual scale, compared with others of their fellow men, especially when we advert to the stationary condition of their minds through so many ages. A physical obstacle to their progress seems to be a more natural solution of this problem, than any political or local circumstances we can imagine.

lips thick and tumid; and their teeth of an ivory whiteness. This their only beauty, however, is set off by the colour of their skin; the contrast between the black and white being the more observable. It is false to say that their features are deformed by art; since, in the negro children born in European countries the same deformities are seen to prevail; the same flatness in the nose; and the same prominence in the lips. They are in general said to be well shaped; but of such as I have seen, I never found one that might be justly called so; their legs being mostly ill formed, and commonly bending outward on the shin-bone. But it is not only in those parts of their bodies that are obvious, that they are disproportioned; those parts which among us are usually concealed by dress, with them are large and languid.[1] The women's breasts, after bearing one child, hang down below the navel; and it is customary with them to suckle the child at their backs, by throwing the breasts over the shoulder. As their persons are thus naturally deformed, at least to our imaginations, their minds are equally incapable of strong exertions. The climate seems to relax their mental powers still more than those of the body; they are, therefore, in general, found to be stupid, indolent, and mischievous. The Arabians themselves, many colonies of whom have migrated southward into the most inland parts of Africa, seem to have degenerated from their ancestors; forgetting their ancient learning, and losing their beauty, they have become a race scarcely any way distinguishable from the original natives. Nor does it seem to have fared otherwise with the Portuguese, who, about two centuries ago, settled along this coast. They also are become almost as black as the negroes, and are said by some to be even more barbarous.

The inhabitants of America make a fifth race, as different from all the rest in colour, as they are distinct in habitation.*

1 Linnæus, in prima linea sua, fœminas Africanas depingit sicut aliquid deforme in parte genitali gestantes, quod sinum pudoris nuncupat. Attamen nihil differunt a nostratibus in hac parte nisi quod labia pudendæ sint aliquantulum tumidiora. In hominibus etiam penis est longior et multo laxior.

* The American variety appears to form a link between the Caucasian and Mongolian, but approximating more to the latter. The skin is dark, with more or less of a copper tint. The hair is straight and black, the beard small, the forehead low, eyes dark and obliqne, face broad and prominent, and cheeks rounded. The features in general, particularly the nose, are

The natives of America (except in the northern extremity, where they resemble the Laplanders) are of a red or copper colour; and although, in the old world, different climates produce a variety of complexions and customs, the natives of the new continent seem to resemble each other in almost every respect. They are all nearly of one colour; all have black thick straight hair, and thin black beards; which, however, they take care to pluck out by the roots. They have, in general, flat

more distinct and projecting than in the Mongolian type. The mouth is large, and the lips are rather thick. Among the Americans, however, are found many deviations of colour and stature from this general character, though but few of structure and features. The people of Nootka Sound are nearly as light as Europeans, but of a dull paleness; so are some of the Peruvians. Mr Birkbeck observes that the natives of the western territory of the United States are various in complexion, some dark, some lighter, but he met with no examples of the copper colour among them. The Chilians are of a reddish brown, but clear; and a tribe of the province of Barva are red and white like ourselves.

The depressed forehead is a more general characteristic of all the American tribes; some of them, it is true, increase by art this natural peculiarity; but the character is prevalent among those who use no art to exaggerate it. A depressed forehead is always considered beautiful among them: the *Aztec* gods and heroes were thus represented by the Mexicans, who used no artificial means to flatten the cranium. There is strong reason to believe, especially from the approximation of the two continents, that the American race originates from the north-eastern Asiatics; traces of resemblance in language, strong and physical similarity, and local facilities of emigration, give countenance to this opinion.

There seems no just reason for separating the Esquimaux from the American variety, and classing them more particularly under the Mongolian; at least, no reason that would not justify a similar classification of the nations of the whole American continent. They resemble the Americans in general characteristic traits; and, in Terra del Fuego, and on the Mosquito shore, we find people exactly like them. With the physical characters of this arctic race, the late voyages to the Pole have made us tolerably acquainted. They have high cheek-bones, broad foreheads, and small eyes far apart. Their complexion is a dusky yellow, and some individuals are lighter than others, and exhibit some symptoms of red in the cheeks. Their stature is short, the average height of the males not being more than five feet five or six inches. The women are still less; their proportions are by no means robust, and they are remarkable for the smallness of their hands and feet. The Esquimaux are not very stupid, nor much distinguished for intelligence. They have very imperfect notions, if any, of a Supreme Being, and some rude ideas of a future state. They exhibit considerable ingenuity in the construction of their houses, their canoes, their clothes, and various implements. They appear remarkable, notwithstanding the severity of their climate, for longevity.

noses, with high cheek-bones, and small eyes; and these deformities of nature they endeavour to increase by art: they flatten the nose, and often the whole head of their children, while the bones are yet susceptible of every impression. They paint the body and face of various colours, and consider the hair upon any part of it, except the head, as a deformity which they are careful to eradicate. Their limbs are generally slighter made than those of the Europeans; and, I am assured, they are far from being so strong. All these savages seem to be cowardly; they seldom are known to face their enemies in the field, but fall upon them at an advantage; and the greatness of their fears serves to increase the rigours of their cruelty. The wants which they often sustain, make them surprisingly patient in adversity: distress, by being grown familiar, becomes less terrible; so that their patience is less the result of fortitude than of custom. They have all a serious air, although they seldom think; and, however cruel to their enemies, are kind and just to each other. In short, the customs of savage nations in every country are almost the same; a wild, independent, and precarious life, produces a peculiar train of virtues and vices: and patience and hospitality, indolence and rapacity, content and sincerity, are found not less among the natives of America, than all the barbarous nations of the globe.

The sixth and last variety of the human species, is that of the Europeans, and the nations bordering on them. In this class we may reckon the Georgians, Circassians, and Mingrelians, the inhabitants of Asia Minor, and the northern parts of Africa, together with a part of those countries which lie north-west of the Caspian sea. The inhabitants of these countries differ a good deal from each other; but they generally agree in the colour of their bodies, the beauty of their complexions, the largeness of their limbs, and the vigour of their understandings. Those arts which might have had their invention among the other races of mankind, have come to perfection there. In barbarous countries the inhabitants go either naked, or are awkwardly clothed in furs or feathers; in countries semi-barbarous, the robes are loose and flowing; but here the clothing is less made for show than expedition, and unites, as much as possible, the extremes of ornament and despatch.

To one or other of these classes we may refer the people of every country: and as each nation has been less visited by

strangers, or has had less commerce with the rest of mankind, we find their persons and their manners more strongly impressed with one or other of the characters mentioned above. On the contrary, in those places where trade has long flourished, or where enemies have made many incursions, the races are usually found blended, and properly fall beneath no one character. Thus, in the islands of the Indian ocean, where a trade has been carried on for time immemorial, the inhabitants appear to be a mixture of all the nations upon the earth; white, olive, brown, and black men, are all seen living together in the same city, and propagating a mixed breed, that can be referred to none of the classes into which naturalists have thought proper to divide mankind.

Of all the colours by which mankind is diversified, it is easy to perceive, that ours is not only the most beautiful to the eye, but the most advantageous. The fair complexion seems, if I may so express it, as a transparent covering to the soul; all the variations of the passions, every expression of joy or sorrow, flows to the cheek, and, without language, marks the mind. In the slightest change of health also the colour of the European face is the most exact index, and often teaches us to prevent those disorders that we do not as yet perceive; not but that the African black, and the Asiatic olive complexions, admit of their alterations also; but these are neither so distinct, nor so visible, as with us; and in some countries the colour of the visage is never found to change; but the face continues in the same settled shade in shame and in sickness, in anger and despair.

The colour, therefore, most natural to man, ought to be that which is most becoming; and it is found, that, in all regions, the children are born fair, or at least red, and that they grow more black, or tawny, as they advance in age. It should seem, consequently, that man is naturally white; since the same causes that darken the complexion in infants, may have originally operated, in slower degrees, in blackening whole nations. We could, therefore, readily account for the blackness of different nations, did we not see the Americans, who live under the line, as well as the natives of Negroland, of a red colour, and but a very small shade darker than the natives of the northern latitudes, in the same continent. For this reason, some have sought for other causes of blackness than the climate; and have endeavoured to

prove that the blacks are a race of people bred from one man, who was marked with accidental blackness. This, however, is but mere ungrounded conjecture: and, although the Americans are not so dark as the negroes, yet we must still continue in the ancient opinion, that the deepness of the colour proceeds from the excessive heat of the climate. For, if we compare the heats of Africa with those of America, we shall find they bear no proportion to each other. In America, all that part of the continent, which lies under the line, is cool and pleasant, either shaded by mountains, or refreshed by breezes from the sea. But in Africa, the wide tract of country that lies under the line is very extensive, and the soil sandy; the reflexion of the sun, therefore, from so large a surface of earth, is almost intolerable; and it is not to be wondered at, that the inhabitants should bear, in their looks, the marks of the inhospitable climate. In America, the country is but thinly inhabited; and the more torrid tracts are generally left desert by the inhabitants; for which reason they are not so deeply tinged by the beams of the sun. But in Africa the whole face of the country is fully peopled; and the natives are obliged to endure their situation, without a power of migration. It is there, consequently, that they are in a manner tied down to feel all the severity of the heat; and their complexions take the darkest hue they are capable of receiving. We need not, therefore, have recourse to any imaginary propagation, from persons accidentally black, since the climate is a cause obvious and sufficient to produce the effect.

In fact, if we examine the complexion of different countries, we shall find them darken in proportion to the heat of their climate; and the shades gradually to deepen as they approach the line. Some nations, indeed, may be found not so much tinged by the sun as others, although they lie nearer the line. But this ever proceeds from some accidental causes; either from the country lying higher, and consequently being colder; or from the natives bathing oftener, and leading a more civilized life. In general, it may be asserted, that as we approach the line, we find the inhabitants of each country grow browner, until the colour deepens into perfect blackness. Thus, taking our standard from the whitest race of people, and beginning with our own country, which, I believe, bids fairest for the pre-

eminence, we shall find the French, who are more southern, a slight shade deeper than we; going farther down, the Spaniards are browner than the French; the inhabitants of Fez darker than they; and the natives of Negroland the darkest of all. In what manner the sun produces this effect, and how the same luminary which whitens wax and linen, should darken the human complexion, is not easy to conceive. Sir Thomas Brown first supposed, that a mucous substance, which had something of a vitriolic quality, settled under the reticular membrane, and grew darker with heat. Others have supposed that the blackness lay in the epidermis, or scarf-skin, which was burnt up like leather. But nothing has been satisfactorily discovered upon the subject; it is sufficient that we are assured of the fact; and that we have no doubt of the sun's tinging the complexion in proportion to its vicinity.*

* The colouring matter is understood to reside in a membranous network of greater or less density extending over the surface of the body, called the rete mucosum. This is situated between the chorion or true skin and the cuticle. The rete mucosum, or, as it is sometimes called, the cutaneous reticle, consists of a fine texture of vessels, containing fluids of different shades in the black and tawny races. It seems, however, doubtful whether any such membrane for the deposition of colouring fluid exists in white men, though the varieties of fair and dark which we observe among them would seem to require some organization of this kind; nor does this theory sufficiently illustrate the occasional instances of pied or spotted men.

The human skin exhibits various shades of white, yellow, red, brown, and black. There is every possible intermediate shade between the fairest white and the deepest black, but no one gradation of colour is found in all the individuals of any nation. Generally speaking, however, we may refer all the national varieties of colour to the five following classes:—

1. White, accompanied with redness of cheeks.* This characterizes all the Europeans except the Laplanders, the Western Asiatics, and the Northern Africans. Considerable variety will be found to exist in the colour generally called white. The albino possesses a skin of a reddish or a dead white colour, with yellowish white or milk-white hair, and red or very light coloured eyes. The hair over the whole body is unusually soft and white, not of the hoary colour of age, nor the light yellow or flaxen tint of the fair-haired races. It is rather that sort of colour peculiar to a white horse. These peculiarities evidently arise from a deficiency in the colouring principle, which is much the same in the skin, hair, and eyes. The latter organs are in the albinos peculiarly sensible to the stimulus of light, in consequence

* Ruddy complexions have been occasionally observed among some of the other varieties. Among the mountaineers of Boolan by Capt. Turner, and the Esquimaux by Lieut. Chapell.

But we are not to suppose that the sun is the only cause of darkening the skin; the wind, extreme cold, hard labour, or coarse and sparing nourishment, are all found to contribute to this effect. We find the peasants of every country, who are

of the want of a black pigment, the office of which is to absorb its superfluous portions. Hence we find the eyelids of these people generally closed, and the eyes usually exhibiting some appearances of morbid phenomena. But in twilight, dusk, or even a close approach to darkness, they see remarkably well. This peculiarity exists from birth, never changes, and may be propagated by generation. Some would refer the albino variety to disease, but this notion appears incorrect, inasmuch as most of the individuals thus characterized are observed to be perfectly strong and healthy. This variety was first observed in the Africans, but it is far from being peculiar to that race. It has, however, never occurred except in detached instances, for though it is observed to be more prevalent in some parts of the world than others, the notion of entire albino tribes has been exploded. There is another race of men, with a remarkably fair complexion, yellow, flaxen, or red hair, and blue or gray eyes. In these persons the cutaneous capillaries are easily filled, and consequently they exhibit a general sanguineous tint, deeper and more florid in the face. The ancient and modern Germans belong to this variety, and generally the Danes, Dutch, Swedes, English, &c. Lastly, a race very extensive is found with skin of a brownish white, and dark brown or black hair. The Southern Europeans and Western Asiatics are of this character.

2. The second grand variety in human colour is yellow or olive. This characterizes all the Mongolian tribes, and, generally speaking, most of the natives of Upper Asia.

3. Is the red or copper colour, which in various shades is prevalent over the entire American continent, and chiefly confined to it.

4. Brown or tawny. This in lighter or darker variations belongs to the inhabitants of the peninsula of Malacca, and is extended through most of the islands of the Pacific Ocean.

5. Black, in an amazing variety of shades, characterizes all the African continent, the northern and southern parts excepted, New Holland, Van Dieman's Land, New Guinea, New Hebrides, and some other islands of the South Sea. It is mingled with the ordinary colour of the natives in Brazil, California, and India.

It is not to be supposed that these different colours, thus generally described, prevail each of them uniformly in all the individuals of the race; on the contrary, there are considerable gradations, and even tribes have been found among the Americans, and individuals are constantly produced in each respective race with characteristics approaching to those of some other Children born from an intermixture of different races hold generally a middle station between the two. Thus the Mulatto forms a medium between the African and European. The colour will be more or less dark according to the complexion of the European father or mother. The cheeks are not ruddy, and the hair is black and curled, but less short than the negroes The iris is always dark.

From the Europeans and Mulattoes proceed what are called Tercerons.

most exposed to the weather, a shade darker than the higher ranks of people. The savage inhabitants of all places are exposed still more, and therefore contract a still deeper hue; and this will account for the tawny colour of the North American

These generally resemble Europeans. The hair has nothing of the woolly curl, the skin has a slight brown tint, and the cheeks are red. The offspring of these last and the Europeans are not to be distinguished from our own race. An opposite course will reduce the Mulatto offspring to the characters of the negro, and by intermixture with the latter, the fourth generation will be perfectly black. From the native Indians and the Europeans are born Mestizos. They are much lighter than the Mulattoes, and often not distinguishable in colour from Europeans. The small beard, hands, and feet, and the obliquity of the eyes, mark their Indian blood. The offspring from them and European fathers are in all respects like the Europeans. From Negroes and Americans spring Zambos, resembling Mulattoes, but darker. Among the dark races are sometimes found persons spotted with white.

Under this head of colour we shall briefly notice the varieties in the hair, beard, and iris.

The structure and properties of the hair are closely allied to those of the skin, and it derives the means of its growth, and probably its colouring matter, from the cutaneous vessels. Each hair may be traced through the cuticle and surface of the cutis to a bulb partly in the chorion and partly in the cellular membrane. This bulb consists of a thick outer covering, in which the root of the hair and a vascular pulp by which the root is secreted, are contained. There is a close analogy between the skin and hair. The latter, in the albino, as before observed, is soft and white. A light complexion and thin skin are usually accompanied with fair or red hair, and darker hair usually belongs to a dark colour and thick skin. In the coloured varieties of the human race, the hair is black and always coarser than that of Europeans. In the spotted negroes the hair growing out of a white patch on the head, is white, a presumptive proof that the colouring matter of the skin and hair is the same. The principal differences in the hair are four. 1. Brownish, deviating into yellow or red, or into black. It is copious, long and soft, and characterizes the natives of the temperate climates of Europe, and somewhat stronger and darker belongs to the eastern Asiatics and northern Africans, and the Celtic and Slavonic races in Europe. 2. Black, strong, straight, and thin. This character of hair belongs to the American and Mongolian varieties. 3. A softer black, thick and curled, is found among the South-Sea Islanders. 4. Black and crisp, in all the negro tribes. It may be proper to notice here that the hair of the African has been ascertained to bear no resemblance to wool except in appearance, and that it has all the characters of true hair.

The above divisions hold good generally, but we find, as in colour so in hair, many individual exceptions in the different races. As great differences are observable in the various races in point of beard, as of hair generally. Most individuals of the dark races are remarkably deficient in this particular. The Mongolians have much less beard than the Europeans, and it grows after. The Calmucks have small and poor mustachios, and very little hair on the body. The Burats are nearly beardless, so are the Tungooses and

Indians. Although they live in a climate the same, or even more northerly than ours, yet they are found to be of complexions very different from those of Europe. But it must be considered, that they live continually exposed to the sun; that they use many methods to darken their skins by art, painting them with red ochre, and anointing them with the fat of bears. Had they taken, for a succession of several generations, the same precautions to brighten their colour that an European does, it is very probable that they would in time come to have similar complexions, and perhaps, dispute the prize of beauty.

The extremity of cold is not less productive of a tawny complexion than that of heat. The natives of the arctic circle, as was observed, are all brown; and those that lie most to the

other hordes of Eastern Siberia. The Chinese resemble the Mongolian tribes in this particular; but contrary to their practice the latter encourage the growth of beard. The custom of exterminating the beard and hair on the body is common among many of the dark nations, but this would not have been attempted and could not be executed if nature had furnished them in this article so plentifully as she has done the Europeans.

There has been much controversy whether the native Americans have beards or not; it is now completely ascertained that they have beards, but weak and imperfect, and that the practice of exterminating them is general. The genuine Negroes have very little beard or growth of hair over the body. But the South-Sea islanders are by no means deficient in these excrescences.

An analogy similar to that between the hair and skin exists between the latter and the iris of the eye. New born children in Europe have generally light eyes and hair, and both gradually darken in those of dark complexion. In old persons as the hair turns grey the eye loses a portion of its colour. In the albino there is an entire deficiency of proper colouring matter, so that the iris has a reddish hue from the colour of the blood in the capillaries. The same sympathetic variations in the skin, hair, and eyes are also observable in other animals.

The principal colours of the human eye are blue, passing to greyish in the lighter tints, a sort of obscure orange, a kind of middle tint between blue and orange, sometimes very green in red-haired persons; and lastly, brown, verging to hazel on the one side, and black on the other. To these the reddish eye of the albino may be added. These varieties occur constantly in individuals of the same race and family. Sometimes they are confined to particular tribes of the same nation. The Gothlanders of Sweden are described with light hair and greyish eyes. The Finlanders with yellow hair and brown eyes, and the Laplanders with both black. Blue eyes with yellow hair have always marked the Germanic tribes. Blue eyes with black or dark hair form a combination not uncommon among the tribes of Koordistan, and others of the Caucasian race, who inhabit elevated situations in Asia. The iris is dark in all the coloured varieties, but in the Negro it is so black as to be distinguished with difficulty from the pupil.

north are almost entirely black. In this manner both extremes are unfavourable to the human form and colour, and the same effects are produced under the poles that are found at the line.

With regard to the stature of different countries, that seems chiefly to result from the nature of the food, and the quantity of the supply. Not but that the severity of heat or cold, may, in some measure, diminish the growth, and produce a dwarfishness of make. But, in general, the food is the great agent in producing this effect; where that is supplied in large quantities, and where its quality is wholesome and nutrimental, the inhabitants are generally seen above the ordinary stature. On the contrary, where it is afforded in a sparing quantity, or very coarse, and void of nourishment in its kind, the inhabitants degenerate, and sink below the ordinary size of mankind. In this respect they resemble other animals, whose bodies, by proper feeding, may be greatly augmented. An ox, on the fertile plains of India, grows to a size four times as large as the diminutive animal of the same kind bred in the Alps. The horses bred in the plains are larger than those of the mountain. So it is with man; the inhabitants of the valley are usually found taller than those of the hill: the natives of the Highlands of Scotland, for instance, are short, broad, and hardy; those of the Lowlands are tall and shapely. The inhabitants of Greenland, who live upon dried fish and seals, are less than those of Gambia, or Senegal, where nature supplies them with vegetable and animal abundance.*

* In Europe the human stature varies from four feet and a half to six feet. Individuals of six feet and some inches are not uncommon. In various parts of the world, men have reached to the height of seven, eight, or nine feet; beyond this, the accounts seem fabulous: the large bones on which such stories have been founded, modern science has ascertained to belong to other animals. Among individual instances of diminutiveness in the human species, authentic accounts go as low as twenty-one inches. In the Caucasian variety there are no strongly marked national deviations from the ordinary stature. In some parts of Switzerland and Sweden, the natives are rather distinguished for height. The Finlanders are rather short. The Latin writers have remarked the stature of the ancient Germans; it is probable that they did not exceed the modern Germans in this particular. The Americans exhibit greater varieties in stature than the Europeans. The Peruvians are generally low, but well proportioned. The people of Terra del Fuego are small and ugly; so are the tribes of Nookta Sound. The Chaymas of South America are short, while the Payagnas, the Guayqnilits, and the Caribees are almost gigantic. Many of the Canadian tribes are very tall. The ac-

The form of the face seems rather to be the result of custom. Nations who have long considered some artificial deformity as beautiful, who have industriously lessened the feet or flattened the nose, by degrees begin to receive the impression they are taught to assume; and Nature, in a course of ages, shapes itself to the constraint, and assumes hereditary deformity. We find nothing more common in births, than for children to inherit sometimes even the accidental deformities of their parents. We have many instances of squinting in the father, which he received from fright or habit, communicated to the offspring; and I myself have seen a child distinctly marked with a scar, similar to one the father had received in battle. In this manner, accidental deformities may become natural ones; and by assiduity may be continued, and even increased, through successive generations. From this, therefore, may have arisen the small eyes and long ears of the Tartar and Chinese nations. From hence originally may have come the flat noses of the blacks, and the flat heads of the American Indians.*

counts of travellers respecting the Patagonians have been various and contradictory; from a careful comparison of statements, we conclude the average height of this nation to be from five feet ten inches to six feet and a half. Similar differences occur in the Ethiopian variety. The Negroes generally correspond in stature with Europeans; the Hottentots are usually smaller than other Africans, and the Bushmen are remarkably short. The Kaffers are distinguished for their stature, and the muscularity and symmetry of their figures. The Mongolians are generally shorter in stature than ourselves; but considerable varieties are found among them. The Chinese and Japanese are about our own size. The Calmucks, Burats, &c. are shorter; the people of Loo Choo are a diminutive race, five feet two being the limit of their average height. The Laplanders, Samoiedes, Greenlanders, and Esquimaux are all short; Captain Parry found no individual among the last above five feet ten; the average was five feet four, five, and six inches. It has been reported that a nation of white long-armed dwarfs existed in the island of Madagascar, but there appears no foundation in truth for such a story.

* No two persons are ever met with possessing precisely the same sort of features; yet there are certain generally characteristic countenances belonging to the different races of mankind, and even to particular nations. To enter into all the minute variations would be endless, but they have been reduced by Blumenbach to the five following, which include all the leading traits:

1. An oval countenance, with the features moderately inter-distinguished; high and broad forehead; nose aquiline, or slightly convex or prominent; cheek-bones not prominent; small mouth and lips slightly curved; chin full

In this slight survey, therefore, I think we may see that all the variations in the human figure, as far as they differ from our own, are produced either by the rigour of the climate, the bad quality or the scantiness of the provisions, or by the savage cus-

and well rounded. This face is most consonant with our ideas of beauty, and is characteristic in greater or less degrees of perfection of the Caucasian tribes.

2. Broad and flattish face; parts ill-distinguished from each other; space between the eyes flat and broad, flat nose; projecting cheeks; narrow and oblique eyelids, and chin rather prominent. This is the Mongolian face.

3. Broad, but not flat visage; prominent check-bones; short forehead; eyes deeply fixed; nose flattish, but prominent. Such is the American face.

4. Narrow face, projecting below; narrow, retreating and arched forehead; prominent eyes; thick nose and lips, &c. Negro face.

5. Face not so narrow as the last, rather projecting downwards; bottled nose, and large mouth. Malay countenance.—See Plate V. for specimens of the above varieties.

Placing these variations of the human countenance thus beside each other, the difference appears very striking. But we must repeat of the characters of countenance above described, as of those of colour, that they are by no means to be found the same in all the individuals of each respective race; on the contrary, individual deviations from the given type are numerous. Among the African and American nations, many persons are found with features as regular and as handsome as any Europeans. The same is more especially true of the South-Sea Islanders. Among ourselves how many have the characteristic features of other races. It may be observed, however, that rather less deviation from the characteristic model is observable in the Mongolian than in the other varieties. Though even there there is considerable difference, if not in form, at least in expression of features. As for example, between the Calmuck and the Chinese.

From the features we naturally proceed to the skull. This, in the Caucasian variety, is more fully developed in the upper and front parts, these forming a large and smooth convexity, a little flattened towards the temples. There is a general softness, harmony, and proportion in the entire contour of the head. Some differences in the formation of the skull have been observed in different nations of the Caucasian race: in the Turks, for instance, a singular globularity of this part has been remarked; and in the Poles and Russians a considerable contraction of the orbits. But we have not sufficient information on this subject to lead us to any definite conclusions.

In the Mongolian variety the head is of a square form, with the forehead low and slanting. The orbits are large and open, and the superciliary arches elevated.

In the Ethiopian variety the front of the head is laterally compressed and considerably elongated, so that the length of the whole skull from the teeth to the occiput is great. It forms a complete contrast to the globular head of some Europeans, and to the square head of the Calmucks. The forehead is wonderfully narrowed off, and the face widened below; the frontal bone is shorter, and it and the parietal less excavated than in the European. The temporal ridge is higher; the compression of the front of the skull arises from the strength of the temporal muscles; the foramen magnum is larger

toms of the country. They are actual marks of the degeneracy in the human form; and we may consider the European figure and colour as standards to which to refer all other varieties, and with which to compare them. In proportion as the Tartar or American approaches nearer to European beauty, we consider the race as less degenerated; in proportion as he differs more widely, he has made greater deviations from his original form.

That we have all sprung from one common parent, we are taught both by reason and religion, to believe; and we have good reason also to think that the Europeans resemble him more then any of the rest of his children. However, it must not be concealed that the olive-coloured Asiatic, and even the jet-black negro, claim this honour of hereditary resemblance;

and farther back, and the apertures for the nerves are larger; the bony substance is hard, and the whole weight of the skull more considerable; the organs of sense are more developed, and the narrow forehead, and protruded muzzle give to the negro head the appearance of a decidedly anima character.

Some of the South African tribes vary a little from the negro conformation of skull. In the head of a Bushman, given by Blumenbach, the cranium is less compressed, the orbits and cheek-bones are wide, and the jaws not prominent. There are other differences, but we scarcely know sufficient of these tribes to class them under any given variety. The origin of the Hottentots, Caffres, Bushmen, and their subdivisions, found at the extremity of South Africa is quite unknown. They exhibit characters strongly approximating to, and discrepancies equally deviating from, their negro neighbours.

The American head is thus characterized: broad cheek-bones, depressed forehead, deep orbits, and the nasal cavity generally large.

The Esquimaux and Greenlanders, who seem to form a link between the Americans and Mongolians, have broad cheek-bones, large jaws and face, flattened nose, the cranium sufficiently ample, but distinguished by a posterior elongation.

The Carib tribes are conspicuous for a most remarkable depression of the forehead, which defect, like others of the Americans, they increase by artificial means. The hinder parts of the skull greatly preponderate; the face is large and muscular; the nasal bone neither small nor flat; the cavity is large, and the jaws and teeth exhibit manifestations of great strength.

The general characters in this respect attributed to the Malay variety are, a moderately-narrowed cranium slanting at the interior and upper part; face large, and jaws prominent. But, indeed, the numerous nations comprehended, with not much philosophical precision, under this variety, exhibit very various and opposing characters; some are not distinguishable in the formation of this part from Europeans, some partake of the Mongole, and many of the Negro type. In truth, the above division of skulls is somewhat arbitrary, and though sufficient for general purposes, is, by no means, universally applicable.

and assert that white men are mere deviations from original perfection. Odd as this opinion may seem, they have Linnæus, the celebrated naturalist, on their side; who supposes man a native of the tropical climates, and only a sojourner more to the north. But not to enter into a controversy upon a matter of a very remote speculation, I think one argument alone will suffice to prove the contrary, and show that the white man is the original source from whence the other varieties have sprung. We have frequently seen white children produced from black parents, but have never seen a black offspring the production of two whites. From hence we may conclude, that whiteness is the colour to which mankind naturally tends: for, as in the tulip, the parent stock is known by all the artificial varieties breaking into it; so in man, that colour must be original which never alters, and to which all the rest are accidentally seen to change. I have seen in London, at different times, two white negroes the issue of black parents, that served to convince me of the truth of this theory. I had before been taught to believe that the whiteness of the negro's skin was a disease, a kind of milky whiteness, that might be called rather a leprous crust than a natural complexion. I was taught to suppose that the numberless white negroes found in various parts of Africa, the white men that go by the name of Chacrelas, in the East Indies, and the white Americans, near the Isthmus of Darien, in the West Indies, were all as so many diseased persons, and even more deformed than the blackest of the natives. But, upon examining that negro which was last shown in London, I found the colour to be exactly like that of an European: the visage white and ruddy, and the lips of the proper redness. However, there were sufficient marks to convince me of its descent. The hair was white and woolly, and very unlike any thing I had seen before. The iris of the eye was yellow, inclining to red; the nose was flat, exactly resembling that of a negro; and the lips thick and prominent. No doubt, therefore, remained of the child's having been born of negro parents: and the person who showed it had attestations to convince the most incredulous. From this, then, we see that the variations of the negro colour is into whiteness, whereas the white are never found to have a race of negro children. Upon the whole, therefore, all those changes which the African, the Asiatic, or the American, un-

dergo, are but accidental deformities, which a kinder climate, better nourishment, or more civilized manners, would in a course of centuries, very probably remove.

CHAP. XII.

OF MONSTERS.

HITHERTO I have only spoken of those varieties in the human species, that are common to whole nations; but there are varieties of another kind, which are only found in the individual, and being more rarely seen, are therefore called *monstrous*. If we examine into the varieties of distorted nature, there is scarcely a limb of the body, or a feature in the face, that has not suffered some reprobation, either from art or nature; being enlarged or diminished, lengthened or wrested, from its due proportion. Linnæus, after having given a catalogue of monsters, particularly adds, the flat heads of Canada, the long heads of the Chinese, and the slender waists of the women of Europe, who, by strait lacing, take such pains to destroy their health, through a mistaken desire to improve their beauty.[1] It belongs more to the physician than the naturalist to attend to these minute deformities; and indeed it is a melancholy contemplation to speculate upon a catalogue of calamities, inflicted by unpitying Nature, or brought upon us by our own caprice. Some, however, are fond of such accounts; and there have been books filled with nothing else. To these, therefore, I refer the reader; who may be better pleased with accounts of men with two heads, or without any head, of children joined in the middle, of bones turned into flesh, or flesh converted into bones, than I am.[2] It is sufficient here

1 Linnæi Syst. vol. i. p. 29. Monorchides ut minus fertiles.

2 Vide Phil. Trans. passim. Miscellan. Curioss. Johan. Baptist. Wenck. Dissertatio Physica an ex virilis humani seminis cum brutali per nefarium coitum commixtione, aut vicissim ex bruti maris cum muliebri humano seminis commixtione possit verus homo generari. Vide etiam, Johnstoni Thaumatographia Naturalis. Vide Adalberti Disquisitio Physica ostenti duorum puerorum unus quorum dente aureo, alter cum capite giganteo Bilue spectabantur. A man without lungs and stomach, Journal de Scavans, 1682, p. 301; another without any brain, Andreas Caroli Memorabilia, p. 166, an.

to observe, that every day's experience must have shown us miserable instances of this kind produced by nature or affectation; calamities that no pity can soften, or assiduity relieve.

Passing over, therefore, every other account, I shall only mention the famous instance quoted by Father Malbranche upon which he founds his beautiful theory of monstrous productions. A woman of Paris, the wife of a tradesman, went to see a criminal broke alive upon the wheel, at the place of public execution. She was at that time two months advanced in her pregnancy, and no way subject to any disorders to affect the child in her womb. She was, however, of a tender habit of body; and, though led by curiosity to this horrid spectacle, very easily moved to pity and compassion. She felt, therefore, all those strong emotions which so terrible a sight must naturally inspire; shuddered at every blow the criminal received, and almost swooned at his cries. Upon returning from this scene of blood, she continued for some days pensive, and her imagination still wrought upon the spectacle she had lately seen. After some time, however, she seemed perfectly recovered from her fright, and had almost forgotten her former uneasiness. When the time of her delivery approached, she seemed no ways mindful of her former terrors, nor were her pains in labour more than usual in such circumstances. But what was the amazement of her friends and assistants when the child came into the world! It was found that every limb in its body was broken like those of the malefactor, and just in the same place. This poor infant that had suffered the pains of life even before its coming into the world, did not die, but lived in an hospital in Paris, for twenty years after a wretched instance of the supposed powers of imagination in the mother, of altering and distorting the infant in the womb. The manner in which Malbranche reasons upon this fact, is as follows: the Creator has established such a sympathy between the several parts of nature, that we are led not only to imitate each other, but also to partake in the same affections and desires. The animal spirits are thus carried to the respective parts of the body, to perform the same actions which we see others perform,

1676; another without any head, Giornale di Roma, anno 1675, p. 26; and other without any arms, New Memoirs of Literature, vol. iv. p. 446. In short, the variety of these accounts is almost infinite; and perhaps, their use is as much circumscribed as their variety is extensive.

to receive in some measure their wounds, and take part in their sufferings. Experience tells us, that if we look attentively on any person severely beaten, or sorely wounded, the spirits immediately flow into those parts of the body which correspond to those we see in pain. The more delicate the constitution, the more it is thus affected; the spirits making a stronger impression on the fibres of a weakly habit than of a robust one. Strong vigorous men see an execution without much concern, while women of nicer texture are struck with horror and concern. This sensibility in them must, of consequence, be communicated to all parts of their body; and as the fibres of the child in the womb are incomparably finer than those of the mother, the course of the animal spirits must consequently produce greater alterations. Hence every stroke given to the criminal forcibly struck the imagination of the woman; and by a kind of counter-stroke, the delicate tender frame of the child.

Such is the reasoning of an ingenious man upon a fact, the veracity of which many have since called in question.[1] They have allowed, indeed, that such a child might have been produced, but have denied the cause of its deformity. "How could the imagination of the mother," say they, "produce such dreadful effects upon her child? She has no communication with the infant; she scarcely touches it in any part; quite unaffected with her concerns, it sleeps in security, in a manner secluded by a fluid in which it swims, from her that bears it. With what a variety of deformities," say they, "would all mankind be marked, if all the vain and capricious desires of the mother were thus readily written upon the body of the child!" Yet notwithstanding this plausible way of reasoning, I cannot avoid giving some credit to the variety of instances I have either read or seen upon this subject. If it be a prejudice, it is as old as the days of Aristotle, and to this day as strongly believed by the generality of mankind as ever. It does not admit of a reason; and, indeed, I can give none, even why the child should, in any respect, resemble the father or the mother. The fact we generally find to be so. But why it should take the particular print of the father's features in the womb is as hard to conceive, as why it

1 Buffon, vol. iv. p. 9

should be effected by the mother's imagination. We all know what a strong effect the imagination has on these parts in particular, without being able to assign a cause how this effect is produced; and why the imagination may not produce the same effect in marking the child that it does in forming it, I see no reason. Those persons whose employment it is to rear up pigeons of different colours, can breed them, as their expression is, to a feather. In fact, by properly pairing them, they can give what colour they will to any feather, in any part of the body. Were we to reason upon this fact, what could we say? Might it not be asserted, that the egg, being distinct from the body of the female cannot be influenced by it? Might it not be plausibly said, that there is no similitude between any part of the egg and any particular feather which we expect to propagate; and yet for all this the fact is known to be true, and what no speculation can invalidate. In the same manner, a thousand various instances assure us that the child in the womb is sometimes marked by the strong affections of the mother: how this is performed we know not; we only see the effect, without any connection between it and the cause. The best physicians have allowed it; and have been satisfied to submit to the experience of a number of ages; but many disbelieve it, because they expect a reason for every effect. This, however, is very hard to be given, while it is very easy to appear wise by pretending incredulity.

Among the number of monsters, dwarfs and giants are usually reckoned; though not, perhaps, with the strictest propriety, since they are no way different from the rest of mankind, except in stature. It is a dispute, however, about words; and therefore scarcely worth contending about. But there is a dispute, of a more curious nature, on this subject; namely, whether there are races of people thus very diminutive, or vastly large; or whether they be merely accidental varieties, that now and then are seen in a country, in a few persons, whose bodies some external cause has contributed to lessen or enlarge.

With regard to men of diminutive stature, all antiquity has been unanimous in asserting their national existence. Homer was the first who has given us an account of the pigmy nation contending with the cranes; and what poetical license might be supposed to exaggerate, Athenæus has attempted seriously to

confirm by historical assertion.[1] If we attend to these, we must believe that, in the internal parts of Africa, there are whole nations of pigmy beings, not more than a foot in stature, who continually wage an unequal war with the birds and beasts that inhabit the plains in which they reside. Some of the ancients, however, and Strabo in particular, have supposed all these accounts to be fabulous; and have been more inclined to think this supposed nation of pigmies nothing more than a species of apes, well known to be numerous in that part of the world. With this opinion the moderns have all concurred; and that diminutive race, which was described as human, has been long degraded into a class of animals that resemble us but very imperfectly.

The existence, therefore, of a pigmy race of mankind being founded in error, or in fable, we can expect to find men of diminutive stature only by accident, among men of the ordinary size. Of these accidental dwarfs, every country, and almost every village, can produce numerous instances. There was a time when these unfavoured children of Nature were the peculiar favourites of the great; and no prince or nobleman thought himself completely attended unless he had a dwarf among the number of his domestics. These poor little men were kept to be laughed at; or to raise the barbarous pleasure of their masters, by their contrasted inferiority. Even in England, as late as the times of King James I. the court was at one time furnished with a dwarf, a giant, and a jester; these the king often took a pleasure in opposing to each other, and often fomented quarrels among them, in order to be a concealed spectator of their animosity. It was a particular entertainment of the courtiers at that time to see little Jeffrey, for so the dwarf was called, ride round the lists, expecting his antagonist; and discovering in his actions, all the marks of contemptible resolution.

It was in the same spirit, that Peter of Russia, in the year 1710, celebrated a marriage of dwarfs. This monarch, though raised by his native genius far above a barbarian, was, nevertheless, still many degrees removed from actual refinement. His pleasures, therefore, were of the vulgar kind; and this was among the number. Upon a certain day, which he had ordered to be proclaimed several months before, he invited the whole

1 Athenæus, ix. 390.

body of his courtiers, and all the foreign ambassadors, to be present at the marriage of a pigmy man and woman. The preparations for this wedding were not only very grand, but executed in a style of barbarous ridicule. He ordered that all the dwarf men and women, within two hundred miles, should repair to the capital; and also insisted that they should be present at the ceremony. For this purpose he supplied them with proper vehicles; but so contrived it, that one horse was seen carrying in a dozen of them into the city at once, while the mob followed, shouting and laughing, from behind. Some of them were at first unwilling to obey an order which they knew was calculated to turn them into ridicule, and did not come; but he soon obliged them to obey: and, as a punishment, enjoined, that they should wait upon the rest at dinner. The whole company of dwarfs amounted to seventy, besides the bride and bridegroom, who were richly adorned, and in the extremity of the fashion. For this little company in miniature, every thing was suitably provided; a low table, small plates, little glasses, and, in short, every thing was so fitted as if all things had been dwindled to their own standard. It was his great pleasure to see their gravity and their pride; the contention of the women for places and the men for superiority. This point he attempted to adjust, by ordering that the most diminutive should take the lead; but this bred disputes, for none would then consent to sit foremost. All this, however, being at last settled, dancing followed the dinner, and the ball was opened with a minuet by the bridegroom, who measured exactly three feet two inches high. In the end, matters were so contrived, that this little company, who met together in gloomy pride, and unwilling to be pleased, being at last familiarized to laughter, joined in the diversion, and became, as the journalist has it, extremely sprightly and entertaining.

But whatever may be the entertainment such guests might afford when united, I never found a dwarf capable of affording any when alone. I have sometimes conversed with some of these that were exhibited at our fairs about Town, and have ever found their intellects as contracted as their persons. They in general, seemed to me to have faculties very much resembling those of children, and their desires likewise of the same kind;

1 Die dench wurdige. Iwerg. Hockweit, &c. Lipsæ, 1713, vol. viii. p. 102. seq.

being diverted with the same sports, and best pleased with such companions. Of all those I have seen, which may amount to five or six, the little man, whose name was Coan, that died lately at Chelsea, was the most intelligent and sprightly. I have heard him and the giant, who sung at the theatres, sustain a very ridiculous duet, to which they were taught to give great spirit. But this mirth, and seeming sagacity, were but assumed. He had, by long habit, been taught to look cheerful upon the approach of company; and his conversation was but the mere etiquette of a person that had been used to receive visitors. When driven out of his walk, nothing could be more stupid or ignorant, nothing more dejected or forlorn. But we have a complete history of a dwarf, very accurately related by Mr Daubenton, in his part of the Histoire Naturelle; which I will here take leave to translate.

This dwarf, whose name was Baby, was well known, having spent the greatest part of his life at Lunenville in the palace of Stanislaus, the titular king of Poland. He was born near the village of Plaisne, in France, in the year 1741. His father and mother were peasants, both of good constitutions, and inured to a life of husbandry and labour. Baby, when born, weighed but a pound and a quarter. We are not informed of the dimensions of his body at that time; but we may conjecture they were very small, as he was presented on a plate to be baptized, and for a long time lay in a slipper. His mouth, although proportioned to the rest of his body, was not, at that time, large enough to take in the nipple; and he was, therefore, obliged to be suckled by a she-goat that was in the house; and that served as a nurse, attending to his cries with a kind of maternal fondness. He began to articulate some words when eighteen months old; and at two years he was able to walk alone. He was then fitted with shoes that were about an inch and a half long. He was attacked with several acute disorders; but the small-pox was the only one which left any marks behind it. Until he was six years old, he eat no other food but pulse, potatoes, and bacon. His father and mother were, from their poverty, incapable of affording him any better nourishment; and his education was little better than his food, being bred up among the rustics of the place. At six years old he was about fifteen inches high; and his whole body weighed but thirteen pounds. Notwith-

standing this, he was well-proportioned and handsome; his health was good, but his understanding scarcely passed the bounds of instinct. It was at that time that the king of Poland, having heard of such a curiosity, had him conveyed to Lunenville, gave him the name of *Baby*, and kept him in his palace.

Baby, having thus quitted the hard condition of a peasant, to enjoy all the comforts and conveniences of life, seemed to receive no alteration from his new way of living, either in mind or person. He preserved the goodness of his constitution till about the age of sixteen, but his body seemed to increase very slowly during the whole time; and his stupidity was such, that all instructions were lost in improving his understanding. He could never be brought to have any sense of religion, nor even to show the least signs of a reasoning faculty. They attempted to teach him dancing and music, but in vain; he never could make any thing of music; and as for dancing, although he beat time tolerably exact, yet he could never remember the figure, but while his dancing-master stood by to direct his motions. Notwithstanding, a mind thus destitute of understanding was not without its passions; anger and jealousy harassed it at times; nor was he without desires of another nature.

At the age of sixteen, Baby was twenty-nine inches tall; at this he rested; but having thus arrived at his acme, the alterations of puberty, or rather, perhaps, of old age, came fast upon him. From being very beautiful, the poor little creature now became quite deformed; his strength quite forsook him; his back-bone began to bend; his head hung forward; his legs grew weak; one of his shoulders turned awry; and his nose grew disproportionably large. With his strength, his natural spirits also forsook him; and, by the time he was twenty, he was grown feeble, decrepit, and marked with the strongest impressions of old age. It had been before remarked by some, that he would die of old age before he arrived at thirty; and, in fact, by the time he was twenty-two, he could scarcely walk a hundred paces, being worn out with the multiplicity of his years, and bent under the burden of protracted life. In this year he died; a cold, attended with a slight fever, threw him into a kind of lethargy, which had a few momentary intervals; but he could scarcely be brought to speak. However, it is asserted, that in the five last years in his life, he showed a clearer understanding than in his times

of best health: but at length he died, after enduring great agonies, in the twenty-second year of his age.

Opposite to this accidental diminution of the human race, is that of its extraordinary magnitude. Concerning the reality of a nation of giants, there have been many disputes among the learned. Some have affirmed the probability of such a race; and others, as warmly have denied the possibility of their existence. But it is not from any speculative reasonings, upon a subject of this kind, that information is to be obtained; it is not from the disputes of the scholar, but the labours of the enterprising, that we are to be instructed in this inquiry. Indeed, nothing can be more absurd, than what some learned men have advanced upon this subject. It is very unlikely, says Grew, that there should either be dwarfs or giants; or if such, they cannot be fitted for the usual enjoyment of life and reason. Had man been born a dwarf, he could not have been a reasonable creature: for to that end, he must have a jolt head, and then he would not have body and blood enough to supply his brain with spirits; or if he had a small head, proportionable to his body, there would not be brain enough for conducting life. But it is still worse with giants; and there could never have been a nation of such, for there would not be food enough found in any country to sustain them; or if there were beasts sufficient for this purpose, there would not be grass enough for their maintenance. But what is still more, add others, giants could never be able to support the weight of their own bodies; since a man of ten feet high, must be eight times as heavy as one of the ordinary stature; whereas he has but twice the size of muscles to support such a burden: and, consequently, would be overloaded with the weight of his own body. Such are the theories upon this subject; and they require no other answer, but that experience proves them both to be false: dwarfs are found capable of life and reason; and giants are seen to carry their own bodies. We have seen several accounts from mariners, that a nation of giants actually exists; and mere speculation should never induce us to doubt their veracity.

Ferdinand Magellan was the first who discovered this race of people along the coast towards the extremity of South America. Magellan was a Portuguese, of noble extraction; who having long behaved with great bravery, under Albuquerque, the con-

queror of India, he was treated with neglect by the court, upon his return. Applying, therefore, to the king of Spain, he was intrusted with the command of five ships, to subdue the Molucca islands; upon one of which he was slain. It was in his voyage thither, that he happened to winter in St Julian's Bay, an American harbour, forty-nine degrees south of the line. In this desolate region, where nothing was seen but objects of terror, where neither trees nor verdure dressed the face of the country, they remained for some months without seeing any human creature. They had judged the country to be utterly uninhabitable; when one day they saw approaching, as if he had been dropped from the clouds, a man of enormous stature, dancing and singing, and putting dust upon his head, as they supposed, in token of peace. This overture for friendship was, by Magellan's command, quickly answered by the rest of his men; and the giant approaching, testified every mark of astonishment and surprise. He was so tall, that the Spaniards only reached his waist; his face was broad, his colour brown, and painted over with a variety of tints; each cheek had the resemblance of a heart drawn upon it; his hair was approaching to whiteness? he was clothed in skins, and armed with a bow. Being treated with kindness, and dismissed with some trifling presents, he soon returned with many more of the same stature; two of whom the mariners decoyed on ship-board: nothing could be more gentle than they were in the beginning; they considered the fetters that were preparing for them as ornaments, and played with them like children with their toys; but when they found for what purpose they were intended, they instantly exerted their amazing strength, and broke them in pieces with a very easy effort. This account, with a variety of other circumstances, has been confirmed by succeeding travellers. Herrara, Sebald Wert, Oliver Van Noort, and James le Maire, all correspond in affirming the fact, although they differ in many particulars of their respective descriptions. The last voyager we have had, that has seen this enormous race, is Commodore Byron. I have talked with the person who first gave the relation of that voyage, and who was the carpenter of the commodore's ship; he was a sensible, understanding man, and I believe extremely faithful. By him, therefore, I was assured, in the most solemn manner, of the truth of his relation; and this account has since been confirmed by one or two publications; in

all which the particulars are pretty nearly the same. One of the circumstances which most puzzled me to reconcile to probability was that of the horses, on which they are described as riding down to the shore. We know the American horse to be of the European breed; and, in some measure, to be degenerated from the original. I was at a loss, therefore, to account how a horse of not more than fourteen hands high, was capable of carrying a man of nine feet; or, in other words, an animal almost as large as itself. But the wonder will cease, when we consider, that so small a beast as an ass, will carry a man of ordinary size tolerably well; and the proportion between this and the former instance is nearly exact. We can no longer, therefore, refuse our assent to the existence of this gigantic race of mankind: in what manner they are propagated, or under what regulations they live, is a subject that remains for future investigation. It should appear, however, that they are a wandering nation, changing their abode with the course of the sun, and shifting their situation, for the convenience of food, climate, or pasture.[1]

This race of giants are described as possessed of great strength; and, no doubt, they must be very different from those accidental giants that are to be seen in different parts of Europe. Stature, with these, seems rather their infirmity than their pride; and adds to their burden, without increasing their strength. Of those I have seen, the generality were ill formed and unhealthful; weak in their persons, or incapable of exerting what strength they were possessed of. The same defects of understanding that attended those of suppressed stature, were found in those who were thus overgrown: they were heavy, phlegmatic, stupid, and inclined to sadness. Their numbers, however, are but few; and it is thus kindly ordered by Providence, that as the middle stature is the best fitted for happiness, so the middle ranks of mankind are produced in the greatest variety.

However, mankind seems naturally to have a respect for men of extraordinary stature; and it has been a supposition of long standing, that our ancestors were much taller, as well as much more beautiful, than we. This has been, indeed, a theme of poetical declamation from the beginning; and man was scarcely

1 Later voyagers have not confirmed this account, in some particulars.

formed, when he began to deplore an imaginary decay. Nothing is more natural than this progress of the mind, in looking up to antiquity with reverential wonder. Having been accustomed to compare the wisdom of our fathers with our own, in early imbecility, the impression of their superiority remains when they no longer exist, and when we cease to be inferior. Thus the men of every age consider the past as wiser than the present; and the reverence seems to accumulate as our imaginations ascend. For this reason, we allow remote antiquity many advantages, without disputing their title; the inhabitants of uncivilized countries represent them as taller and stronger; and the people of a more polished nation, as more healthy and more wise. Nevertheless, these attributes seem to be only the prejudices of ingenuous minds; a kind of gratitude, which we hope in turn to receive from posterity. The ordinary stature of men, Mr Derham observes, is, in all probability, the same now as at the beginning. The oldest measure we have of the human figure, is in the monument of Cheops, in the first pyramid of Egypt. This must have subsisted many hundred years before the times of Homer, who is the first that deplores the decay. This monument, however, scarcely exceeds the measure of our ordinary coffins: the cavity is no more than six feet long, two feet wide, and deep in about the same proportion. Several mummies also, of a very early age, are found to be only of the ordinary stature; and show that, for these three thousand years at least, men have not suffered the least diminution. We have many corroborating proofs of this, in the ancient pieces of armour which are dug up in different parts of Europe. The brass helmet dug up at Medauro fits one of our men, and yet is allowed to have been left there at the overthrow of Asdrubal. Some of our finest antique statues, which we learn from Pliny and others to be exactly as big as the life, still continue to this day, remaining monuments of the superior excellence of their workmen indeed, but not of the superiority of their stature. We may conclude, therefore, that men have been in all ages pretty much of the same size they are at present; and that the only difference must have been accidental, or perhaps national.

As to the superior beauty of our ancestors, it is not easy to make the comparison: beauty seems a very uncertain charm; and frequently is less in the object, than in the eye of the be-

holder. Were a modern lady's face formed exactly like the Venus of Medicis, or the Sleeping Vestal, she would scarcely be considered beautiful, except by the lovers of antiquity, whom of all her admirers perhaps she would be least desirous of pleasing. It is true, that we have some disorders among us that disfigure the features, and from which the ancients were exempt, but it is equally true, that we want some which were common among them, and which were equally deforming. As for their intellectual powers, these also were probably the same as ours: we excel them in the sciences, which may be considered as a history of accumulated experience; and they excel us in the poetic arts, as they had the first rifling of all the striking images of Nature.

CHAP. XIII.

OF MUMMIES, WAX-WORK, ETC.

"MAN[1] is not content with the usual term of life, but he is willing to lengthen out his existence by art; and although he cannot prevent death, he tries to obviate his dissolution. It is natural to attempt to preserve even the most trifling relics of what has long given us pleasure; nor does the mind separate from the body, without a wish, that even the wretched heap of dust it leaves behind may yet be remembered. The embalming practised in various nations, probably had its rise in this fond desire: an urn filled with ashes, among the Romans, served as a pledge of continuing affection; and even the grassy graves in our own church-yards are raised above the surface, with the desire that the body below should not be wholly forgotten. The soul, ardent after eternity for itself, is willing to procure, even for the body, a prolonged duration."

But of all nations, the Egyptians carried this art to the highest perfection: as it was a principle of their religion, to suppose the soul continued only coeval to the duration of the body, they

1 This chapter I have, in a great measure, translated from Mr Daubenton. Whatever is added from others, is marked with inverted commas.

tried every art to extend the life of the one by preventing the dissolution of the other. In this practice they were exercised from the earliest ages; and the mummies they have embalmed in this manner, continue in great numbers to the present day. We are told, in Genesis, that Joseph, seeing his father expire, gave orders to his physicians to embalm the body, which they executed in the compass of forty days, the usual time of embalming. Herodotus also, the most ancient of the profane historians, gives us a copious detail of this art, as it was practised, in his time, among the Egyptians. There are certain men among them, says he, who practise embalming as a trade; which they perform with all expedition possible. In the first place, they draw out the brain through the nostrils, with irons adapted to this purpose; and in proportion as they evacuate it in this manner, they fill up the cavity with aromatics: they next cut open the belly near the sides with a sharpened stone, and take out the entrails, which they cleanse, and wash in palm oil; having performed this operation, they roll them in aromatic powder, fill them with myrrh, cassia, and other perfumes, except incense; and replace them, sewing up the body again. After these precautions, they salt the body with nitre, and keep it in the salting place for seventy days, it not being permitted to preserve it so any longer. When the seventy days are accomplished, and the body washed once more, they swathe it in bands made of linen, which have been dipt in a gum the Egyptians use instead of salt. When the friends have taken back the body, they make a hollow trough, something like the shape of a man, in which they place the body; and this they inclose in a box, preserving the whole as a most precious relic, placed against the wall. Such are the ceremonies used with regard to the rich. As for those who are contented with an humbler preparation, they treat them as follows: they fill a syringe with an odoriferous liquor extracted from the cedar-tree, and, without making any incision, inject it up the body of the deceased, and then keep it in nitre, as long as in the former case. When the time is expired, they evacuate the body of the cedar liquor which had been injected; and such is the effect of this operation, that the liquor dissolves the intestines, and brings them away: the nitre also serves to eat away the flesh, and leaves only the skin and the bones remaining. This done, the body is returned to the friends, and

the embalmer takes no farther trouble about it. The third method of embalming those of the meanest condition is merely by purging and cleansing the intestines by frequent injections, and preserving the body for a similar term in nitre, at the end of which it is restored to the relations.

Diodorus Siculus also makes mention of the manner in which these embalmings are performed. According to him there were several officers appointed for this purpose; the first of them, who was called the scribe, marked those parts of the body on the left side which were to be opened; the cutter made the incision; and one of those that were to salt it drew out all the bowels, except the heart, and the kidneys; another washed them in palm wine and odoriferous liquors; afterwards they anointed for above thirty days with cedar, gum, myrrh, cinnamon, and other perfumes. These aromatics preserved the body entire for a long time, and gave a very agreeable odour. It was not in the least disfigured by this preparation; after which it was returned to the relations, who kept it in a coffin, placed upright against a wall.

Most of the modern writers who have treated on this subject, have merely repeated what has been said by Herodotus; and if they add any thing of their own, it is but merely from conjecture. Dumont observes that it is very probable, that aloes, bitumen, and cinnamon, make a principal part of the composition which is used on this occasion: he adds, that, after embalming, the body is put into a coffin, made of the sycamore tree, which is almost incorruptible. Mr Grew remarks, that in an Egyptian mummy, in the possession of the Royal Society, the preparation was so penetrating as to enter into the very substance of the bones, and rendered them so black that they seemed to have been burned. From this he is induced to believe that the Egyptians had a custom of embalming their dead, by boiling them in a kind of liquid preparation, until all the aqueous parts of the body were exhaled away; and until the oily or gummy matter had penetrated throughout. He proposes, in consequence of this, a method of macerating, and afterwards of boiling the dead body in oil of walnut.

I am, for my own part, of opinion, that there were several ways of preserving dead bodies from putrefaction; and that this would be no difficult matter, since different nations have all succeeded in the attempt. We have an example of this kind

among the Guanches, the ancient inhabitants of the island of Teneriffe. Those who survived the general destruction of this people by the Spaniards, when they conquered this island, informed them, that the art of embalming was still preserved there; and that there was a tribe of priests among them possessed of the secret, which they kept concealed as a sacred mystery. As the greatest part of the nation was destroyed, the Spaniards could not arrive at a complete knowledge of this art; they only found out a few of the particulars. Having taken out the bowels, they washed the body several times in a lee made of the dried bark of the pine-tree, warmed, during the summer, by the sun, or by a stove in the winter. They afterwards anointed it with butter, or the fat of bears, which they had previously boiled with odoriferous herbs, such as sage and lavender. After this unction they suffered the body to dry; and then repeated the operation as often as it was necessary, until the whole substance was impregnated with the preparation. When it was become very light, it was then a certain sign that it was fit and properly prepared. They then rolled it up in the dried skins of goats; which when they had a mind to save expense, they suffered to remain with the hair still growing upon them. Purchas assures us, that he has seen mummies of this kind in London; and mentions the name of a gentleman who had seen several of them in the island of Teneriffe, which were supposed to have been two thousand years old; but without any certain proofs of such great antiquity. This people, who probably came first from the coasts of Africa, might have learned this art from the Egyptians, as there was a traffic carried on from thence into the most internal parts of Africa.

Father Acosta and Garcilasso de la Vega make no doubt but that the Peruvians understood the art of preserving their dead for a very long space of time. They assert their having seen the bodies of several incas, that were perfectly preserved. They still preserved their hair and their eye-brows; but they had eyes made of gold, put in the places of those taken out. They were clothed in their usual habits, and seated in the manner of the Indians, their arms placed on their breasts. Garcilasso touched one of their fingers, and found it apparently as hard as wood; and the whole body was not heavy enough to overburden a weak man, who should attempt to carry it away. Acosta presumes that these bodies were embalmed

with a bitumen of which the Indians knew the properties. Garcilasso, however, is of a different opinion, as he saw nothing bituminous about them; but he confesses that he did not examine them very particularly; and he regrets his not having inquired into the methods used for that purpose. He adds, that being a Peruvian his countrymen would not have scrupled to inform him of the secret, if they really had it still among them.

Garcilasso, thus being ignorant of the secret, makes use of some inductions to throw light upon the subject; he asserts, that the air is so dry and so cold at Cusco, that flesh dries there like wood, without corrupting; and he is of opinion, that they dried the body in snow before they applied the bitumen: he adds, that in the times of the incas, they usually dried the flesh which was designed for the use of the army; and that, when it had lost its humidity, it might be kept without salt, or any other preparation.

It is said, that at Spitzbergen, which lies within the arctic circle, and consequently in the coldest climate, bodies never corrupt nor suffer any apparent alteration, even though buried for thirty years. Nothing corrupts or putrefies in that climate; the wood which has been employed in building those houses where the train-oil is separated, appears as fresh as the day it was first cut.

If excessive cold, therefore, be thus capable of preserving bodies from corruption, it is not less certain that a great degree of dryness produced by heat, produces the same effect. It is well known that the men and animals that are buried in the sands of Arabia quickly dry up and continue in preservation for several ages, as if they had been actually embalmed. It has often happened, that whole caravans have perished in crossing those deserts, either by the burning winds that infest them, or by the sands which are raised by the tempest, and overwhelm every creature in certain ruin. The bodies of those persons are preserved entire; and they are often found in this condition by some accidental passenger. Many authors, both ancient and modern, make mention of such mummies as these; and Shaw says, that he has been assured that numbers of men, as well as other animals, have been thus preserved, for times immemorial, in the burning

sands of Saibah, which is a place, he supposes, situate between Rasem and Egypt.

The corruption of dead bodies being entirely caused by the fermentation of the humours, whatever is capable of hindering or retarding this fermentation will contribute to their preservation. Both heat and cold, though so contrary in themselves, produce similar effects in this particular, by drying up the humours: the cold in condensing and thickening them, and the heat in evaporating them before they have time to act upon the solids. But it is necessary that these extremes should be constant; for if they succeed each other so that cold shall follow heat, or dryness humidity, it must then necessarily happen that corruption must ensue.—However, in temperate climates there are natural causes capable of preserving dead bodies; among which we may reckon the quality of the earth in which they are buried. If the earth be drying and astringent, it will imbibe the humidity of the body; and it may probably be for this reason that the bodies buried in the monastery of the Cordeliers, at Thoulouse, do not putrefy, but dry in such a manner that they may be lifted up by one arm.

The gums, resins, and bitumens, with which dead bodies are embalmed, keep off the impressions which they would else receive from the alteration of the temperature of the air; and still more, if a body thus prepared be placed in a dry or burning sand, the most powerful means will be united for its preservation. We are not to be surprised, therefore, at what we are told by Chardin of the country of Chorosan, in Persia. The bodies which have been previously embalmed and buried in the sands of that country, as he assures us, are found to petrify, or, in other words, to become extremely hard, and are preserved for several ages. It is asserted that some of them have continued for a thousand years.

The Egyptians, as has been mentioned above, swathed the body with linen bands, and inclosed it in a coffin: however, it is probable that with all these precautions, they would not have continued till now, if the tombs, or pits, in which they were placed, had not been dug in a dry chalky soil, which was not susceptible of humidity; and which was besides covered over with a dry sand of several feet thickness.

The sepulchres of the ancient Egyptians subsist to this day,

Most travellers who have been in Egypt have described those of ancient mummies, and have seen the mummies interred there. These catacombs are within two leagues of the ruins of the city, nine leagues from Grand Cairo, and about two miles from the village of Zaccara. They extend from thence to the Pyramids of Pharaoh, which are about eight miles distant. These sepulchres lie in a field, covered with a fine running sand, of a yellowish colour. The country is dry and hilly; the entrance of the tombs is choked up with sand; there are many open; but several more that are still concealed. The inhabitants of the neighbouring village have no other commerce or method of subsisting, but by seeking out mummies, and selling them to such strangers as happen to be at Grand Cairo. This commerce, some years ago, was not only a very common, but a very gainful one. A complete mummy was often sold for twenty pounds: but it must not be supposed that it was bought at such a high price from a mere passion for antiquity; there were much more powerful motives for this traffic. Mummy, at that time, made a considerable article in medicine; and a thousand imaginary virtues were ascribed to it, for the cure of most disorders, particularly of the paralytic kind. There was no shop, therefore, without mummy in it; and no physician thought he had properly treated his patient, without adding this to his prescription. Induced by the general repute in which this supposed drug was at that time, several Jews, both of Italy and France, found out the art of imitating mummy so exactly, that they, for a long time, deceived all Europe. This they did by drying dead bodies in ovens, after having prepared them with myrrh, aloes, and bitumen. Still, however, the request for mummies continued, and a variety of cures were daily ascribed to them. At length, Paræus wrote a treatise on their total inefficacy in physic; and showed their abuse in loading the stomach, to the exclusion of more efficacious medicines. From that time, therefore, their reputation began to decline; the Jews discontinued their counterfeits, and the trade returned entire to the Egyptians, when it was no longer of value. The industry of seeking after mummies is now totally relaxed, their price merely arbitrary, and just what the curious are willing to give.

In seeking for mummies, they first clear away the sand, which they may do for weeks together, without finding what is wanted.

Upon coming to a little square opening, of about eighteen feet in depth, they descend into it by holes for the feet, placed at proper intervals, and there they are sure of finding what they seek for. These caves, or wells, as they call them, are hollowed out of a white free-stone, which is found in all this country, a few feet below the covering of sand. When one gets to the bottom of these, which are sometimes forty feet below the surface, there are several square openings on each side, into passages of ten or fifteen feet wide, and these lead to chambers of fifteen or twenty feet square. These are all hewn out of the rock; and in each of the catacombs are to be found several of these apartments, communicating with each other. They extend a great way under ground, so as to be under the city of Memphis, and in a manner to undermine its environs.

In some of the chambers, the walls are adorned with figures and hieroglyphics; in others, the mummies are found in tombs round the apartment hollowed out in the rock. These tombs are upright, and cut into the shape of a man, with his arms stretched out. There are others found, and these in the greatest number, in wooden coffins, or in cloths covered with bitumen. These coffins, or wrappers, are covered all over with a variety of ornaments. There are some of them painted, and adorned with figures, such as that of Death, and the leaden seals, on which several characters are engraven. Some of these coffins are carved into the human shape; but the head alone is distinguishable: the rest of the body is all of a piece, and terminated by a pedestal, while there are some with their arms hanging down; and it is by these marks that the bodies of persons of rank are distinguished from those of the meaner order. These are generally found lying on the floor, without any profusion of ornaments; and in some chambers the mummies are found indiscriminately piled upon each other, and buried in the sand.

Many mummies are found lying on their backs; their heads turned to the north, and their hands placed on the belly. The bands of linen, with which these were swathed, are found to be more than a thousand yards long; and, of consequence, the number of circumvolutions they make about the body must have been amazing. These were performed by beginning at the head, and ending at the feet; but they contrived it so as to avoid covering the face. However, when the face is entirely

uncovered, it moulders into dust immediately upon the admission of the air. When, therefore, it is preserved entire, a slight covering of cloth is so disposed over it, that the shape of the eyes, the nose, and the mouth, are seen under it. Some mummies have been found with a long beard, and hair that reached down to the mid-leg, nails of a surprising length, and some gilt, or at least painted of a gold colour. Some are found with bands upon the breast, covered with hieroglyphics, in gold, silver, or in green; and some with tutelary idols, and other figures of jasper, within their body. A piece of gold also has often been found under their tongues, of about two pistoles value; and, for this reason the Arabians spoil all the mummies they meet with, in order to get at the gold.

But although art, or accident, has thus been found to preserve dead bodies entire, it must by no means be supposed that it is capable of preserving the exact form and lineaments of the deceased person. Those bodies which are found dried away in the deserts, or in some particular church-yards, are totally deformed, and scarcely any lineaments remain of their external structure. Nor are the mummies preserved by embalming, in a better condition. The flesh is dried away, hardened and hidden under a variety of bandages; the bowels, as we have seen, are totally removed; and from hence, in the most perfect of them, we see only a shapeless mass of skin discoloured; and even the features scarcely distinguishable. The art is, therefore, an effort rather of preserving the substance than the likeness of the deceased; and has, consequently, not been brought to its highest pitch of perfection. It appears from a mummy not long since dug up in France, that the art of embalming was more completely understood in the western world than even in Egypt. This mummy, which was dug up at Auvergne, was an amazing instance of their skill, and is one of the most curious relics in the art of preservation. As some peasants, in that part of the world, were digging in a field, near Rion, within about twenty-six paces off the highway, between that and the river Artiers, they discovered a tomb, about a foot and a half beneath the surface. It was composed only of two stones; one of which formed the body of the sepulchre, and the other the cover. This tomb was of free-stone, seven feet and a half long, three feet and a half broad, and about three feet high. It was of rude workmanship;

the cover had been polished, but was without figure or inscription: within this tomb was placed a leaden coffin, four feet seven inches long, fourteen inches broad, and fifteen high. It was not made coffin-fashion, but oblong, like a box, equally broad at both ends, and covered with a lid that fitted on like a snuff-box, without a hinge. This cover had two holes in it, each of about two inches long, and very narrow, filled with a substance resembling butter; but for what purpose intended remains unknown. Within this coffin was a mummy, in the highest and most perfect preservation. The internal sides of the coffin were filled with an aromatic substance, mingled with clay. Round the mummy was wrapped a coarse cloth, in form of a napkin; under this were two shirts, or shrouds, of the most exquisite texture; beneath these a bandage, which covered all parts of the body, like an infant in swaddling-clothes; still under this general bandage there was another, which went particularly round the extremities, the hands, and the legs. The head was covered with two caps; the feet and hands were without any particular bandages; and the whole body was covered with an aromatic substance an inch thick. When these were removed, and the body exposed naked to view, nothing could be more astonishing than the preservation of the whole, and the exact resemblance it bore to a body that had been dead a day or two before. It appeared well proportioned, except that the head was rather large, and the feet small. The skin had all the pliancy and colour of a body lately dead: the visage, however, was of a brownish hue. The belly yielded to the touch; all the joints were flexible, except those of the legs and feet; the fingers stretched forth of themselves when bent inwards. The nails still continued entire; and all the marks of the joints, both in the fingers, the palms of the hands, and the soles of the feet, remained perfectly visible. The bones of the arms and legs were soft and pliant; but, on the contrary, those of the skull preserved their rigidity; the hair, which only covered the back of the head, was of a chesnut colour, and about two inches long. The pericranium at top was separated from the skull by an incision, in order to open it for the introducing proper aromatics in the place of the brain, where they were found mixed with clay. The teeth, the tongue, and the ears, were all preserved in perfect form. The intestines were not taken out of the body, but remained pliant and entire,

as in a fresh subject; and the breast was made to rise and fall like a pair of bellows. The embalming preparation had a very strong and pungent smell, which the body preserved for more than a month after it was exposed to the air. This odour was perceived wherever the mummy was laid; although it remained there but a very short time, it was even pretended that the peasants of the neighbouring villages were incommoded by it. If one touched either the mummy, or any part of the preparation, the hands smelled of it for several hours after, although washed with water, spirit of wine, or vinegar. This mummy, having remained exposed for some months to the curiosity of the public, began to suffer some mutilations. A part of the skin of the forehead was cut off, the teeth were drawn out, and some attempts were made to pull away the tongue. It was, therefore, put into a glass-case, and shortly after transmitted to the king of France's cabinet at Paris.*

There are many reasons to believe this to be the body of a person of the highest distinction; however, no marks remain to assure us either of the quality of the person, or the time of his decease. There are only to be seen some irregular figures on the coffin; one of which represents a kind of star. There were also some singular characters upon the bandages, which were totally defaced by those who had torn them away. However, it should seem that it had remained for several ages in this state, since the first years immediately succeeding the interment, are usually those in which the body is most liable to decay. It appears also to be a much more perfect method of embalming than that of the Egyptians; as in this the flesh continues with its natural elasticity and colour, the bowels remain entire, and the joints have almost the pliancy which they had when the perso

* In March 1813, the body of King Charles the First was found embalmed, and in a very high state of preservation, in a leaden coffin in St George's chapel, Windsor, when the men were cleaning out the vault for the reception of the remains of the duchess of Brunswick.—A vault was accidentally discovered by the sexton, under the old parish church of Kilsyth, in Scotland; on descending a flight of steps he discovered a leaden coffin, in which were embalmed, and in every respect in high preservation, the bodies of lady Kilsyth and her infant son, who were both killed by the fall of a house on the continent, where they were embalmed, and sent home to the family burying-place. This circumstance happened upwards of a hundred and fifty years age.

was alive. Upon the whole, it is probable that a much less tedious preparation than that used by the Egyptians would have sufficed to keep the body from putrefaction; and that an injection of petreoleum inwardly, and that a layer of asphaltum without, would have sufficed to have made a mummy; and it is remarkable that Auvergne, where this was found, affords these two substances in sufficient plenty. This art, therefore, might be brought to greater perfection than it has arrived at hitherto, were the art worth preserving. But mankind have long since grown wiser in this respect; and think it unnecessary to keep by them a deformed carcase, which, instead of aiding their magnificence, must only serve to mortify their pride.

CHAP. XIV.

OF ANIMALS.

Leaving man, we now descend to the lower ranks of animated nature, and prepare to examine the life, manners, and characters, of these our humble partners in the creation. But, in such a wonderful variety as is diffused around us, where shall we begin? The number of beings endued with life, as well as we, seems, at first view, infinite. Not only the forest, the waters, the air, teems with animals of various kinds; but almost every vegetable, every leaf, has millions of minute inhabitants, each of which fill up the circle of its allotted life, and some are found objects of the greatest curiosity. In this seeming exuberance of animals, it is natural for ignorance to lie down in hopeless uncertainty, and to declare what requires labour to particularize to be utterly inscrutable. It is otherwise, however, with the active and searching mind; no way intimidated with the immense variety, it begins the task of numbering, grouping, and classing, all the various kinds that fall within its notice; finds every day new relations between the several parts of the creation; acquires the art of considering several at a time under one point of view; and, at last, begins to find that the variety is neither so great nor so inscrutable as was at first imagined. As in a clear night, the number of the stars seems infinite; yet, if

we sedulously attend to each in its place, and regularly class them, they will soon be found to diminish, and come within a very scanty computation.

Method is one of the principal helps in natural history, and without it very little progress can be made in this science. It is by that alone we can hope to dissipate the glare, if I may so express it, which arises from a multiplicity of objects at once presenting themselves to the view. It is method that fixes the attention to one point, and leads it, by slow and certain degrees, to leave no part of nature unobserved.

All naturalists, therefore, have been very careful in adopting some method of classing or grouping the several parts of nature, and some have written books of natural history with no other view. These methodical divisions some have treated with contempt,[1] not considering that books, in general, are written with opposite views; some to be read, and some only to be occasionally consulted. The methodists in natural history seem to be content with the latter advantage; and have sacrificed to order alone, all the delights of the subject, all the arts of heightening, awakening, or continuing curiosity. But they certainly have the same use in science, that a dictionary has in language; but with this difference, that in a dictionary we proceed from the name to the definition; in a system of natural history, we proceed from the definition to find out the thing. Without the aid of system, nature must still have lain undistinguished, like furniture in a lumber-room: every thing we wish for is there indeed, but we know not where to find it. If, for instance, in a morning excursion, I find a plant, or an insect, the name of which I desire to learn; or, perhaps, am curious to know whether already known; in this inquiry I can expect information only from one of these systems, which being couched in a methodical form, quickly directs me to what I seek for. Thus we will suppose that our inquirer has met with a spider, and that he has never seen such an insect before. He is taught by the writer of a system[2] to examine whether it has wings, and he finds it has none. He, therefore, is to look for it among the wingless insects, or the Aptera, as Linnæus calls them: he then is to see whether the head and breast make one part of the body, or are

1 Mr Buffon in his Introduction, &c. 2 Linnæus.

disunited; he finds they make one: he is then to reckon the number of feet and eyes, and he finds that it has eight of each. The insect, therefore, must be either a scorpion or a spider; but he lastly examines its feelers, which he finds clavated, or clubbed: and, by all these marks, he at last discovers it to be a spider. Of spiders there are forty seven sorts; and, by reading the description of each, the inquirer will learn the name of that which he desires to know. With the name of the insect, he is also directed to those authors that have given any account of it, and the page where that account is to be found; by this means he may know at once what has been said of that animal by others, and what there is of novelty in the result of his own researches.

From hence it will appear how useful those systems in natural history are to the inquirer; but, having given them all their merit, it would be wrong not to observe, that they have, in general, been very much abused. Their authors, in general, seem to think that they are improvers of natural history, when in reality they are but guides; they seem to boast that they are adding to our knowledge, while they are only arranging it. These authors, also, seem to think that the reading of their works and systems is the best method to attain a knowledge of nature; but setting aside the impossibility of getting through whole volumes of a dry long catalogue, the multiplicity of whose contents is too great for even the strongest memory, such works rather tell us the names than the history of the creature we desire to inquire after. In these dreary pages, every insect or plant, that has a name, makes as distinguished a figure as the most wonderful, or the most useful. The true end of studying nature is to make a just selection, to find those parts of it that most conduce to our pleasure or convenience, and to leave the rest in neglect. But these systems, employing the same degree of attention upon all, give us no opportunities of knowing which most deserves attention; and he who has made his knowledge from such systems only, has his memory crowded with a number of trifling or minute particulars, which it should be his business and his labour to forget. These books, as was said before, are useful to be consulted, but they are very unnecessary to be read; no inquirer into nature should be without one of them; and, without any doubt, Linnæus deserves the preference.

One fault more, in almost all these systematic writers, and that which leads me to the subject of the present chapter, is, that seeing the necessity of methodical distribution in some parts of nature, they have introduced it into all. Finding the utility of arranging plants, birds, or insects, they have arranged quadrupeds also with the same assiduity; and although the number of these is so few as not to exceed two hundred,[1] they have darkened the subject with distinctions and divisions, which only serve to puzzle and perplex. All method is only useful in giving perspicuity, where the subject is either dark or copious; but with regard to quadrupeds, the number is but few; many of them we are well acquainted with by habit; and the rest may very readily be known, without any method. In treating of such, therefore, it would be useless to confound the reader with a multiplicity of divisions; as quadrupeds are conspicuous enough to obtain the second rank in nature, it becomes us to be acquainted with, at least, the names of them all. However, as there are naturalists who have gained a name from the excellence of their methods in classing these animals, some readers may desire to have a knowledge of what has been laboriously invented for their instruction. I will just take leave, therefore, to mention the most applauded methods of classing animals, as adopted by Ray, Klein, and Linnæus; for it often happens, that the terms which have been long used in a science, though frivolous, become, by prescription, a part of the science itself.*

Ray, after Aristotle, divides all animals into two kinds; those which have blood, and those which are bloodless. In the last class, he places all the insect tribes. The former he divides into such as breathe through the lungs, and such as breathe through gills: these last comprehend the fishes. In those which breathe through the lungs, some have the heart composed of two ventricles, and some have it of one. Of the last are all animals of the cetaceous kind, all oviparous quadrupeds, and serpents. Of those that have two ventricles, some are ovipa-

1 In Dr Shaw's General Zoology, the number of quadrupeds, not including the cetaceous and seal tribes, amount to five hundred and twelve, besides their varieties.

* In the appendix to this work, the reader will find a view of the various classifications of animals, particularly of the Cuvierian or natural system of Zoology.

rous, which are the birds; and some viviparous, which are quadrupeds. The quadrupeds, he divides into such as have a hoof, and such as are claw-footed. Those with the hoof, he divides into such as have it undivided, such as have it cloven, and such as have the hoof divided into more parts, as the rhinoceros, and hippopotamus. Animals with the cloven hoof, he divides into such as chew the cud, as the cow and the sheep; and such as are not ruminant, as the hog. He divides those animals that chew the cud, into four kinds; the first have hollow horns, which they never shed, as the cow; the second is of a less species, and is of the sheep kind; the third is of the goat kind; and the last, which have solid horns, and shed them annually, are of the deer kind. Coming to the claw-footed animals, he finds some with large claws, resembling the fingers of the human hand. and these he makes the ape kind. Of the others, some have the foot divided in two, have a claw to each division; these are the camel kind. The elephant makes a kind by itself, as its claws are covered over by a skin. The rest of the numerous tribe of claw-footed animals he divides into two kinds; the analogous, or such as resemble each other; and the anomalous, which differ from the rest. The analogous claw-footed animals, are of two kinds; they have more than two cutting teeth in each jaw, such as the lion and the dog, which are carnivorous; or they have but two cutting teeth in each jaw, and these are chiefly fed upon vegetables. The carnivorous kinds are divided into the great and the little. The great carnivorous animals are divided into such as have a short snout, as the cat and the lion: and such as have it long and pointed, as the dog and the wolf. The little claw-footed carnivorous animals, differ from the great, in having a proportionably smaller head, and a slender body, that fits them for creeping into holes, in pursuit of their prey like worms; and they are therefore called the vermin kind.

We see, from this sketch of division and subdivision, how a subject, extremely delightful and amusing in itself, may be darkened and rendered disgusting. But, notwithstanding, Ray seems to be one of the most simple distributors; and his method is still, and not without reason, adopted by many. Such as have been at the trouble to learn this method, will certainly find it useful: nor would we be thought, in the least, to take from its merits; all we contend for is, that the

same information may be obtained by a pleasanter and an easier method.

It was the great success of Ray's method, that soon after produced such a variety of attempts in the same manner; but almost all less simple, and more obscure. Mr Klein's method is briefly as follows; he makes the power of changing place, the characteristic mark of animals in general; and he takes their distinctions from their aptitude and fitness for such a change. Some change place by means of feet, or some similar contrivance; others have wings and feet: some can change place only in water, and have only fins: some go upon earth, without any feet at all: some change place, by moving their shell; and some move only at a certain time of the year. Of such, however, as do not move at all, he takes no notice. The quadrupeds that move chiefly by means of four feet upon land he divides into two orders. The first are the hoofed kind; and the second, the claw kind. Each of these orders is divided into four families. The first family of the hoofed kind, are the single hoofed, such as the horse, ass, &c. The second family are such as have the hoof cloven into two parts, such as the cow, &c. The third family have the hoof divided into three parts, and in this family is found only the rhinoceros. The fourth family have the hoof divided into five parts; and in this is only to be found the elephant. With respect to the clawed kind, the first family comprehends those that have but two claws on each foot, as the camel; the second family have three claws; the third, four; and the fourth, five. This method of taking the distinctions of animals from the organs of motion, is ingenious; but is, at the same time, incomplete; and, besides, the divisions into which it must necessarily fall are inadequate; since, for instance, in his family with two claws, there is but one animal; whereas, in his family with five claws, there are above a hundred.

Brisson, who has laboured this subject with great accuracy, divides animated nature into nine classes; namely, quadrupeds; cetaceous animals, or those of the whale kind; birds; reptiles, or those of the serpent kind; cartilaginous fishes; spinous fishes; shelled animals; insects; and worms. He divides the quadrupeds into eighteen orders; and takes their distinctions from the number and form of their teeth.

But of all those whose systems have been adopted and admir-

ed, Linnæus is the foremost; as with a studied brevity his system comprehends the greatest variety in the smallest space.

According to him, the first distinction of animals is to be taken from their internal structure. Some have the heart with two ventricles, and hot red blood; namely, quadrupeds and birds. The quadrupeds are viviparous, and the birds oviparous.

Some have the heart with but two ventricles, and cold red blood; namely, amphibia and fishes. The amphibia are furnished with lungs; the fishes with gills.

Some have the heart with one ventricle, and cold white serum; namely, insects and worms; the insects have feelers; and the worms, holders.

The distinctions of quadrupeds or animals with paps, as he calls them, are taken from their teeth. He divides them into seven orders; to which he gives names that are not easy of translation: Primates, or principles, with four cutting teeth in each jaw; Bruta, or brutes, with no cutting teeth; Feræ, or wild beasts, with generally six cutting teeth in each jaw; Glires, or dormice, with two cutting teeth, both above and below; Pecora, or cattle, with many cutting teeth above, and none below; Belluæ, or beasts, with the fore-teeth blunt; Cete, or those of the whale kind, with cartilaginous teeth. I have but just sketched out this system, as being, in its own nature, the closest abridgment: it would take volumes to dilate it to its proper length. The names of the different animals, and their classes, alone make two thick octavo volumes; and yet nothing is given but the slightest description of each. I have omitted all criticism also upon the accuracy of the preceding systems; this has been done both by Buffon and Daubenton, not with less truth than humour; for they had too much good sense not to see the absurdity of multiplying the terms of science to no end, and disappointing our curiosity rather with a catalogue of nature's varieties, than a history of nature.

Instead, therefore, of taxing the memory and teasing the patience with such a variety of divisions and subdivisions, I will take leave to class the productions of nature in the most obvious, though not in the most accurate, manner. In natural history, of all other sciences, there is the least danger of obscurity. In morals, or in metaphysics, every definition must be precise, because those sciences are built upon definitions; but it is other-

wise in those subjects where the exhibition of the object itself is always capable of correcting the error. Thus it may often happen, that in a lax system of natural history, a creature may be ranked among quadrupeds that belongs more properly to the fish or the insect classes. But that can produce very little confusion, and every reader can thus make a system the most agreeable to his own imagination. It will be of no manner of consequence whether we call a bird or insect a quadruped, if we are careful in marking all its distinctions: the uncertainty in reasoning, or thinking, that these approximations of the different kinds of animals produce, is but very small, and happens but very rarely; whereas the labour that naturalists have been at to keep the kinds asunder, has been excessive. This, in general, has given birth to that variety of systems which we have just mentioned, each of which seems to be almost as good as the preceding.

Taking, therefore, this latitude, and using method only where it contributes to conciseness or perspicuity, we shall divide animated nature into four classes; namely, Quadrupeds, Birds, Fishes, and Insects. All these seem in general pretty well distinguished from each other by nature; yet there are several instances in which we can scarcely tell whether it is a bird or a quadruped that we are about to examine; whether it is a fish or an insect that offers to our curiosity. Nature is varied by imperceptible gradations, so that no line can be drawn between any two classes of its productions, and no definition made to comprehend them all. However, the distinctions between these classes are sufficiently marked, and their encroachments upon each other are so rare, that it will be sufficient particularly to apprise the reader when they happen to be blended.

There are many quadrupeds that we are well acquainted with; and of those we do not know, we shall form the most clear and distinct conceptions, by being told wherein they differ, and wherein they resemble those with which we are familiar. Each class of quadrupeds may be ranged under some one of the domestic kinds, that may serve for the model by which we are to form some kind of idea of the rest. Thus we may say that a tiger is of the cat kind, a wolf of the dog kind, because there are some rude resemblances between each; and a person who has never seen the wild animals, will have some incomplete knowledge of their figure from the tame ones. On the contrary, I

will not, as some systematic writers have done,[1] say that the bat is of the human kind, or a hog of the horse kind, merely because there is some resemblance in their teeth, or their paps. For although this resemblance may be striking enough, yet a person who has never seen a bat or a hog, will never form any just conception of either by being told of this minute similitude. In short, the method in classing quadrupeds should be taken from their most striking resemblances; and where these do not offer, we shall not force the similitude, but leave the animal to be described as a solitary species. The number of quadrupeds is so few, that indeed, without any method whatever, there is no great danger of confusion.

All quadrupeds, the number of which, according to Buffon, amounts to but two hundred, may be classed in the following manner.

First, those of the Horse kind. This class contains the Horse, the Ass, and the Zebra. Of these none have horns, and their hoof is of one solid piece.

The second class are those of the Cow kind; comprehending the Urus, the Buffalo, the Bison, and the Bonassus. These have cloven hoofs, and chew the cud.

The third class is that of the Sheep kind; with cloven hoofs, and chewing the cud like the former. In this is comprehended the Sheep, the Goat, the Lama, the Vigogne, the Gazella, the Guinea Deer, and all of a similar form.

The fourth class is that of the Deer kind, with cloven hoofs, and with solid horns, that are shed every year. This class contians the Elk, the Rein-deer, the Stag, the Buck, the Roe-buck, and the Axis.

The fifth class comprehends all those of the Hog kind, the Peccari, and the Babyrouessa.

The sixth class is, that numerous one of the Cat kind. This comprehends the Cat, the Lion, the Panther, the Leopard, the Jaguar, the Cougar, the Jaguarette, the Lynx, the Ounce, and the Catamountain. These are all carnivorous, and furnished with crooked claws, which they can sheathe and unsheathe at pleasure.

The seventh class is that of the Dog kind, carnivorous, and

[1] Linnæi Syst.

furnished with claws like the former, but which they cannot sheathe. This class comprehends the Dog, the Wolf, the Fox, the Jackal, the Isatis, the Hyæna, the Civet, the Gibet, and the Genet.

The eighth class is that of the Weasel kind, with a long small body, with five toes, or claws, on each foot; the first of them separated from the rest like a thumb. This comprehends the Weasel, the Martin, the Pole-cat, the Ferret, the Mangoust, the Vansire, the Ermine, with all the varieties of the American Moufettes.

The ninth class is that of the Rabbit kind, with two large cutting teeth in each jaw. This comprehends the Rabbit, the Hare, the Guinea-pig, all the various species of the Squirrel, the Dormouse, the Marmotte, the Rat, the Mouse, the Agouti, the Paca, the Aperea, and the Tapeti.

The tenth class is that of the Hedge-hog kind, with claw-feet, and covered with prickles; comprehending the Hedge-hog and the Porcupine, the Couando and the Urson.

The eleventh class is that of the Tortoise kind, covered with a shell, or scales. This comprehends the Tortoise, the Pangolin, and the Phataguin.

The twelfth is that of the Otter, or amphibious kind; comprehending the Otter, the Beaver, the Desman, the Morse, and the Seal.

The thirteenth class is that of the Ape and Monkey kinds, with hands, and feet resembling hands.

The fourteenth class is that of winged quadrupeds, or the Bat kind; containing the Bat, the Flying Squirrel, and some other varieties

The animals which seem to approach no other kind, either in nature or in form, but to make each a distinct species in itself, are the following: the Elephant, the Rhinoceros, the Hippopotamus, the Camelopard, the Camel, the Bear, the Badger, the Tapir, the Cabrai, the Coati, the Ant-bear, the Tatou, and, lastly, the Sloth.

All other quadrupeds, whose names are not set down, will be found among some of the above-mentioned classes, and referred to that which they most resemble. When, therefore, we are at a loss to know the name of any particular animal, by examining which of the known kinds it most resembles, either in shape, or

in hoofs, or claws, and then examining the particular description, we shall be able to discover not only its name, but its history. I have already said, that all methods of this kind are merely arbitrary, and that Nature makes no exact distinction between her productions. It is hard, for instance, to tell whether we ought to refer the civet to the dog or the cat kind; but, if we know the exact history of the civet, it is no great matter to which kind we shall judge it to bear the greatest resemblance. It is enough, that a distribution of this kind excites in us some rude outlines of the make, or some marked similitudes in the nature of these animals; but to know them with any precision, no system, or even description, will serve, since the animal itself, or a good print of it, must be seen, and its history be read at length, before it can be said to be known. To pretend to say that we have an idea of a quadruped, because we can tell the number or the make of its teeth, or its paps, is as absurd as if we should pretend to distinguish men by the buttons of their clothes. Indeed it often happens that the quadruped itself can be but seldom seen; that many of the more rare kinds do not come into Europe above once in an age, and some of them have never been able to bear the removal: in such a case, therefore, there is no other substitute but a good print of the animal, to give an idea of its figure; for no description whatsoever can answer this purpose so well. Mr Locke, with his usual good sense, has observed, that a drawing of the animal, taken from the life, is one of the best methods of advancing natural history; and yet most of our modern systematic writers are content rather with describing. Descriptions, no doubt, will go some way towards giving an idea of the figure of an animal; but they are certainly much the longest way about, and, as they are usually managed, much the most obscure. In a drawing we can, at a single glance, gather more instruction than by a day's painful investigation of methodical systems, where we are told the proportions with great exactness, and yet remain ignorant of the totality. In fact, this method of describing all things is a fault that has infected many of our books, that treat on the meaner arts, for this last age. They attempt to teach by words, what is only to be learnt by practice and inspection. Most of our dictionaries, and bodies of arts and sciences, are guilty of this error. Suppose, for instance, it be requisite to mention the manner of making shoes, it is plain that all the ver-

bal instructions in the world will never give an adequate idea of this humble art, or teach a man to become a shoemaker. A day or two in a shoemaker's shop will answer the end better than a whole folio of instruction, which only serves to oppress the learner with the weight of its pretended importance. We have lately seen a laborious work carried on at Paris, with this only intent, of teaching all the trades by description: however, the design at first blush seems to be ill considered; and it is probable that very few advantages will be derived from so laborious an undertaking. With regard to the descriptions in natural history, these, without all question, under the direction of good sense, are necessary; but still they should be kept within proper bounds; and, where a thing may be much more easily shown than described, the exhibition should ever precede the account.

CHAP. XV.

OF QUADRUPEDS IN GENERAL, COMPARED TO MAN.

Upon comparing the various animals of the globe with each other, we shall find that quadrupeds demand the rank immediately next ourselves; and, consequently, come first in consideration. The similitude between the structure of their bodies and ours, those instincts which they enjoy in a superior degree to the rest, their constant services, or their unceasing hostilities, all render them the foremost objects of our curiosity, the most interesting parts of animated nature. These, however, although now so completely subdued, very probably, in the beginning, were nearer upon an equality with us, and disputed the possession of the earth. Man, while yet savage himself, was but ill qualified to civilize the forest. While yet naked, unarmed, and without shelter, every wild beast was a formidable rival; and the destruction of such was the first employment of heroes. But when he began to multiply, and the arts to accumulate, he soon cleared the plains of the most noxious of these his rivals; a part was taken under his protection and care, while the rest found a precarious refuge in the burning desert, or the howling wilderness.

From being rivals, quadrupeds have now become the assistants of man; upon them he devolves the most laborious employments, and finds in them patient and humble coadjutors, ready to obey, and content with the smallest retribution. It was not, however, without long and repeated efforts that the independent spirit of these animals was broken; for the savage freedom, in wild animals, is generally found to pass down through several generations before it is totally subdued. Those cats and dogs that are taken from a state of natural wildness in the forest, still transmit their fierceness to their young; and, however concealed in general, it breaks out upon several occasions. Thus the assiduity and application of man in bringing them up, not only alters their disposition, but their very forms; and the difference between animals in a state of nature and domestic tameness, is so considerable, that Mr Buffon has taken this as a principal distinction in classing them.

In taking a cursory view of the form of quadrupeds, we may easily perceive, that of all the ranks of animated nature, they bear the nearest resemblance to man. This similitude will be found more striking when, erecting themselves on their hinder feet, they are taught to walk forward in an upright posture. We then see that all their extremities in a manner correspond with ours, and present us with a rude imitation of our own. In some of the ape kind the resemblance is so striking, that anatomists are puzzled to find in what part of the human body man's superiority consists; and scarcely any but the metaphysician can draw the line that divides them.

But if we compare their internal structure with our own, the likeness will be found still to increase, and we shall perceive many advantages they enjoy in common with us, above the lower tribes of nature. Like us, they are placed above the class of birds, by bringing forth their young alive; like us, they are placed above the class of fishes, by breathing through the lungs; like us, they are placed above the class of insects, by having red blood circulating through their veins; and, lastly, like us, they are different from almost all the other classes of animated nature, being either wholly or partly covered with hair. Thus nearly are we represented, in point of conformation, to the class of animals immediately below us; and this shows what little reason we have to be proud of our persons alone.

to the perfection of which quadrupeds make such very near approaches.

The similitude of quadrupeds to man obtains also in the fixedness of their nature, and their being less apt to be changed by the influence of climate or food, than the lower ranks of nature.[1] Birds are found very apt to alter both in colour and size; fishes likewise still more; insects may be quickly brought to change and adapt themselves to the climate; and if we descend to plants, which may be allowed to have a kind of living existence, their kinds may be surprisingly and readily altered, and taught to assume new forms. The figure of every animal may be considered as a kind of drapery, which it may be made to put on or off by human assiduity: in man, the drapery is almost invariable; in quadrupeds, it admits of some variation; and the variety may be made greater still, as we descend to the inferior classes of animal existence.

Quadrupeds, although they are thus strongly marked, and in general divided from the various kinds around them, yet some of them are often of so equivocal a nature, that it is hard to tell whether they ought to be ranked in the quadruped class, or degraded to those below them. If, for instance, we were to marshal the whole groupe of animals round man, placing the most perfect next him, and those most equivocal near the classes they most approach, we should find it difficult after the principal had taken their stations near him, where to place many that lie at the outskirts of this phalanx. The bat makes a near approach to the aerial tribe, and might, by some, be reckoned among the birds. The porcupine has not less pretensions to that class, being covered with quills, and showing that birds are not the only part of nature that are furnished with such a defence. The armadillo might be referred to the tribe of insects or snails, being like them covered with a shell; the seal and the morse might be ranked among the fishes, like them being furnished with fins and almost constantly reside ing in the same element. All these, the farther they recedfrom the human figure, become less perfect, and may be considered as the lowest kinds of that class to which we have referred them.

But although the variety in quadrupeds is thus great, they all

1 Buffon.

seem well adapted to the stations in which they are placed. There is scarcely one of them, how rudely shaped soever, that is not formed to enjoy a state of happiness fitted to its nature. All its deformities are only relative to us, but all its enjoyments are peculiarly its own. We may superficially suppose the sloth, that takes up months in climbing a single tree, or the mole, whose eyes are too small for distant vision, are wretched and helpless creatures: but it is probable that their life, with respect to themselves, is a life of luxury; the most pleasing food is easily obtained; and as they are abridged in one pleasure, it may be doubled in those which remain. Quadrupeds, and all the lower kinds of animals, have, at worst, but the torments of immediate evil to encounter, and this is but transient and accidental: man has two sources of calamity, that which he foresees, as well as that which he feels; so that if his reward were to be in this life alone, then, indeed, would he be of all beings the most wretched.

The heads of quadrupeds, though differing from each other, are, in general, adapted to their way of living. In some it is sharp, the better to fit the animal for turning up the earth in which its food lies. In some it is long, in order to give a greater room for the olfactory nerves, as in dogs, who are to hunt and find out their prey by the scent. In others, it is short and thick, as in the lion, to increase the strength of the jaw, and to fit it the better for combat. In quadrupeds that feed upon grass, they are enabled to hold down their heads to the ground, by a strong tendinous ligament, that runs from the head to the middle of the back. This serves to raise the head, although it has been held to the ground for several hours, without any labour or any assistance from the muscles of the neck.

The teeth of all animals are entirely fitted to the nature of their food. Those of such as live upon flesh differ in every respect from such as live upon vegetables. In the latter, they seem entirely made for gathering and bruising their simple food, being edged before, and fitted for cutting; but broad towards the back of the jaw, and fitted for pounding. In the carnivorous kinds, they are sharp before, and fitted rather for holding than dividing. In the one, the teeth serve as grindstones; in the other, as weapons of defence: in both, however, the surface of those teeth which serve for grinding are unequal: the

cavities and risings fitting those of the opposite, so as to tally exactly when the jaws are brought together. These inequalities better serve for comminuting the food; but they become smooth with age; and, for this reason, old animals take a longer time to chew their food than such as are in the vigour of life.

Their legs are not better fitted than their teeth to their respective wants or enjoyments. In some they are made for strength only, and to support a vast unwieldy frame, without much flexibility or beautiful proportion. Thus, the legs of the elephant, the rhinoceros, and the sea-horse, resemble pillars: were they made smaller, they would be unfit to support the body; were they endowed with greater flexibility, or swiftness, that would be needless, as they do not pursue other animals for food; and conscious of their own superior strength, there are none that they deign to avoid. Deer, hares, and other creatures, that are to find safety only in flight have their legs made entirely for speed; they are slender, and nervous. Were it not for this advantage every carnivorous animal would soon make them a prey, and their races would be entirely extinguished. But, in the present state of nature, the means of safety are rather superior to those of offence; and the pursuing animal must owe success only to patience, perseverance, and industry. The feet of some that live upon fish alone, are made for swimming. The toes of these animals are joined together with membranes, being web-footed like a goose or a duck, by which they swim with great rapidity. Those animals that lead a life of hostility, and live upon others, have their feet armed with sharp claws, which some can sheathe, and unsheathe, at will. Those, on the contrary, who lead peaceful lives, have generally hoofs, which serve some as weapons of defence; and which in all are better fitted for traversing extensive tracts of rugged country, than the claw-foot of their pursuers.

The stomach is generally proportioned to the quality of the animal's food, or the ease with which it is obtained. In those that live upon flesh, and such nourishing substances, it is small and glandular, affording such juices as are best adapted to digest its contents; their intestines also are short, and without fatness. On the contrary, such animals as feed entirely upon vegetables, have the stomach very large; and those who chew the cud have no less than four stomachs, all which serve as so many laboratories,

to prepare and turn their coarse food into proper nourishment. In Africa, where the plants afford greater nourishment than in our temperate climates, several animals, that with us have four stomachs, have there but two.[1] However, in all animals the size of the intestines is proportioned to the nature of the food: where that is furnished in large quantities the stomach dilates to answer the increase. In domestic animals, that are plentifully supplied, it is large; in the wild animals, that live precariously, it is much more contracted, and the intestines are much shorter.

In this manner, all animals are fitted by nature to fill up some peculiar station. The greatest animals are made for an inoffensive life, to range the plains and the forest without injuring others; to live upon the productions of the earth, the grass of the field, or the tender branches of trees. These, secure in their own strength, neither fly from any other quadrupeds, nor yet attack them: Nature to the greatest strength has added the most gentle and harmless dispositions: without this those enormous creatures would be more than a match for all the rest of the creation; for what devastation might not ensue, were the elephant, or the rhinoceros, or the buffalo, as fierce and as mischievous as the tiger or the rat? In order to oppose these larger animals and in some measure to prevent their exuberance, there is a species of the carnivorous kind, of inferior strength indeed, but of greater activity and cunning. The lion and the tiger generally watch for the larger kinds of prey, attack them at some disadvantage, and commonly jump upon them by surprise. None of the carnivorous kinds, except the dog alone, will make a voluntary attack, but with the odds on their side. They are all cowards by nature, and usually catch their prey by a bound from some lurking-place, seldom attempting to invade them openly; for the larger beasts are too powerful for them, and the smaller too swift.

A lion does not willingly attack a horse, and then only when compelled by the keenest hunger. The combats between a lion and a horse are frequent enough in Italy; where they are both enclosed in a kind of amphitheatre, fitted for that purpose. The lion always approaches wheeling about, while the horse presents his hinder parts to the enemy. The lion in this manner

1 Buffon.

goes round and round, still narrowing his circle, till he comes to the proper distance to make his spring; just at the time the lion springs, the horse lashes with both legs from behind, and, in general, the odds are in his favour; it more often happening that the lion is stunned, and struck motionless by the blow, than that he effects his jump between the horse's shoulders. If the lion is stunned, and left sprawling, the horse escapes, without attempting to improve his victory; but if the lion succeeds, he sticks to his prey, and tears the horse in pieces, in a very short time.

But it is not among the larger animals of the forest alone, that these hostilities are carried on; there is a minuter, and a still more treacherous contest, between the lower ranks of quadrupeds. The panther hunts for the sheep and the goat; the catamountain for the hare or the rabbit; and the wild cat for the squirrel or the mouse. In proportion as each carnivorous animal wants strength, it uses all the assistance of patience, assiduity, and cunning. However, the arts of these to pursue, are not so great as the tricks of their prey to escape; so that the power of destruction in one class, is inferior to the power of safety in the other. Were this otherwise, the forest would soon be dispeopled of the feebler races of animals; and beasts of prey themselves would want, at one time, that subsistence which they lavishly destroyed at another.

Few wild animals seek their prey in the day-time; they are then generally deterred by their fears of man in the inhabited countries, and by the excessive heat of the sun in those extensive forests that lie towards the south, and in which they reign the undisputed tyrants. As soon as the morning, therefore, appears, the carnivorous animals retire to their dens; and the elephant, the horse, the deer, and all the hare kinds, those inoffensive tenants of the plain, make their appearance. But again, at night-fall, the state of hostility begins; the whole forest then echoes to a variety of different howlings. Nothing can be more terrible than an African landscape at the close of evening; the deep-toned roarings of the lion; the shriller yellings of the tiger; the jackal, pursuing by the scent, and barking like a dog; the hyena, with a note peculiarly solitary and dreadful; but, above all, the hissing of the various kinds of serpents, that then begin their call, and, as I am assured, make a much louder symphony than the birds in our groves in a morning.

Beasts of prey seldom devour each other; nor can any thing but the greatest degree of hunger induce them to it. What they chiefly seek after, is the deer, or the goat; those harmless creatures, that seem made to embellish nature. These are either pursued or surprised, and afford the most agreeable repast to their destroyers. The most usual method with even the fiercest animals, is to hide and crouch near some path frequented by their prey; or some water where cattle come to drink; and seize them at once with a bound. The lion and the tiger leap twenty feet at a spring; and this, rather than their swiftness or strength, is what they have most to depend upon for a supply. There is scarcely one of the deer or hare kind, that is not very easily capable of escaping them by its swiftness; so that whenever any of these fall a prey, it must be owing to their own inattention.

But there is another class of the carnivorous kind, that hunt by the scent, and which it is much more difficult to escape. It is remarkable, that all animals of this kind pursue in a pack; and encourage each other by their mutual cries. The jackal, the syagush, the wolf, and the dog, are of this kind; they pursue with patience rather than swiftness; their prey flies at first, and leaves them for miles behind; but they keep on with a constant steady pace, and excite each other by a general spirit of industry and emulation, till at last they share the common plunder. But it too often happens, that the larger beasts of prey, when they hear a cry of this kind begin, pursue the pack, and when they have hunted down the animal, come in and monopolize the spoil. This has given rise to the report of the jackal's being the lion's provider; when the reality is, that the jackal hunts for itself, and the lion is an unwelcome intruder upon the fruit of his toil.

Nevertheless, with all the powers which carnivorous animals are possessed of, they generally lead a life of famine and fatigue. Their prey has such a variety of methods for escaping, that they sometimes continue without food for a fortnight together: but nature has endowed them with a degree of patience equal to the severity of their state; so that as their subsistence is precarious, their appetites are complying. They usually seize their prey with a roar, either of seeming delight, or perhaps to terrify it from resistance. They frequently devour it, bones and all, in

the most ravenous manner; and then retire to their dens, continuing inactive, till the calls of hunger again excite their courage and industry. But as all their methods of pursuit are counteracted by the arts of evasion, they often continue to range without success, supporting a state of famine for several days, nay, sometimes, weeks together. Of their prey, some find protection in holes, in which nature has directed them to bury themselves; some find safety by swiftness; and such as are possessed of neither of these advantages, generally herd together, and endeavour to repel invasion by united force. The very sheep, which to us seem so defenceless, are by no means so in a state of nature; they are furnished with arms of defence, and a very great degree of swiftness; but they are still further assisted by their spirit of mutual defence: the females fall into the centre; and the males, forming a ring round them, oppose their horns to the assailants. Some animals, that feed upon fruits which are to be found only at one time of the year, fill their holes with several sorts of plants, which enable them to lie concealed during the hard frosts of the winter, contented with their prison, since it affords them plenty and protection. These holes are dug with so much art, that there seems the design of an architect in the formation. There are usually two apertures, by one of which the little inhabitant can always escape, when the enemy is in possession of the other. Many creatures are equally careful of avoiding their enemies, by placing a sentinel to warn them of the approach of danger. These generally perform this duty by turns; and they know how to punish such as have neglected their post, or have been unmindful of the common safety. Such are a part of the efforts that the weaker races of quadrupeds exert to avoid their invaders; and, in general, they are attended with success. The arts of instinct are most commonly found an overmatch for the invasions of instinct. Man is the only creature against whom all their little tricks cannot prevail. Wherever he has spread his dominions, scarcely any flight can save, or any retreat harbour; wherever he comes, terror seems to follow, and all society ceases among the inferior tenants of the plain; their union against him can yield them no protection, and their cunning is but weakness. In their fellow-brutes, they have an enemy whom they can oppose with an equality of advantage: they can oppose fraud or swiftness to force, or numbers to in-

vasion; but what can be done against such an enemy as man, who finds them out though unseen; and though remote, destroys them? Wherever he comes, all the conquests among the meaner ranks seem to be at an end, or is carried on only by surprise. Such as he has thought proper to protect, have calmly submitted to his protection; such as he has found it convenient to destroy, carry on an unequal war, and their numbers are every day decreasing.

The wild animal is subject to few alterations; and, in a state of savage nature, continues for ages the same, in size, shape, and colour. But it is otherwise when subdued, and taken under the protection of man; its external form, and even its internal structure, are altered by human assiduity; and this is one of the first and greatest causes of the variety that we see among the several quadrupeds of the same species. Man appears to have changed the very nature of domestic animals, by cultivation and care. A domestic animal is a slave that seems to have few other desires but such as man is willing to allow it. Humble, patient, resigned, and attentive, it fills up the duties of its station; ready for labour, and content with subsistence.

Almost all domestic animals seem to bear the marks of servitude strong upon them. All the varieties in their colour, all the fineness and length of their hair, together with the depending length of their ears, seem to have arisen from a long continuance of domestic slavery.—What an immense variety is there to be found in the ordinary race of dogs and horses! the principal differences of which have been effected by the industry of man, so adapting the food, the treatment, the labour, and the climate, that Nature seems almost to have forgotten her original design; and the tame animal no longer bears any resemblance to its ancestors in the woods around him.

In this manner, nature is under a kind of constraint, in those animals we have taught to live in a state of servitude near us. The savage animals preserve the marks of their first formation; their colours are generally the same; a rough dusky brown, or a tawny, seem almost their only varieties. But it is otherwise in the tame; their colours are various, and their forms different from each other. The nature of the climate indeed operates upon all; but more particularly on these. That nourishment which is prepared by the hand of man, not adapted to their ap-

purposes, but to suit his own convenience; that climate, the rigours of which he can soften; and that employment to which they are sometimes assigned; produce a number of distinctions that are not to be found among the savage animals. These, at first, were accidental, but in time became hereditary; and a new race of artificial monsters are propagated, rather to answer the purposes of human pleasure than their own convenience. In short, their very appetites may be changed; and those that feed only upon grass may be rendered carnivorous. I have seen a sheep that would eat flesh, and a horse that was fond of oysters.

But not their appetites, or their figure alone, but their very dispositions, and their natural sagacity, are altered by the vicinity of man. In those countries where men have seldom intruded, some animals have been found, established in a kind of civil state of society. Remote from the tyranny of man, they seem to have a spirit of mutual benevolence, and mutual friendship. The beavers, in those distant solitudes, are known to build like architects, and rule like citizens. The habitations that these have been seen to erect, exceed the houses of the human inhabitants of the same country, both in neatness and convenience. But as soon as man intrudes upon their society, they seem impressed with the terrors of their inferior situation, their spirit of society ceases, the bond is dissolved, and every animal looks for safety in solitude, and there tries all its little industry to shift only for itself.

Next to human influence, the climate seems to have the strongest effects both upon the nature and the form of quadrupeds. As in man we have seen some alterations produced by the variety of his situation; so in the lower ranks, that are more subject to variation, the influence of climate is more readily perceived. As these are more nearly attached to the earth, and in a manner connected to the soil; as they have none of the arts of shielding off the inclemency of the weather, or softening the rigours of the sun, they are consequently more changed by its variations. In general it may be remarked, that the colder the country, the larger and the warmer is the fur of each animal; it being wisely provided by Nature, that the inhabitant should be adapted to the rigours of its situation. Thus the fox and wolf, which in temperate climates have but short hair, have a fine long fur in the frozen regions near the pole. On the contrary, those dogs which

with us have long hair, when carried to Guinea or Angola, in a short time cast their thick covering, and assume a lighter dress, and one more adapted to the warmth of the country. The beaver, and the ermine, which are found in the greatest plenty in the cold regions, are remarkable for the warmth and delicacy of their furs; while the elephant and the rhinoceros, that are natives of the line, have scarcely any hair. Not but that human industry can, in some measure, co-operate with, or repress, the effects of climate in this particular. It is well known what alterations are produced, by proper care, in the sheep's fleece, in different parts of our country; and the same industry is pursued with a like success in Syria, where many of their animals are clothed with a long and beautiful hair, which they take care to improve, as they work it into that stuff called camblet, so well known in different parts of Europe.

The disposition of the animal seems also not less marked by the climate than the figure. The same causes that seem to have rendered the human inhabitants of the rigorous climates savage and ignorant, have also operated upon their animals. Both at the line and the pole, the wild quadrupeds are fierce and untameable. In these latitudes, their savage dispositions having not been quelled by any efforts from man, and being still farther stimulated by the severity of the weather, they continue fierce and untractable. Most of the attempts which have hitherto been made to tame the wild beasts brought home from the pole or the equator, have proved ineffectual. They are gentle and harmless enough while young; but as they grow up, they acquire their natural ferocity, and snap at the hand that feeds them. It may indeed, in general, be asserted, that in all countries where the men are most barbarous, the beasts are most fierce and cruel; and this is but a natural consequence of the struggle between man and the more savage animals of the forest; for in proportion as he is weak and timid, they must be bold and intrusive; in proportion as his dominion is but feebly supported, their rapacity must be more obnoxious. In the extensive countries, therefore, lying round the pole, or beneath the line, the quadrupeds are fierce and formidable. Africa has ever been remarked for the brutality of its men, and the fierceness of its animals: its lions and its leopards are not less terrible than its crocodiles and its serpents; their dispositions seem entirely marked with the

rigours of the climate, and being bred in an extreme of heat they show a peculiar ferocity, that neither the force of man can conquer, nor his arts allay. However, it is happy for the wretched inhabitants of those climates, that its most formidable animals are all solitary ones; that they have not learned the art of uniting, to oppress mankind; but each depending on its own strength, invades without any assistant.

The food also is another cause of the variety which we find among quadrupeds of the same kind. Thus the beasts which feed in the valley are generally larger than those which glean a scanty subsistence on the mountain. Such as live in the warm climates, where the plants are much larger and more succulent than with us, are equally remarkable for their bulk. The ox fed in the plains of Indostan, is much larger than that which is more hardily maintained on the side of the Alps. The deserts of Africa, where the plants are extremely nourishing, produce the largest and fiercest animals; and, perhaps for a contrary reason, America is found not to produce such large animals as are seen in the ancient continent. But, whatever be the reason, the fact is certain, that while America exceeds us in the size of its reptiles of all kinds, it is far inferior in its quadruped productions. Thus, for instance, the largest animal of that country is the tapir, which can by no means be compared to the elephant of Africa. Its beasts of prey, also, are divested of that strength and courage which is so dangerous in this part of the world. The American lion, tiger, and leopard, if such diminutive creatures deserve these names, are neither so fierce nor so valiant as those of Africa and Asia. The tiger of Bengal has been seen to measure twelve feet in length, without including the tail: whereas the American tiger seldom exceeds three. This difference obtains still more in the other animals of that country, so that some have been of opinion[1] that all quadrupeds in Southern America are of a different species from those most resembling them in the old world; and that there are none which are common to both, but such as have entered America by the north; and which, being able to bear the rigours of the frozen pole, have travelled from the ancient continent, by that passage, into the new. Thus the bear, the wolf, the elk, the stag, the fox, and

1 Buffon.

the beaver, are known to the inhabitants as well of North America as of Russia; while most of the various kinds to the southward, in both continents, bear no resemblance to each other. Upon the whole, such as peculiarly belong to the new continent are without any marks of the quadruped perfection. They are almost wholly destitute of the power of defence, they have neither formidable teeth, horns, or tail; their figure is awkward, and their limbs ill proportioned. Some among them, such as the ant-bear and the sloth, appear so miserably formed, as scarcely to have the power of moving and eating. They, seemingly, drag out a miserable and languid existence in the most desert solitude; and would quickly have been destroyed in a country where there were inhabitants, or powerful beasts to oppose them.

But if the quadrupeds of the new continent be less, they are found in much greater abundance; for it is a rule that obtains through nature, that the smallest animals multiply the fastest. The goat, imported from Europe to South America, soon begins to degenerate; but as its grows less it becomes more prolific; and, instead of one kid at a time, or two at the most, it gerally produces five, and sometimes more. What there is in the food, or the climate, that produces this change, we have not been able to learn; we might be apt to ascribe it to the heat, but that on the African coast, where it is still hotter, this rule does not obtain; for the goat, instead of degenerating there, seems rather to improve.

However, the rule is general among all quadrupeds, that those which are large and formidable produce but few at a time; while such as are mean and contemptible are extremely prolific. The lion, or tiger, have seldom above two cubs at a litter; while the cat, that is of a similar nature, is usually seen to have five or six. In this manner the lower tribes become extremely numerous; and, but for this surprising fecundity, from their natural weakness they would quickly be extirpated. The breed of mice, for instance, would have long since been blotted from the earth, were the mouse as slow in production as the elephant. But it has been wisely provided, that such animals as can make but little resistance, should at least have a means of repairing the destruction, which they must often suffer, by their quick reproduction; that they should increase even among enemies, and

multiply under the hand of the destroyer. On the other hand, it has as wisely been ordered by Providence, that the larger kinds should produce but slowly; otherwise, as they require proportional supplies from nature, they would quickly consume their own store; and, of consequence, many of them would soon perish through want; so that life would thus be given without the necessary means of subsistence. In a word, Providence has most wisely balanced the strength of the great against the weakness of the little. Since it was necessary that some should be great and others mean, since it was expedient that some should live upon others, it has assisted the weakness of one by granting it fruitfulness; and diminished the number of the other by infecundity.

In consequence of this provision, the larger creatures, which bring forth few at a time, seldom begin to generate till they have nearly acquired their full growth. On the contrary, those which bring many, reproduce before they have arrived at their natural size. Thus the horse and the bull are nearly at their best before they begin to breed; the hog and the rabbit scarcely leave the teat before they become parents in turn. Almost all animals likewise continue the time of their pregnancy in proportion to their size. The mare continues eleven months with foal, the cow nine, the wolf five, and the bitch nine weeks. In all, the intermediate litters are the most fruitful; the first and the last generally producing the fewest in number, and the worst of the kind.

Whatever be the natural disposition of animals at other times, they all acquire new courage when they consider themselves as defending their young. No terrors can then drive them from the post of duty; the mildest begin to exert their little force, and resist the most formidable enemy. Where resistance is hopeless, they then incur every danger, in order to rescue their young by flight, and retard their own expedition by providing for their little ones. When the female oppossum, an animal of America, is pursued, she instantly takes her young into a false belly, with which nature has supplied her, and carries them off, or dies in the endeavour. I have been lately assured of a she-fox, which, when hunted, took her cub in her mouth, and run for several miles without quitting it, until at last she was forced to leave it behind, upon the approach of a mastiff, as she ran

through a farmer's yard. But, if at this period the mildest animals acquire new fierceness, how formidable must those be that subsist by rapine! At such times, no obstacles can stop their ravage, nor no threats can terrify; the lioness then seems more hardy than even the lion himself. She attacks men and beasts indiscriminately, and carries all she can overcome reeking to her cubs, whom she thus early accustoms to slaughter. Milk, in the carnivorous animals, is much more sparing than in others; and it may be for this reason that all such carry home their prey alive, that, in feeding their young, its blood may supply the deficiencies of nature, and serve instead of that milk with which they are so sparingly supplied.

Nature, that has thus given them courage to defend their young, has given them instinct to choose the proper times of copulation, so as to bring forth when the provision suited to each kind is to be found in the greatest plenty. The wolf, for instance, couples in November, so that the time of pregnancy continuing five months, it may have its young in April. The mare, who goes eleven months, admits the horse in summer, in order to foal about the beginning of May. On the contrary, those animals which lay up provisions for the winter, such as the beaver and the marmotte, couple in the latter end of autumn, so as to have their young about January, against which season they have provided a very comfortable store. These seasons for coupling, however, among some of the domestic kinds, are generally in consequence of the quantity of provisions with which they are at any time supplied. Thus we may, by feeding any of these animals, and keeping off the rigour of the climate, make them breed whenever we please. In this manner those contrive who produce lambs all the year round.

The choice of situation in bringing forth is also very remarkable. In most of the rapacious kinds, the female takes the utmost precautions to hide the place of her retreat from the male; who otherwise, when pressed by hunger, would be apt to devour her cubs. She seldom, therefore, strays far from the den, and never approaches it while he is in view, nor visits him again till her young are capable of providing for themselves. Such animals as are of tender constitutions take the utmost care to provide a place of warmth, as well as safety, for their young; the rapacious kinds bring forth in the thickest woods; those that

chew the cud, with the various tribes of the vermin kind, choose some hiding place in the neighbourhood of man. Some dig holes in the ground; some choose the hollow of a tree; and all the amphibious kinds bring up their young near the water, and accustom them betimes to their proper element.

Thus Nature seems kindly careful for the protection of the meanest of her creatures: but there is one class of quadrupeds that seems entirely left to chance, that no parent stands forth to protect, nor no instructor leads, to teach the arts of subsistence. These are the quadrupeds that are brought forth from the egg, such as the lizard, the tortoise, and the crocodile. The fecundity of all other animals compared with these is sterility itself. These bring forth above two hundred at a time; but, as the offspring is more numerous, the parental care is less exerted. Thus the numerous brood of eggs are, without farther solicitude, buried in the warm sands of the shore, and the heat of the sun alone is left to bring them to perfection. To this perfection they arrive almost as soon as disengaged from the shell. Most of them, without any other guide than instinct, immediately make to the water. In their passage thither, they have numberless enemies to fear. The birds of prey that haunt the shore, the beasts that accidentally come there, and even the animals that give them birth, are known, with a strange rapacity, to thin their numbers as well as the rest.

But it is kindly ordered by Providence, that these animals which are mostly noxious, should thus have many destroyers: were it not for this, by their extreme fecundity, they would soon overrun the earth, and cumber all our plains with deformity.

A

HISTORY OF ANIMALS.

BOOK I.

ANIMALS OF THE HORSE KIND.

CHAP. I.

OF THE HORSE.[1]*

ANIMALS of the horse kind deserve a place next to man, in a history of nature. Their activity, their strength, their usefulness, and their beauty, all contribute to render them the princi-

1 As it may happen, that in a description where it is the aim rather to insert what is not usually known, than all that is known, some of the more obvious particulars may be omitted; I will take leave to subjoin in the notes the characteristic marks of each animal, as given us by Linnæus. "The horse, with six cutting teeth before, and single-hoofed; a native of Europe and the East (but I believe rather of Africa); a generous, proud, and strong animal; fit either for the draught, the course, or the road; he is delighted with woods; he takes care of his hinder parts; defends himself from the flies with his tail; scratches his fellow; defends his young; calls by neighing; sleeps after night-fall; fights by kicking, and by biting also; rolls on the ground when he sweats; eats the grass closer than the ox; distributes the seed by dunging; wants a gall bladder; never vomits; the foal is produced with the feet stretched out; he is injured by being struck on the ear; upon the stiffle; by being caught by the nose in barnacles; by having his teeth rubbed with tallow; by the herb padus; by the herb phalandria; by the cruculio; by the conops. His diseases are different in different countries. A consumption of the ethmoid bones of the nose, called the *glanders*, is with us the most infectious and fatal. He eats hemlock without injury. The mare goes with foal 290 days. The placenta is not fixed. He acquires not the canine teeth till the age of five years."

* The horse genus, according to the Cuvierian arrangement, is placed in the Class Mammalia, which contains those animals that suckle their young, and forms the ninth genus of his sixth order, called Pachydermata. The follow

pal objects of our curiosity and care; a race of creatures in whose welfare we are interested next to our own.

Of all the quadruped animals, the horse seems the most beautiful: the noble largeness of his form, the glossy smoothness of his skin, the graceful ease of his motions, and the exact symmetry of his shape, have taught us to regard him as the first, and

ing are his characters of this order:—Skin very thick, whence the name of the order; some of the genera are partially without teeth, others with the three sorts of teeth; quadrupedal, generally with hoofs, and the toes varying in number; stomach simple, and they do not ruminate; without clavicles, or collar-bones. They are either herbivorous or omnivorous, and their habits are various. They generally inhabit the temperate and torrid zones.

The genus Equus, or Horse, contains six species, agreeing in their essential characters, which are thus defined by Cuvier, in his *Regne Animal*:—Incisory teeth, six in the upper jaw, and six in the under; two canines, one above and one below, on each side of the cutting or incisory teeth, (the females of some of the species with no canine teeth,) and six cheek teeth, or grinders, on each side, on both jaws; they are furrowed on both sides with flat crowns and several ridges of enamel. Between the canines and cheek teeth is a void space; the upper lip is susceptible of considerable motion; the eyes are large; the pupil oblong-ovate, placed laterally; their sight excellent, and although not formed for seeing in the night, they can distinguish objects very clearly in the dark: ears rather small, pointed, and erect, having great mobility in the external conch, so that their hearing is very acute, and is the sense which, in all probability, they possess in the greatest perfection; feet, with a single apparent toe, covered with a thick hoof; the tail is furnished with long hair, or with a tuft at the extremity; mammæ two, inguinal; the stomach is simple and membranaceous, and the intestines and cæcum very large.

This genus forms a very natural, though isolated, division in the class Mammalia. Its characters are so distinct, that it cannot be grouped with any other genus. This is strongly exemplified by the different places the genus has occupied in the arrangements of authors, to none of which it had the slightest alliance. In the Linnæan arrangement, it is placed with the hippopotamus, as a genus of the order *Belluæ*. The method of Erxleben, ranks it between the elephant and dromedary. Storr made a distinct order of it, to follow the ruminantia, under the name *Solipedes*, which was followed by Baron Cuvier in his first edition of the *Regne Animal*, and has been, subsequently, placed by him in the order of Pachydermata. The feet of all the species are monodactylous, or having but one toe; however, the rudiments of two other toes are to be seen under the skin. From their acute sense of hearing, their attention is speedily arrested by any new sound, at which they will instantly halt, and listen with great attention. Their sense of smell is also very delicate, and it is frequently exercised on objects with which they are unacquainted. The thickness of their hides must render their sense of feeling less acute.

The horse is the only quadruped, with a thick and round body, which is graceful; and his head, although not so elegant as that of some other quad-

is the most perfectly formed; and yet, what is extraordinary enough, if we examine him internally, his structure will be found the most different from that of man of all other quadrupeds whatsoever. As the ape approaches us the nearest in internal conformation, so the horse is the most remote;[1] a striking proof that there may be oppositions of beauty, and that all grace is not to be referred to one standard.

To have an idea of this noble animal in his native simplicity, we are not to look for him in the pastures or the stables to which he has been consigned by man; but in those wild and extensive plains where he has been originally produced; where he ranges without control, and riots in all the variety of luxurious nature. In this state of happy independence, he disdains the assistance of man, which only tends to servitude. In those boundless tracts, whether of Africa or New Spain, where he runs at liberty, he seems no way incommoded with the inconveniences to which he is subject in Europe. The continual verdure of the fields supplies his wants; and the climate, that never knows a winter, suits his constitution, which naturally seems adapted to heat. His enemies of the forest are but few, for none but the greater kinds will venture to attack him: any one of these he is singly able to overcome; while, at the same time, he is content to find safety in society; for the wild horses of those countries always herd together.

In these countries, therefore, the horses are often seen feeding in droves of five or six hundred. As they do not carry on war against any other race of animals, they are satisfied to remain entirely upon the defensive. The pastures on which they live satisfy all their appetites, and all other precautions are purely for

rupeds, is, nevertheless, capable of manifesting the varied emotions of pride, docility, courage, and caution.

The species of this genus are six, namely, the horse, ass, common zebra, zebra of the plains, quagga, dzigtai, with the mule, which may be regarded as a sub-species.

It is not possible to determine whether the fossil bones of horses, which are found, in strata, associated with the bones of other extinct species of animals, are really of a distinct species from any that at present exist; but, judging from analogy, we are warranted in supposing them to be so. There is so little difference in the bones of this genus, that the most skilful osteologists are unable, from them, to determine the species, which they can distinguish with ease and certainty in almost every other animal.

1 Histoire Naturelle, Daubenton, vol. vii. p. 574.

their security, in case of a surprise. As they are never attacked but at a disadvantage, whenever they sleep in the forests, they have always one among their number that stands as centinel, to give notice of any approaching danger; and this office they take by turns.[2] If a man approaches them while they are feeding by day, their centinel walks up boldly near him, as if to examine his strength, or to intimidate him from proceeding; but as the man approaches within pistol-shot, the centinel then thinks it high time to alarm his fellows; this he does by a loud kind of snorting, upon which they all take the signal, and fly off with the speed of the wind; their faithful centinel bringing up the rear.[3]

It is not easy to say from what country the horse came originally.* It should seem that the colder climates do not agree

2 Dictionnaire Universelle des Animaux, p. 19.

3 Labat, tom. vii.

* The period at which the horse was first domesticated is now lost in the cloud of antiquity. He is mentioned by the oldest writers, and in all probability, his subjugation was nearly coeval with the earliest state of society. From the Scriptures we learn, that 1702 years before the Christian era, horses were used; for, in the 47th chapter of Genesis, verse 17, it is said, "And Joseph gave them (the Egyptians) bread in exchange for horses." Again, in the 50th chapter of the same book, 1689 years before Christ, it is said, "And there went up with him (Joseph) both chariots and horsemen; and it was a very great company." These are the first instances of horses being mentioned in Holy Writ; and from what we read in the earlier chapters of Genesis, it seems very probable that the horse was unknown to the Hebrews and Egyptians before that period; for, in the 12th chapter of that book, it is said, "And he (Abram) had sheep, and oxen, and men-servants, and maid-servants, and she-asses, and camels," but no mention is made of horses. This was 1920 years before the birth of our Saviour. It would therefore, appear, that horses were first introduced into Egypt a short time before the year 1702 A.C. but whence we are not informed; and they seem to have propagated and increased in Canaan with great rapidity; for, in the 11th chapter of Joshua, and 4th verse, we are told, "They (certain kings opposed to Joshua) went out, they and all their hosts with them, much people, even as the sand that is upon the sea-shore in multitude, with horses and chariots very many." This was 1450 years before the Christian era. It is mentioned in Deuteronomy, chapter xvii. verse 16, "But (whoever shal be king of Israel) shall not multiply horses to himself, nor cause the people to return to Egypt, to the end that he should multiply horses." Which proves that Egypt, at that time, was the great place for breeding horses.

Assyria, the most ancient empire, which is highly celebrated in the Bible for its horses, seems, from all accounts, to have obtained them from Armenia Media, and Persia. The natives of Canaan are spoken of, in Judges, as having used horses in battle, but no mention is made of the Israelites having done so. This people, when at war, made their stronghold among the moun-

with his constitution; for although he is found almost in them all, yet his form is altered there, and he is found at once diminutive and ill-shaped. We have the testimony of the ancients that there were wild horses once in Europe; at present, however.

tains, so that horses could be of little use to them. This was about 1250 years before Christ. When Saul was chosen king of Israel, 1095 years A.C. he led the armies of that kingdom against the tribes of Arabia, but they had not at that time begun to breed horses; for we find his plunder consisted only of camels, oxen, sheep, and asses.

David, second king of Israel, 1018 years A.C. justly celebrated for his prowess and skill in the art of war, and who was from his youth engaged in perpetual feuds with the tribes by which Israel was surrounded, had cavalry under his command; but in this force his enemies greatly exceeded him: and, it would appear, he did not consider them of very great consequence; for, in his defeat of the Syrians, where all their war-chariots, which were drawn by horses, fell into his hands, and with them three hundred of these animals, he reserved only one hundred for his own use, and hamstrung the rest.

The first breaking of the horse for riding is attributed by some authors to the Lapithæ, and is spoken of by Virgil in his third Georgic. Strabo asserts that the Medes, Persians, and Armenians, were the first that invented the art of riding and shooting. Polydorus ascribes it to Bellerophon; Lysias, the orator, to the Amazonian women. But be this as it may, it seems indisputable, that horses were not used for riding till long after the time they were harnessed in war-chariots. Sir Gore Ouseley mentions, in his travels through Persia and various countries of the East, that he examined all the relics of antiquity, and amongst others the fine sculptures on the ruins of Persepolis, from which he drew a conclusion, at once interesting, and in some measure confirmatory of the opinion above noticed, that the horse has been gradually subdued. He says, "There are no figures mounted on horseback, although some travellers have mentioned horsemen among those sculptures. One would think, that the simple act of mounting on a horse's back would naturally have preceded the use of wheel carriages, and their complicated harness, yet no horsemen are found at Persepolis; and we know Homer's horses are represented in chariots, from which the warriors sometimes descended to combat on foot; but the poet has not described them as fighting on horseback. The absence of mounted figures might authorize an opinion, that these sculptures had been executed before the time of Cyrus, whose precepts and example first inspired the Persians with a love of equestrian exercises, of which, before his time, they were totally ignorant."

It is a generally received, although erroneous opinion, that Arabia was the native country of the horse; but this we find not to be the case, from what is stated in 2 Chronicles, chap. ix. which informs us that King Solomon obtained gold and silver from that country; and in the 28th verse, that "they brought unto Solomon horses out of Egypt, and out of all lands." Now, had they originally come from Arabia, it is probable that country would have been here expressly mentioned. Even so late as the seventh century of the Christian era, when the prophet Mahomet attacked the Koreish, not far from Mecca, he had only two horses in his train; and although, in the plunder of this horrible campaign, he carried with him in his retreat twenty-four

they are totally brought under subjection; and even those which are found in America are of a Spanish breed, which being sent thither upon its first discovery, have since become wild, and have spread over all the south of that vast continent almost to the straits of Magellan. These, in general, are a small breed, of about fourteen hands high. They have thick jaws and clumsy joints; their ears and neck also are long; they are easily tamed, for the horse, by nature, is a gentle complying creature, and resists rather from fear than obstinacy. They are caught by a kind of noose, and then held fast by the legs, and tied to a tree, where they are left for two days without food or drink. By that time they begin to grow manageable; and in some weeks they become as tame as if they had never been in a state of wildness. If, by any accident, they are once more set at liberty, they never become wild again, but know their masters, and come to their call. Some of the buccaniers have often been agreeably surprised, after a long absence, to see their faithful horses once more present themselves, with their usual assiduity; and come up, with fond submission to receive the rein.

thousand camels, forty thousand sheep, and twenty-four thousand ounces of silver, there is no mention of horses being part of the booty. We are informed that the Arabians had but few horses, and those not at all valued; so that Arabia, where are now the most celebrated coursers in the world, is comparatively of modern date as a breeding country. In the second century, horses were exported from Egypt to Arabia, as presents to various of their kings; and there can be little doubt that their finest horses were originally the produce of Egypt, whence they were also exported to Ethiopia, India, Persia, Parthia, Armenia, Scythia, &c. Solomon is said to have had "four thousand stalls for horses and chariots, and twelve thousand horsemen." The price of an Egyptian horse in those days was one hundred and fifty shekels of silver, which amounts to about seventeen pounds two shillings sterling; a very large sum at that remote period.

Left only to conjecture, we can but suppose, from a combination of circumstances, that Asia was the original country of the horse; for there he is found to the present day, roving in unrestrained freedom: and we are without any historical record of his having been introduced by man into those extensive wilds. One thing is quite certain, that he was not found either in America or New Holland, at the original discovery of these continents. The great tracts of desert country around the Sea of Arel, and the Caspian Sea, have been supposed to be the native residence of the horse; but, if this conjecture be correct, he must have widely extended his geographical range, for he is found in a wild state in Asia, as far north as the sixtieth degree, and to the utmost southern extremes of that vast continent, and also in many parts of Africa; but we must suppose, that those of the former country emigrated as the species multiplied.

These American horses, however, cannot properly be ranked among the wild races, since they were originally bred from such as were tame.* It is not in the new, but the old world, that we are to look for this animal, in a true state of nature; in the ex-

* The wild horses which exist in the extensive plains of South America, extending from the shores of La Plata to Patagonia, are descendants of those carried thither by the Spaniards, after their discovery of the country, and have increased with such astonishing rapidity, that they are to be seen in troops of many thousands. Azara affirms, that they sometimes congregate, in squadrons of not less than ten thousand individuals. They are invariably preceded by a leader, by whom they are governed, and who appears to direct all their movements; which are performed in a manner so perfectly systematic, as hardly to be surpassed in regularity by the best trained cavalry. It is extremely dangerous for travellers to pass through the districts in which these horses abound; for, if perceived by the wild herd, they will approach closely to those who are mounted on horseback. After their leader and videttes, or advanced guard, have reconnoitered the strangers, they will, at the direction of the leader, make a rapid wheel round the course of the travellers, and, with a loud and irritating neighing, tempt the tame horses, which are either saddled or loaded, to join them. If the rider do not use all his energies, or the leader of the loaded horse his utmost care, they will either fling the rider, or throw off their burden, and precipitately unite with the wild troop, after which they are in general lost for ever.

The steady approach, and menacing appearance, of this prodigious column of horses, are most appalling to those who witness it for the first time, and will cause the boldest heart to quake; the trampling sound of the animals' hoofs, even upon the green sward, may be compared to the loudest thunder, while it makes all around to vibrate. In this manner they will frequently sweep round the astonished traveller, like the whirlwind of the desert, threatening instant destruction; when of a sudden they will set up the most fearful neighing, wheel in an opposite course, and disappear in the neighbouring wilderness. These immense troops do not always feed together, but are dispersed into smaller herds, when the cause of alarm which congregated them has passed away.

In the province of Cumana there are great numbers of wild horses in the forests. They go in companies generally to the extent of five or six hundred, and even one thousand. They occupy the great savannas, where it is dangerous to disturb or try to catch them. In the dry season, they are sometimes obliged to go two or three leagues, and even more, to find water. They set out in regular ranks, four abreast, and thus form a procession extending to a quarter of a league. Five or six scouts precede the troop by about fifty paces. If they perceive a man, a puma, or a jaguar, they neigh, and the troop stops; if avoided, they continue their march; but if any one dare to pass across their squadron, they turn on him, and crush him under their feet. No foe is capable of withstanding their attack. They have a chief, who marches between the scouts and the squadron—a kind of adjutant, whose duty consists in hindering any individual from quitting the ranks. If any one attempts to straggle, either from hunger or fatigue, he is bitten till he resumes his place, and the culprit obeys with his head hanging down. Three or four

tensive deserts of Africa, in Arabia, and those wide-spread countries that separate Tartary from the more southern nations. Vast droves of these animals are seen wild among the Tartars; they are of a small breed, extremely swift, and very readily evade their pursuers. As they go together, they will not admit of any strange animals among them, though even of their own kind. Whenever they find a tame horse attempting to associate with them, they instantly gather round him, and soon oblige him to seek safety by flight. There are vast numbers also of wild horses

chiefs march, as the rear guard, at five or six paces from the troop. These animals are impelled by a natural instinct, which looks remarkably like reason, to obey their leaders. They are sensible that their safety consists in united force, and in maintaining subordination,—the first thing to be attended to, even by man himself.

The wild horses of America are generally chestnut, bay, sorrel, or black colour. The latter, however, is not very common, and chestnut usually predominates, from which some authors suppose that to be the original hue of the horse; but we do not find it to be the prevailing colour of the Asiatic wild breeds, bay-dun being the most common among these. The general pace of the American horse is between a gallop and an amble.

When wild horses are feeding, should any stragglers be threatened with an attack from the puma or jaguar, which are their principal enemies in America, by a particular signal, which they all understand, they close into a dense mass, and trample their assailant to death, if he have the hardihood to persist in his attack; or, forming a circle, with the young and females in the centre, defend themselves with their heels, and strike with such velocity and force, that the most agile animal is incapable of overcoming them. When an attack is resolved upon, their leader shows the example, and if he consider a retreat necessary, he gives them the signal, which they take care to follow.

Captain Hall, in his Journey to Peru and Mexico, gives the following description of the manner in which the gaucho, or native inhabitant of South America, takes a wild horse:—He first mounts an animal which has been accustomed to the sport, and gallops over the plain, in the direction where the wild herd are, and, circling round, by degrees gets near to one of them, and as soon as he has approached sufficiently near, the lasso is thrown round the two hind legs, and as the gaucho rides round a little on one side, the jerk pulls the entangled horse's feet laterally, so as to throw him on his side, without endangering his knees or his face. Before the horse can recover the shock, the rider dismounts, and snatching his *poncho*, or cloak, from his shoulders, wraps it round the prostrate animal's head. He then forces into his mouth one of the powerful bridles of the country, straps a saddle on his back, and, bestriding him, removes the poncho; upon which, the astonished horse springs on his legs, and endeavours, by a thousand vain efforts, to disencumber himself of his new master, who sits quite composedly on his back, and, by a discipline which never fails, reduces the horse to such complete obedience, that he is soon trained to lend his whole speed and strength to the capture of his companions.

to the north of China, but they are of a weak, timid breed, small of stature, and useless in war.

At the Cape of Good Hope there are numbers of horses in a state of nature, but small, vicious, and untameable. They are found wild also in several other parts of Africa; but the wretched inhabitants of that country either want the art to tame them, or seem ignorant of their uses. It is common with the negroes, who are carried over from thence to America, when they first see a horse, to testify both terror and surprise. These poor men seem not to have any knowledge of such a creature; and, though the horse is probably a native of their own country, they have let all the rest of mankind enjoy the benefit of his services without turning them to any advantage at home. In some parts of Africa, therefore, where the horse runs wild, the natives seem to consider him rather in the light of a dainty for food, than a useful creature, capable of assisting them either in war or in labour: riding seems a refinement that the natives of Angola or Caffraria have not as yet been able to attend to; and whenever they catch a horse, it is only with an intent to eat him.

But of all countries in the world, where the horse runs wild, Arabia produces the most beautiful breed, the most generous, swift, and persevering. They are found, though not in great numbers, in the deserts of that country; and the natives use every stratagem to take them. Although they are active and beautiful, yet they are not so large as those that are bred up tame; they are of a brown colour, their mane and tail very short, and the hair black and tufted.[1] Their swiftness is incredible; the attempt to pursue them in the usual manner of the chase, with dogs, would be entirely fruitless. Such is the rapidity of their flight, that they are instantly out of view, and the dogs themselves give up the vain pursuit. The only method, therefore, of taking them, is by traps hidden in the sand, which entangling their feet, the hunter at length comes up, and either kills them, or carries them home alive. If the horse be young, he is considered among the Arabians as a very great delicacy; and they feast upon him while any part is found remaining: but if, from his shape or vigour, he promises to be serviceable in his

1 Marm. Descript. de l'Afrique, lib. i. p. 51.

more noble capacity, they take the usual methods of taming him, by fatigue and hunger, and he soon becomes a useful domestic animal.

The usual manner of trying their swiftness is by hunting the ostrich: the horse is the only animal whose speed is comparable to that of this creature, which is found in the sandy plains, with which those countries abound. The instant the ostrich perceives itself aimed at, it makes to the mountains, while the horseman pursues with all the swiftness possible, and endeavours to cut off its retreat. The chase then continues along the plain, while the ostrich makes use of both legs and wings to assist its motion. However, a horse of the first speed is able to outrun it; so that the poor animal is then obliged to have recourse to art to elude the hunter, by frequently turning: at length, finding all escape hopeless, it hides its head wherever it can, and suffers itself tamely to be taken. If the horse, in a trial of this kind, shows great speed, and is not readily tired, his price becomes proportionably great, and there are some horses valued at a thousand ducats.

But the horses thus caught, or trained in this manner, are at present but very few: the value of Arabian horses all over the world, has, in a great measure, thinned the deserts of the wild breed; and there are very few to be found in those countries, except such as are tame. The Arabians, as we are told by historians, first began the management of horses in the time of Shaque Ishmael. Before that, they wandered wild along the face of the country neglected and useless; but the natives then first began to tame their fierceness, and to improve their beauty: so that at present they possess a race of the most beautiful horses in the world, with which they drive a trade, and furnish the stables of princes at immense prices.

There is scarcely an Arabian, how poor soever, but is provided with his horse.[2] They, in general, make use of mares in their ordinary excursions; experience having taught them that they support fatigue, thirst, and hunger, better than the horses are found to do. They are also less vicious, of a gentler nature, and are not so apt to neigh. They are more harmless also among themselves, not so apt to kick or hurt each other, but re-

2 Buffon.

main whole days together without the least mischief. The Turks, on the contrary, are not fond of mares; and the Arabians sell them such horses as they do not choose to keep for stallions at home. They preserve the pedigree of their horses with great care, and for several ages back. They know their alliances, and all their genealogy; they distinguish the races by different names, and divide them into three classes. The first is that of the nobles, the ancient breed, and unadulterated on either side; the second is that of the horses of the ancient race, but adulterated; and the third is that of the common and inferior kind: the last they sell at a low price; but those of the first class, and even of the second, amongst which are found horses of equal value to the former, are sold extremely dear. They know, by long experience, the race of a horse by his appearance; they can tell the name, the surname, the colour, and the marks properly belonging to each. When they are not possessed of stallions of the noble race themselves, for their mares, they borrow from their neighbours, paying a proper price, as with us, and receive a written attestation of the whole. In this attestation is contained the name of the horse and the mare, and their respective genealogies. When the mare has produced her foal, new witnesses are called, and a new attestation signed, in which are described the marks of the foal, and the day noted when it was brought forth. These attestations increase the value of the horse; and they are given to the person who buys him. The most ordinary mare of this race sells for five hundred crowns; there are many that sell for a thousand; and some of the very finest kinds for fourteen or fifteen hundred pounds. As the Arabians have no other house but a tent to live in, this also serves them for a stable; so that the mare, the foal, the husband, the wife, and the children, lie all together indiscriminately; the little children are often seen upon the body or the neck of the mare, while these continue inoffensive and harmless, permitting them thus to play with and caress them without any injury. The Arabians never beat their horses: they treat them gently; they speak to them, and seem to hold a discourse; they use them as friends; they never attempt to increase their speed by the whip, nor spur them, but in cases of necessity. However, when this happens, they set off with amazing swiftness; they leap over obstacles with as much agility as a buck; and if the rider hap-

pens to fall, they are so manageable that they stand still in the midst of their most rapid career. The Arabian horses are of a middle size, easy in their motions, and rather inclined to leanness than fat. They are regularly dressed every morning and evening, and with such care that the smallest roughness is not left upon their skins. They wash the legs, the mane, and the tail, which they never cut; and which they seldom comb, lest they should thin the hair. They give them nothing to eat during the day; they only give them to drink once or twice; and at sun-set they hang a bag to their heads in which there is about half a bushel of clean barley. They continue eating the whole night, and the bag is again taken away the next morning. They are turned out to pasture in the beginning of March, when the grass is pretty high, and at which time the mares are given to the stallion. When the spring is past, they take them again from pasture, and they get neither grass nor hay during the rest of the year; barley is their only food, except now and then a little straw. The mane of the foal is clipped when about a year or eighteen months old, in order to make it stronger and thicker. They begin to break them at two years old, or two years and a half at farthest; they never saddle nor bridle them till at that age; and then they are always kept ready saddled at the door of the tent, from morning till sun-set, in order to be prepared against any surprise. They at present seem sensible of the great advantage their horses are to the country; there is a law, therefore, that prohibits the exportation of the mares; and such stallions as are brought into England are generally purchased on the eastern shores of Africa, and come round to us by the Cape of Good Hope. They are in general less in stature than our own, being not above fourteen, or fourteen hands and a half high: their motions are much more graceful and swifter than of our own horses; but nevertheless, their speed is far from being equal; they run higher from the ground; their stroke is not so long and close; and they are far inferior in bottom. Still, however, they must be considered as the first and finest breed in the world, and that from which all others have derived their principal qualifications. It is even probable that Arabia is the original country of horses; since there, instead of crossing the breed, they take every precaution to keep it entire. In other countries they must continually change the races, or their horses would soon

degenerate; but there the same blood has passed down through a long succession, without any diminution either of force or beauty.

The race of Arabian horses has spread itself into Barbary, among the Moors,* and has even extended across that extensive continent to the western shores of Africa. Among the negroes of Gambia and Senegal, the chiefs of the country are possessed of horses, which, though little, are very beautiful, and extremely manageable. Instead of barley, they are fed in those countries with maise bruised and reduced into meal, and mixed up with milk when they design to fatten them. These are considered as next to the Arabian horses, both for swiftness and beauty; but they are still rather smaller than the former. The Italians have a peculiar sport, in which horses of this breed run against each other. They have no riders, but saddles so formed

* The present horses of Morocco are a race nearly allied to the Arabian, and have been produced by a cross with those of Algiers, which are supposed to have had their origin in a south European breed, crossed with the Arabian. They are somewhat larger than the Arabian, with fine heads and crests, and, in general, well formed about the shoulder, straight backs, and droop considerably towards the haunches. They are exceedingly swift. As none of them are geldings, they are possessed of great spirit, and are naturally fiery in their dispositions. The forehead of the Barb is generally long and slender, and his mane rather scanty; his ears are small, beautifully shaped, and placed in such a manner as to give him great expression; his shoulders are light, flat, and sloping backwards; withers fine, and standing high; loins short and straight; flanks and ribs round and full, without giving him too large a belly; his haunches strong and elastic; the croup is sometimes long to a fault; the tail is placed high; thighs well turned and rounded; legs clean, beautifully formed, and the hair thin, short, and silky; the tendons are detached from the bone; but the pasterns are often too long, and bending; the feet rather small, but in general sound. The Moors being still unacquainted with the use of the ring, are, therefore, obliged to commence breaking their horses when very young, by taking them long and fatiguing journeys, more especially over the mountainous and rocky parts of the country, in which they soon reduce their natural ardour. They next teach them to rear up, stand fire, gallop, and stop short, almost instantaneously; and having obtained these, they are satisfied, without any farther qualification. For this reason, a Barbary horse seldom can perform any other pace than a gallop, or a walk; and from being broken in, and worked hard, before they have arrived at their full strength, these horses, in a very few years, become unfit for service. The Moors seldom ride mares, but keep them in the country for breeding; and, like other eastern nations, contrary to the general opinion in Europe, they consider them so much more valuable than horses, that they are never permitted to be exported.

as to flap against the horses' sides as they move, and thus to spur them forward. They are set to run in a kind of railed walk, about a mile long, out of which they never attempt to escape; but when they once set forward, they never stop, although the walk from one end to the other is covered with a crowd of spectators, which opens and gives way as the horses approach. Our horses would scarcely, in this manner, face a crowd, and continue their speed without a rider, through the midst of a multitude; and indeed it is a little surprising how in such a place the horses find their own way. However, what our English horses may want in sagacity, they make up by their swiftness; and it has been found upon computation, that their speed is nearly one-fourth greater, even carrying a rider, than that of the swiftest Barb without one.

The Arabian breed has been diffused into Egypt as well as Barbary, and into Persia also; where as we are told by Marcus Paulus, there are studs of ten thousand white mares all together very fleet, and with the hoof so hard that shoeing is unnecessary.* In these countries, they in general give their horses the same treatment that they give in Arabia, except that they litter them upon a bed of their own dung, dried in the sun, and then reduced to powder.

* Persia, from the remotest ages, has been famous for its horses; and at the present day they are excelled only by the Arabian breed. The former were, however in high estimation long before the latter existed. They were the best cavalry in ancient times, amongst all the eastern nations. We are informed by historians that Alexander the Great considered a Persian horse as a gift of the highest value; it was one which he only bestowed on potentates, and favourites of the first class. Sir John Malcolm says,—"A variety of horses are produced in Persia. The inhabitants of the districts which border on the Gulf, still preserve pure those races of animals, which their ancestors brought from the opposite shore of Arabia. In Fars and Irak, they have a mixed breed from the Arabian, which, though stronger, is still a small horse, compared with either the Toorkoman or Khorassan breed, which are most prized by the soldiers of Persia. Both these latter races have also a great proportion of Arabian blood. The price of horses in Persia varies extremely. The common horse is always to be purchased for from fifteen to forty pounds; fine horses, particularly of the Toorkoman or Khorassan breed, are, in general, very dear; a hundred pounds is a common price, and sometimes a much larger sum is paid. They are often valued more from their breed than their appearance." In some points the Persian horse excels the Arabian. The head is nearly as beautiful, the crupper superior, and the whole frame more developed: the neck is beautifully arched; and the animal possesses much fire. They are about equal in speed; but the Arabian is capable of longer endurance.

When this, which is spread under the horse about five inches thick, is moistened, they dry it again, and spread it as before. The horses of these countries a good deal resemble each other. They are usually of a slender make; their leg fine, bony, and far apart; a thin mane; a fine crest; a beautiful head; the ear small and well pointed; the shoulder thin; the side rounded, without any unsightly prominence; the croup is a little of the longest, and the tail is generally set high. The race of horses, however, is much degenerated in Numidia; the natives having been discouraged from keeping the breed up by the Turks, who seize upon all the good horses, without paying the owners the smallest gratuity for their care in bringing them up. The Tingitanians and Egyptians have now, therefore, the fame of rearing the finest horses, both for size and beauty. The smallest of these last are usually sixteen hands high; and all of them shaped, as they express it, with the elegance of an antelope.

Next to the Barb, travellers generally rank the Spanish genette. These horses like the former, are little, but extremely swift and beautiful. The head is something of the largest; the mane thick: the ears long, but well pointed: the eyes filled with fire; the shoulder thickish, and the breast full and large. The croup round and large; the legs beautiful, and without hair; the pastern a little of the longest, as in the Barb, and the hoof rather too high. Nevertheless, they move with great ease, and carry themselves extremely well. Their most usual colour is black, or a dark bay. They seldom or never have white legs, or white snip. The Spaniards, who have a groundless aversion to these marks, never breed from such as have them. They are all branded on the buttock with the owner's name; and those of the province of Andalusia pass for the best. These are said to possess courage, obedience, grace, and spirit, in a greater degree than even the Barb; and for this reason they have been preferred as war-horses to those of any other country.*

* Spain was early celebrated for a breed of fine horses. These took their rise in the Moorish horse, or Barb, at the time the greater part of the peninsula was under the subjection of the Moors. When the Roman empire was at its height, the horses of Calpe were in higher repute than any other European breed. Calpe, the modern Gibraltar, is situated at nearly the south-west extremity of Spain; consequently, nearly opposite to Abyla, on the

The Italian horses were once more beautiful than they are at present, for they have greatly neglected the breed. Nevertheless, there are still found some beautiful horses among them, particularly among the Neapolitans, who chiefly use them for the draught. In general, they have large heads and thick necks. They are also restive, and consequently unmanageable. These faults, however, are recompensed by the largeness of their size, by their spirit, and the beauty of their motion. They are excellent for show, and have a peculiar aptitude to prance.

The Danish horses are of such an excellent size, and so strong a make, that they are preferred to all others for the draught. There are some of them perfectly well shaped; but this is but seldom seen, for in general they are found to have a thick neck, heavy shoulders, long and hollow back, and a narrow croup: however, they all move well, and are found excellent both for parade and war. They are of all colours, and often of whimsical ones, some being streaked like the tiger, or mottled like the leopard.

The German horses are originally from Arabian and Barbary stocks: nevertheless, they appear to be small and ill-shaped: it is said also, that they are weak and washy, with tender hoofs. The Hungarian horses, on the other hand, are excellent for the draught, as well as the saddle. The Hussars, who use them in war, usually slit their nostrils; which is done, as it is said, to prevent their neighing, but, perhaps, without any real foundation.

The Dutch breed is good for the draught, and is generally used for that purpose over Europe: the best come from the province of Friezland. The Flanders' horses are much inferior to the former; they have most commonly large heads, flat feet, and swollen legs; which are an essential blemish in horses of this kind.

The French horses are of various kinds; but they have few that are good. The best horses of that country come from Limosin; they have a strong resemblance to the Barb, and, like them, they are excellent for the chase; but they are slow in coming to perfection; they are to be carefully treated while young,

Barbary coast, and from thence they received their horses; hence the origin of the genettes.

and must not be backed till they are eight years old. Normandy furnishes the next best; which, though not so good for the chase, are yet better for war. In general, the French horses have the fault of being heavy-shouldered, which is opposite to the fault of the Barb, which is too thin in the shoulder, and is consequently apt to be shoulder-slipt.*

Having mentioned the horses most usually known in Europe, we pass on to those of more distant countries, of whose horses we can only judge by report. We mentioned the wild horses of America. Such as are tame, if we may credit the latest reports,[1] are admirable. Great numbers of these are bred up to the chase, and are chiefly kept for this purpose, particularly at Quito. The hunters, as Ulloa informs us, are divided into two classes; one part on foot, the other on horseback: the business of the footmen is to rouse the deer; and that of the horsemen, to hunt it down. They all, at break of day, repair to the place appointed, which is generally on the summit of a hill, with every

* France, from its great extent, contains various breeds of horses; and although much attention has been paid to improving the different races, the experiment has not been attended with full success. The late Emperor Napoleon was extremely anxious that his horses might cope with those of England, and used every means to procure some of our best blood ones, as well as Arabians. Of late years, many steeds of racing blood have been sold to the French, and some of the nobility have hired persons from England acquainted with breeding; but all their efforts to produce horses equal to ours for beauty, fleetness, and strength, have proved abortive. There are various excellent and serviceable breeds in different provinces; those of Normandy have long been celebrated as carriage and troop horses. During the late war, this province was a great nursery for the cavalry. The Norman horses are tall and strong boned; with considerable spirit, and at the same time docile in their habits. After the Norman conquest, William being sensible of the superiority of this breed, imported many of them into England, and by crossing them with our native breeds, produced good troop horses and roadsters. The best hackneys in France are bred in Limousin; they are closely allied to the Spanish breed, and have in all probability sprung from them. They are also, from their spirit, well calculated for hunters, in which capacity they acquit themselves better than any others of the French stock; but a great drawback is, that they do not arrive at their full strength, till they are eight years of age. Auvergne, Poitou, and Burgundy, produce good ponies, called bidets. These horses are better adapted than the Norman steeds, for hunting; but can by no means cope with those of Britain. Good horses for the draught are produced at Boulonnois and Franche Comte. Bretagne, Auot, Navarre, &c., produce good saddle horses, though by no means to be compared to those of Limousin, for speed and action, or to the Norman for strength.

1 Ulloa's Voyage, vol. i. p. 464.

man his greyhound. The horsemen place themselves on the highest peaks; whilst those on foot range the precipices, making a hideous noise, in order to start the deer. Thus the company extend themselves three or four leagues, or more, according to their numbers. On starting any game, the horse which first perceives it sets off, and the rider, being unable to guide or stop him, pursues the chase, sometimes down such a steep slope, that a man on foot, with the greatest care, could hardly keep his legs; from thence he flies up a dangerous ascent, or along the side of a mountain; so that a person not used to this exercise would think it much safer to throw himself out of the saddle, than commit his life to the precipitate ardour of his horse. The other horses which join in the chase do not wait for the riders to animate them; they set forward immediately upon seeing another at full speed; and it becomes prudence in the rider to give them their way, and at the same time to let them feel the spur, to carry him over the precipices. These horses are backed and exercised to this method of hunting; and their usual pace is trotting.

There are said to be very good horses in the islands of the Archipelago. Those of Crete were in great reputation among the ancients for their swiftness and force; however, at present they are but little used, even in the country itself, because of the unevenness of the ground, which is there very rocky and mountainous. The original horses of Morocco are much smaller than the Arabian breed; however, they are very swift and vigorous. In Turkey there are to be found horses of almost all races: Arabian, Tartars, Hungarians, and those natural to the place. The latter are very beautiful and elegant; they have a great deal of fire, swiftness, and management; but they are not able to support fatigue: they eat little; they are easily heated; and they have skins so sensible, that they can scarcely bear the rubbing of the stirrup. The Persian horses are, in general, the most beautiful and most valuable of all the East. The pastures in the plains of Media, Persepolis, Ardebil, and Derbent, are excellent for the purpose of rearing them; and there were bred in those places vast numbers, by order of the government of Persia, while that country was under any government. Pietro della Valle prefers the horses of Persia to those of Italy; and informs us, that they are in general of a middle size; and although some are found even of the smallest stature, yet that does not

impair their beauty or their strength; yet, in some places, they are found of a very good size, and as large as the English saddle-horses are generally found to be: they have all a thin head, a fine crest, a narrow breast, small ears well placed, the legs fine, the hoof hard, and the croup beautiful; they are docile, spirited, nimble, hardy, courageous, and capable of supporting very great fatigue; they run very swiftly, without being easily fatigued; they are strong, and easily nourished, being only supplied with barley and chopped straw; they are put to grass only for six weeks in the spring; they have always the tail at full length, and there is no such thing as geldings among the number; they are defended from the air, as in England, by body-cloths: they attend them with the most punctual exactness; and they are rid generally in a snaffle, without spurs. Great numbers of these are every year transported into Turkey, but chiefly into the East Indies: however, after all, travellers agree that they are not to be compared to the Arabian horses, either for courage, force, or beauty; and that the latter are eagerly sought, even in Persia.

The horses of India are of a very indifferent kind, being weak and washy.* Those which are used by the grandees of the country come from Persia and Arabia; they are fed with a small quantity of hay during the day; and at night they have boiled peas, mixed with sugar and butter, instead of oats or barley: this nourishment supports them, and gives them strength; otherwise they would soon sink and degenerate. Those naturally belonging to the country, are very small and vicious. Some are so very little, that Taverner reports, that the young Mogul prince, at the age of seven or eight, rode one of those little horses, that was not much larger than a greyhound: and it is not long since one of these was brought over into this country as a present to our Queen, that measures no more than nine

* The climate of India does not seem favourable to the horse. The breeds which may be termed native, or such as have been in use from time immemorial, are weak and degenerate. It is found necessary, in order to keep up a good stock, to have horses introduced from foreign countries. The breed called the *Tazee* is, perhaps, of the older kind; they are of a slight make, with long hollow backs, their limbs placed ill below them, and are weak, spiritless animals, while they are extremely irritable and stubborn. The only redeeming quality is the easiness of their paces, which, in a country where the heat is oppressive, is matter of no small consideration.

hands high: and is not much larger than a common mastiff. It would seem, that climates excessively hot are unfavourable to this animal. In this manner, the horses of the Gold-Coast, and of Guinea, are extremely little, but very manageable. It is a common exercise with the grandees of that country, who are excellent horsemen, to dart out their lances before them upon full gallop, and to catch them again before they come to the ground. They have a sport also on horseback that requires great dexterity in the rider, and a great share of activity in the horse: they strike off a ball, with a battledore, while they are upon a full gallop, and pursuing it, strike it again before it comes to the ground; and this they continue for a mile together, striking sometimes to the right, and sometimes to the left, with amazing speed and agility.

The horses of China are as indifferent as those of India: they are weak, little, ill-shaped, and cowardly. Those of Corea are not above three feet high; almost all the breed there are made geldings, and are so timorous, that they can be rendered no way serviceable in war; so that it may be said, that the Tartar horses were properly the conquerors of China. These, indeed, are very serviceable in war, and although but of a middle size, yet they are surprisingly patient, vigorous, swift, and bold; their hoofs are extremely hard, though rather too narrow; their heads are fine, but rather too little; the neck is long and stiff; the legs of the longest; and yet, with all these faults, they are found to be an excellent breed. The Tartars live with their horses pretty much in the same manner as the Arabians do; they begin to back them at the age of seven or eight months, placing their children upon them, who manage them even at that early age. By these means they break them by little and little, till at last about the age of six or seven years, they are capable of enduring amazing hardships. Thus they have been known to march two or three days without once stopping; to continue five or six, without eating any thing except a handful of grass at every eight hours; and, besides, to remain without drinking for four and twenty hours. These horses, which are so vigorous in their own country, lose all their strength when they are brought into China or the Indies; but they thrive pretty well in Persia, and Turkey. The race of little Tartars towards the north have also a breed of little horses, which they set such a value upon, that it is forbid-

den to sell them to strangers: these horses have the very same qualities with those of the larger kind; which they probably derive from a similar treatment. There are also very fine horses in Circassia and Mingrelia. There are some greatly esteemed in the Ukraine, in Walachia, Poland, and Sweden; but we have no particular accounts of their excellencies or defects.

If we consult the ancients on the nature and qualities of the horses of different countries, we learn that the Grecian horses, and particularly those of Thessaly, had the reputation of being excellent for war; that those of Achaia were the largest that were known; that the most beautiful came from Egypt, which bred great numbers; that the horses of Ethiopia were not in esteem, from the heat of the country; that Arabia and Africa furnished very beautiful horses, and very fit for the course; that those of Italy, and particularly of Apulia, were very good; that in Sicily, Cappadocia, Syria, Armenia, Media, and Persia, there were excellent horses, equally esteemed for their speed and vigour; that those of Sardinia and Corsica, though small, were spirited and courageous; that those of Spain resembled the Parthian horses, in being very well adapted for war; that in Walachia and Transylvania, there were horses with bushy tails, and manes hanging down to the ground, which, nevertheless, were extremely swift and active; that the Danish horses were good leapers; those of Scandinavia, though little, were well shaped, and possessed of great agility; that the Flanders' breed was strong; that the Gaulish horses were good for carrying burdens; that German breeds were so bad, so diminutive, and ill-shaped, that no use could be made of them; that the Swiss and Hungarian horses were good; and, lastly, that those of India were very diminutive and feeble.

Such are the different accounts we have of the various races of horses in different parts of the world. I have hitherto omitted making mention of one particular breed more excellent than any that either the ancients or moderns have produced; and that is our own. It is not without great assiduity and unceasing application, that the English horses are now become superior to those of any other part of the world, for size, strength, swiftness, and beauty. It was not without great attention, and repeated trials of all the best horses in different parts of the world, that we have been thus successful in improving the breed of this animal; so

that the English horses are now capable of performing what no others ever could attain to. By a judicious mixture of the several kinds, by the happy difference of our soils, and by our superior skill in management, we have brought this animal to its highest perfection. An English horse, therefore, is now known to excel the Arabian in size and swiftness, to be more durable than the Barb, and more hardy than the Persian. An ordinary racer is known to go at the rate of a mile in two minutes: and we had one instance, in the admirable Childers, of still greater rapidity. He has been frequently known to move above eighty-two feet and a half in a second, or almost a mile in a minute: he has also run round the course of Newmarket, which is very little less than four miles, in six minutes and forty seconds. But what is surprising, few horses have been since found that ever could equal him; and those of his breed have been remarkably deficient.*

However this be, no horses can any way equal our own, either in point of swiftness or strength; and these are the qualifications our horsemen seem chiefly to value. For this reason, when the

* This horse was well known by the name of the Flying, or Devonshire, Childers. He was the property of the Duke of Devonshire, and allowed by sportsmen to be the fleetest horse that ever was bred in the world. He started repeatedly at Newmarket against the best horses of his time, and was never beaten. He won in different prizes, to the amount of nearly £20,000, and was afterwards reserved for breeding. The sire of Childers was an Arabian, sent by a gentleman as a present to his brother in England. Childers was somewhat more than fifteen hands in height. He was foaled in 1715, and was the property of Leonard Childers, Esq. of Carr House, near Doncaster, and sold when young to the Duke of Devonshire.

It is said that Childers was first used as a hunter, where he evinced high qualities, and was noted for being very headstrong, as well as vicious. He had not however any restiveness. It is supposed his racing career commenced at five or six, and he beat all competitors at whatever distance. He was never tried at running a single mile, but his speed must have been almost a mile in a minute. He ran over the Beacon course, which is four miles, one furlong, and one hundred and thirty-eight yards, in seven minutes and thirty seconds; covering at every bound a space of about twenty-five feet. On one occasion he made a spring or leap, with his rider on his back, on level ground, of twenty-five feet. Childers died in the Duke of Devonshire's stud in 1741, aged twenty-six years. There were various other coursers of the same name nearly cotemporary with this prince of horses. Bleeding Childers, so named from his having frequent bleedings at the nose, afterwards called Young Childers, and finally Bartlett's Childers: he was full brother to Flying Childers, and was never trained.

French, or other foreigners, describe our breed, they all mention, as a fault, the awkward and ungainly motion of our horses; they allow them to be very good, indeed, but they will not grant them an easy or an elegant carriage.[1] But these writers do not consider that this seeming want of grace is entirely the result of our manner of breaking them. We consult only speed and despatch in this animal's motions: the French and other nations are more anxious for parade and spirit. For this reason, we always throw our horses forward, while they put them upon their haunches: we give them an easy swift gait of going, that covers a great deal of ground, they on the contrary, throw them back, giving them a more showy appearance indeed, but one infinitely less useful. The fault of our manner of breaking is, that the horse is sometimes apt to fall forward: the French managed-horse never falls before, but more usually on one side: and for this reason the rider wears stiff boots to guard his legs against such accidents. However, it would be a very easy matter to give our horses all that grace which foreigners are so fond of; but it would certainly take from their swiftness and durability.

But in what degree of contempt soever, foreigners might formerly have held our horses, they have for some time perceived their error, and our English hunters are considered as the noblest and the most useful horses in the world. Our geldings are, therefore, sent over to the continent in great numbers, and sell at very great prices; as for our mares and stallions, there is a law prohibiting their exportation; and one similar to this is said to have obtained even as early as the times of Athelstan, who prohibited their exportation, except where designed as presents.

Roger de Belegme, created Earl of Shrewsbury by William the Conqueror,[2] is the first who is recorded to have made attempts towards the mending our native breed. He introduced Spanish stallions into his estate at Powisland in Wales, from which that part of the country was for many ages after famous for a swift and generous race of horses: however, at that time

1 See Buffon's account of our horses.

2 British Zoology, vol. i. p. 4. To this work I am indebted for several particulars with regard to the native animals of this island.

strength and swiftness were more regarded than beauty; the horses' shapes, in time of action, being entirely hid by a coat of armour which the knights then usually put upon them either by way of ornament or defence.

The number of our horses in London alone, in the time of king Stephen, is said to have amounted to twenty thousand. However, long after, in the times of queen Elizabeth, the whole kingdom could not supply two thousand horses to form our cavalry. At present, the former numbers seem revived, so that in the late war, we furnished out above thirteen thousand horsemen; and could, if hard pushed, supply above four times that number. How far this great increase of horses among us may be beneficial or otherwise, is not the proper business of the present page to discuss; but certain it is, that where horses increase in too great a degree, men must diminish proportionably; as that food which goes to supply the one, might very easily be converted into nourishment to serve the other. But, perhaps, it may be speculating too remotely, to argue for the diminution of their numbers upon this principle, since every manufacture we export into other countries, takes up room, and may have occupied that place, which in a state of greater simplicity, might have given birth and subsistence to mankind, and have added to population.*

* The earliest record of the horse in Great Britain is contained in the history given by Julius Cæsar of his invasion of our island. The British army was accompanied by numerous war chariots, drawn by horses. Short scythes were fastened to the ends of the axletrees, sweeping down every thing before them, and carrying terror and devastation into the ranks of their enemies. The conqueror gives a most animated description of the dexterity with which the horses were managed. What kind of horse the Britons then possessed, it would be useless to inquire; but, from the cumbrous structure of the car, and the fury with which it was driven, and from the badness or nonexistence of the roads, they must have been both active and powerful in an extraordinary degree. Cæsar deemed them so valuable, that he carried many of them to Rome, and the British horses were, for a considerable period afterwards, in great request in various parts of the Roman empire. Horses must at that time have been exceedingly numerous in Britain, for we are told that when the British king, Cassibellaunus, dismissed the main body of his army, he retained four thousand of his war chariots for the purpose of harrassing the Romans, when they attempted to forage.

The British horse now received its first cross; but whether the breed was thereby improved cannot be ascertained. The Romans having established themselves in Britain, found it necessary to send over a numerous body of cavalry to maintain a chain of posts and check the frequent insurrections of

Be this as it will, as we have been at such expense and trouble to procure an excellent breed of horses, it is not now to be expected that we should decline the advantages arising from it, just when in our possession. It may be therefore the most prudent

the natives. The Roman horses would breed with those of the country, and, to a greater or less extent, change their character; and from this time, the English horse would consist of a compound of the native and those from Gaul, Italy, Spain, and every province from which the Roman cavalry was supplied. Many centuries afterwards passed by, and we have no record of the character or value, improvement or deterioration, of the animal.

It would appear probable, however, that Athelstan, the natural son of Alfred the Great, and the second in succession to him, paid some attention to the improvement of the horse; for having subdued all the rebellious portions of the heptarchy, he was congratulated on his success by some of the continental princes, and received from Hugh Capet of France, who solicited his sister in marriage, various presents doubtless of a nature that would be thought most acceptable to him, and among them several German *running horses*. Hence our breed received another cross, and probably an improvement.

Athelstan seems to have seriously devoted himself to this important object, for he soon afterwards decreed (A. D. 930) that no horses should be sent abroad for sale, or on any account, except as royal presents. This proves his anxiety to preserve the breed, and likewise renders it probable that that breed was begioning to be esteemed by our neighbours. In a document bearing date A.D. 1000, we have an interesting account of the relative value of the horse. If a horse was destroyed, or negligently lost, the compensation to be demanded was thirty shillings; a mare or colt twenty shillings; a mule or young ass, twelve shillings; an ox thirty pence; a cow, twenty-four pence; a pig eightpence; and, it strangely follows, a man one pound.*

In the laws of Howell the Good, Prince of Wales, and passed a little before this time, there are some curious particulars respecting the value and sale of horses. The value of a foal not fourteen days old is fixed at fourpence; at one year and a day it is estimated at forty-eight pence; and at three years sixty pence. It was then to be tamed with the bridle, and brought up either as a *palfrey* or a *serving horse;* when its value became one hundred and twenty pence; and that of a *wild* or unbroken mare, sixty pence.

Even in those early days, the frauds of dealers were too notorious, and the following singular regulations were established. The buyer was allowed time to ascertain whether the horse were free from three diseases. He had three nights to prove him for the staggers; three months to prove the soundness of his lungs; and one year to ascertain whether he was infected with glanders. For every blemish discovered after the purchase, one third of the money was to be returned, except it should be a blemish of the ears or tail.

The practise of letting horses for hire was then known, and then, as now,

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* According to the Anglo-Saxon computation, forty-eight shillings made a pound, equal in silver to about three pounds of our present money, in value to fifteen or sixteen pounds, and five pence made one shilling.

measure in our legislature, to encourage the breed as a useful branch of commerce, and a natural defence to the country. But how far this end is answered by the breeding up of racers, is what most persons, versed in this subject, are very apt to question.

the services of the poor hack were too brutally exacted. The benevolent Howell disdains not to legislate for the protection of this abused, and valuable servant. "Whoever shall borrow a horse, and rub the hair so as to gall the back, shall pay fourpence; if the skin is forced into the flesh, eightpence; if the flesh be forced into the bone, sixteen pence.

One circumstance deserves to be remarked, that in none of the earliest historical records of the Anglo-Saxons or the Welsh, is there any allusion to the use of the horse for the plough. Until a comparatively recent period, oxen alone were used in England, as in other countries, for this purpose; but about this time (the latter part of the tenth century) some innovation on this point was creeping in, and, therefore, a Welsh law forbids the farmer to plough with horses, mares, or cows, but with oxen alone. On one of the pieces of tapestry woven at Bayonne in the time of William the Conqueror, (A. D. 1066) there is the figure of a man driving a horse attached to a harrow. This is the earliest notice we have of the use of the horse in field-labour.

With William the Conqueror came a marked improvement in the British horse. To his superiority in cavalry this prince was chiefly indebted for the victory of Hastings. The favourite charger of William was a Spaniard. His followers, both the barons and the common soldiers, came principally from a country in which agriculture had made more rapid progress than in England. A very considerable portion of the kingdom was divided among these men; and it cannot be doubted that, however unjust was the usurpation of the Norman, England benefited in its husbandry, and particularly in its horses, by the change of masters. Some of the barons, and particularly Roger de Boulogne, earl of Shrewsbury, introduced the Spanish horse, on their newly acquired estates. The historians of these times, however, principally monks, knowing nothing about horses, give us very little information on the subject.

In the reign of Henry I. (A. D. 1121) the first Arabian horse, or, at least, the first on record, was introduced. Alexander I., king of Scotland, presented to the church of St Andrews, an Arabian horse, with costly furniture, Turkish armour, many valuable trinkets, and a considerable estate.

Forty years afterwards, in the reign of Henry II., Smithfield was celebrated as a horse-market. Fitz-Stephen, who lived at that time, gives the following animated account of the manner in which the *hackneys* and *charging-steeds* were tried there, by racing against one another. "When a race is to be run by this sort of horses, and perhaps by others, which also in their kind are strong and fleet, a shout is immediately raised, and the common horses are ordered to withdraw out of the way. Three jockeys, or sometimes only two, as the match is made, prepare themselves for the contest. The horses on their part are not without emulation; they tremble and are impatient, and are continually in motion. At last, the signal once given, they start, devour the course, and hurry along with unremitting swiftness. The jockeys, inspired with the thought of applause, and the hope of victory, clap spurs to their willing horses, brandish their whips, and cheer them with

They assert, that the running-horse, as the breed has been for a long time refined, is unfit for any other service than that of the course, being too slight either for the road, the chase, or the combat; and his joints so delicately united, as to render him subject to

their cries." This description reminds us of the more lengthened races of the present day, and proves the blood of the English horse, even before the Eastern breed was tried.

Close on this followed the Crusades. The champions of the Cross certainly had it in their power to enrich their native country with some of the choicest specimens of Eastern horses, but they were completely under the influence of superstition and fanaticism, and common sense and usefulness were forgotten.

The war-steed was defended by mail or plate, much on the plan of the harness of the knight himself. His head was ornamented with a crest. The head, chest, and flanks, were wholly or partially protected; and sometimes he was clad in complete steel, with the arms of his master engraved or embossed on his *bardings*. The bridle of the horse was always as splendid as the circumstances of the knight allowed, and thus a horse was often called Brigliadore, from *briglia d'oro*, a bridle of gold. Bells were a very favourite addition to the equipment of the horse. The old-Troubadour, Arnold of Marson, says, that "nothing is so proper to inspire confidence in a knight, and terror in an enemy."

To King John, hateful as he was in all other respects, we are yet much indebted for the attention which he paid to agriculture generally, and particularly to improving the breed of horses. He imported one hundred chosen stallions of the Flanders kind, and thus mainly contributed to prepare our noble species of draught horses, as unrivalled as the horses of the turf.

One hundred years afterwards, Edward II. purchased thirty Lombardy *war-horses*, and twelve heavy draught-horses. Lombardy, Italy, and Spain, were the countries whence the greater part of Europe was then supplied with the most valuable cavalry or parade horses. Horses for agricultural purposes were chiefly procured from Flanders.

Edward III. devoted one thousand marks to the purchase of fifty Spanish horses; and of such importance did he conceive this addition to the English, or rather mingled blood, then existing, that formal application was made to the kings of France and Spain to grant safe conduct to the troop. When they had safely arrived at the royal stud, it was computed that they had cost the monarch no less than thirteen pounds six shillings and eightpence per horse, equal in value to one hundred and sixty pounds of our present money.

This monarch had many *running-horses*. The precise meaning of the term is not, however, clear. It might be light and speedy horses in opposition to the war-horse, or those that were literally used for the purpose of racing. The average price of these running-horses was twenty marks, or three pounds six shillings and eightpence. Edward was devoted to the sports of the turf or the field, or he began to see the propriety of crossing our stately and heavy breed with those of a lighter structure and greater speed.

There was, however, one impediment to this, which was not for a very long period removed. The soldier was cased in heavy armour. The knight

the smallest accidents. They, therefore, conclude, that less encouragement given to racing would be a means of turning us from breeding rather for swiftness than strength; and that we should thus be again famous for our strong hunters, which they say are wearing out from among us.

with all his accoutrements, often rode more than twenty-five stone. No little bulk and strength were required in the animals destined to carry this back-breaking weight. When the musket was substituted for the cross-bow and battle-axe, and this iron defence, cumbrous to the wearer and destructive to the horse, was useless, and laid side, the improvement of the British horse in reality commenced.

While Edward was thus eager to avail himself of foreign blood, with the too frequent selfishness of the sportsman, he would let no neighbour share in the advantage. The exportation of horses was forbidden under very heavy penalties. One case in which he relaxed from his severity is mentioned, when he permitted a German merchant to re-export some Flanders horses which he had brought on speculation; but he was strictly forbidden to send them to Scotland. Nay, so jealous were these sister-kingdoms of each other's prosperity, that so late as the time of Elizabeth, it was felony to export horses from England to Scotland.

The English horse was advancing, although slowly, to an equality with, or even superiority over, those of neighbouring countries. His value began to be more generally and highly estimated, and his price rapidly increased—so much so, that breeders and the dealers, then, as now, skilful in imposing on the experienced, obtained from many of our young grandees enormous prices for them. This evil magnified to such an extent, that Richard II. (1386) interfered to regulate and determine the price. The proclamation which he issued is interesting, not only as proving the increased value of the horse, but showing what were four hundred and fifty years ago, and what are, still, the chief breeding districts. It was ordered to be published in the counties of Lincoln and Cambridge, and the East and North Ridings of Yorkshire; and the price of the horse was restricted to that which had been determined by former sovereigns. A more enlightened policy has at length banished all such absurd interferences with agriculture and commerce.

We can now collect but little of the history of the horse, until the reign of Henry VII. at the close of the fifteenth century. He continued to prohibit the exportation of stallions, but allowed that of mares when more than two years old, and under the value of six shillings and eight pence. This regulation was, however, easily evaded, for if a mare could be found worth more than six shillings and eight pence, she might be freely exported on the payment of that sum.

Henry VIII., a tyrannical and cruel prince, but fond of show and splendour, was very anxious to produce a valuable breed of horses; and the means which he adopted were both perfectly in unison with his arbitrary disposition, and very little calculated to effect his object. He affixed a certain standard below which no horse should be kept. The lowest height for the stallion was fifteen hands, and for the mare thirteen hands; and even before they had arrived at their full growth, no stallion above two years old, and under

How far this may be fact, I will not take upon me to determine, being but little versed in a subject that does not properly come within the compass of natural history. Instead therefore of farther expatiating on this well-known animal's qualifications,

fourteen hands and a half, was permitted to run on any forest moor or common, where there were mares. At "Michaelmastide" the neighbouring magistrates were ordered to "drive" all forests and commons, and not only destroy such stallions, but all "unlikely tits," whether mares, or geldings, or foals which they might deem not calculated to produce a valuable breed. He likewise ordained, that in every deer-park, a certain number of mares in proportion to its size, and each at least thirteen hands high, should be kept; and that all his prelates and nobles, and "all those whose wives wore velvet bonnets" should keep stallions for the saddle at least fifteen hands high. These ordinances perished with the tyrant by whom they were promulgated.

The tyrannical edicts of Henry VIII. had the effect which common sense would have anticipated,—the breed of horses was not materially improved, and their numbers were sadly diminished. When the bigot, Philip of Spain, threatened England in the reign of Elizabeth, with his Invincible Armada, that princess could muster in her whole kingdom only three thousand cavalry to oppose him; and Blundeville, who wrote at this time a very pleasant and excellent book on the art of riding, speaks contemptuously of the qualities of these horses. The secret of improving the breed had not then been discovered; it had been attempted by arbitrary power; and it had extended only to those crosses from which little good could have been expected: or rather it had more reference to the actual situation of the country, and the heavy carriages, and the bad roads, and the tedious travelling which then prevailed, than to the wonderful change in these which a few centuries were destined to effect.

Blundeville describes the majority of our horses as consisting of strong sturdy beasts, fit only for slow draught, and the few of a lighter structure being weak and without bottom. There were, however, some exceptions; for he relates a case of one of these lighter horses travelling eighty miles in a day—a task which in later times has been too often and cruelly exacted from our half-bred nags.

An account has been given of the racing trial of the horses in Smithfield market. Regular races were now established in various parts of England. Meetings of this kind were first held at Chester and Stamford; but there was no acknowledged system as now; and no breed of racing horses. Hunters and hackneys mingled together, and no description of horse was excluded.

There was at first no course marked out for the race, but the contest generally consisted in the running of *train-scent* across the country, and sometimes the most difficult and dangerous part of the country was selected for the exhibition. Occasionally our present steeple chase was adopted with all its dangers, and more than its present barbarity; for persons were appointed cruelly to flog along the jaded and exhausted horses.

It should, however, be acknowledged that the races of that period were not disgraced by the system of gambling and fraud, which seems to have become almost inseparable from the amusements of the turf. The prize was use-

upon which many volumes might easily be written, I will content myself with just mentioning the description of Camerarius, in which he professes to unite all the perfections which a horse ought to be possessed of:—"It must," says he, "have three

ally a wooden bell adorned with flowers. This was afterwards exchanged for a silver bell, and "given to him who should run the best and farthest on horseback on Shrove Tuesday." Hence the common phrase of "bearing away the bell."

Horse-racing became gradually more cultivated; but it was not until the last year of the reign of James I., that rules were promulgated and generally subscribed to for their regulation. That prince was fond of field sports. He had encouraged if he did not establish horse-racing in Scotland, and he brought with him to England his predilection for it; but his races were more often matches against time, or trials of speed and bottom, for absurdly and cruelly long distances. His favourite courses were at Croydon and on Enfield Chase.

Although the Turkish and Barbary horses had been freely used to produce with the English mare the breed which was best suited to this exercise, little improvement had been effected. James, with great judgment, determined to try the Arab breed. Probably, he had not forgotten the story of the Arabian which had been presented to one of his Scottish churches, five centuries before. He purchased from a merchant named Markham, a celebrated Arabian horse, for which he gave the extravagant sum of five hundred pounds. Kings, however, like their subjects, are often thwarted and governed by their servants, and the Duke of Newcastle took a dislike to this foreign animal. He wrote a book, and a very good one, on horsemanship, and described this Arabian as a little bony horse, of ordinary shape, setting him down as good for nothing, because, after being regularly trained, he could not race. The opinion of the Duke, probably altogether erroneous, had, for nearly a century, great weight; and the Arabian horse lost its reputation among the English turf-breeders.

A South-Eastern horse was afterwards brought into England, and purchased by James, of Mr Place, who was afterwards stud-master, or groom, to Oliver Cromwell. This beautiful animal was called the White Turk, and his name and that of his keeper will long be remembered. Shortly afterwards appeared the Helmsley Turk, introduced by Villiers, the first duke of Buckingham. He was followed by Fairfax's Morocco Barb. These horses speedily effected a considerable change in the character of our breed, so that Lord Harleigh, one of the old school, complained that the great horse was fast disappearing, and that horses were now bred light and fine for the sake of speed only.

Charles I. ardently pursued this favourite object of English gentlemen, and a little before his rupture with the parliament, established races in Hyde Park, and at Newmarket. The civil war somewhat suspended the improvement of the breed; yet the advantage which was derived by both parties from a light and active cavalry, sufficiently proved the importance of the change which had been effected; and Cromwell perceiving, with his wonted sagacity, how much these pursuits were connected with the prosperity of the country, had his stud of race-horses.

At the Restoration a new impulse was given to the cultivation of the horse

parts like those of a woman; the breast must be broad, the hip round, and the mane long: it must in three things resemble a lion; its countenance must be fierce, its courage must be great, and its fury irresistible: it must have three things belonging to the sheep; the nose, gentleness, and patience: it must have three of a deer; head, leg, and skin: it must have three of a wolf; throat, neck, and hearing: it must have three of a fox: ear, tail, and trot: three of a serpent; memory, sight, and flexibility: and, lastly, three of a hare; running, walking, and perseverance."*

by the inclination of the court to patronize gaiety and dissipation. The races at Newmarket were restored, and as an additional spur to emulation, royal plates were now given at each of the principal courses. Charles II. sent his master of the horse to the Levant, to purchase brood mares and stallions. These were principally Barbs and Turks.

From that period to the middle of the last century the system of improvement was zealously pursued: every variety of Eastern blood was occasionally engrafted on ours, and the superiority of the engrafted, above the very best of the original stock, began to be evident.

Man is rarely satisfied with any degree of perfection in the object on which he has set his heart. The sportsman had now beauty of form, and speed and stoutness, scarcely an approach to which had been observed in the original breed. Still some imagined that this speed and stoutness might possibly be increased; and Mr Darley, in the latter part of the reign of Queen Anne, had recourse to the discarded and despised Arabian. He had much prejudice to contend with, and it was some time before the Darley Arabian attracted notice. At length the value of his produce began to be recognised, and to him we are greatly indebted for a breed of horses of unequalled beauty, speed, and strength.

This last improvement now furnishes all that can be desired: nor is this true only of the thorough-bred or turf-horse; it is, to a very material degree, the case with every description of horse. By a judicious admixture and proportion of blood we have rendered our hunters, our hackneys, our coach, nay even our cart horses, much stronger, more active, and more enduring than they were before the introduction of the race-horse.

* It is a curious natural fact, that the horse has the singular property of breathing through the nostril only, and not through the mouth; for in the severest exercise, the mouth is never seen open, unless the lower jaw be brought down violently by the force of the bit. This may account for the great dilatation of the nostrils after hard running.

Though endowed with vast strength, and great powers of body, such is the disposition of the horse, that it rarely exerts either to its master's prejudice: on the contrary, it will endure fatigues, even to death, for our benefit. Providence seems to have implanted in him a benevolent disposition, and a fear of the human race, with, at the same time, a certain consciousness of the services we can render him. We have, however, one instance of recollection of injury, and an attempt to revenge it. This is inserted in a work

CHAP. II.

OF THE ASS.[1]

ALTHOUGH this animal is very easily distinguished from the horse at first sight, yet upon a closer inspection, the similitude

of D. Rolle, Esq. of Torrington, in Devonshire. A baronet, one of whose hunters had never tired in the longest chase, once encouraged the cruel thought of attempting completely to fatigue him. After a long chase he dined, and again mounting, rode him furiously among the hills; when brought to the stable his strength appeared exhausted, and he was scarcely able to walk. The groom, possessed of more feeling than his brutal master, could not refrain from tears at the sight of so noble an animal thus sunk down. The baronet some time after entered the stable, and the horse made a furious spring upon him, and had not the groom interfered, would soon have put it out of his power of ever again misusing his animals.

The barbarous custom of docking the tails and cutting the ears of horses, is in this country very prevalent. The former, however, principally with waggon horses, under the pretence that a bushy tail collects the dirt of the roads; and the latter from the notion that they are rendered more elegant in their appearance. Thus, from ideal necessity, we deprive them of two parts of the body principally instrumental, not only to their own ease and comfort, but in their utility to us. By taking away their ears, the funnels are destroyed which they always direct to the place from whence any sound is heard, and they are thus rendered nearly deaf. And in the loss of their tail, they find even a still greater inconvenience. During summer they are perpetually teased with swarms of insects, that either attempt to suck their blood, or to deposit their eggs in the rectum, which they have now no means of lashing off; and in winter they are deprived of a necessary protection against the cold.

But of all others, the custom that we have adopted (for it is found in no other nation than this) of nicking them, is the most useless and absurd. It is a most affecting sight to go into the stable of an eminent horse dealer, and there behold a range of fine and beautiful steeds with their tails cut and slashed, tied up by pulleys to give them force, suffering such torture, that they sometimes never recover the savage gashes they have received. And for what is all this done? That they may hold their tails somewhat higher than they otherwise would, and be for ever after deprived of the power of moving the joints of them as a defence against flies!

Another abuse may be noticed, observable in those who shoe horses. The stupid blacksmith, in order to save himself a little trouble, will frequently apply the shoe red hot to the horse's foot, in order that it may burn for itself a bed in the hoof, and fit it for its reception. "The utmost severity (says Lord

1 Many parts of this account are extracted from Daubenton and Buffon; which I mention here, to avoid troubling the reader with a multiplicity of quotations.

between them is very striking.† They have both a similar outline in the external parts; the same conformation within. One would be led, from the great resemblance there is between them, to suppose them of the same species; and that the ass

Pembroke) ought to be inflicted on all those who clap shoes on hot. This unpardonable laziness of farriers, in making feet thus to fit shoes, instead of shoes to fit the feet, dries up the hoofs, and utterly destroys them." It is of the most ruinous consequence, hardening and cracking the hoofs, and inducing even the most fatal disorders. The joints, the wind, and the eyes, are injured by it; and the gross humours which naturally descend to the feet, and ought to be carried off by insensible perspiration, are detained by the hardness of the surface they have to penetrate.

The stomach of horses is small, and at the cardia there is a little valve which renders them incapable of vomiting. Their natural diseases are few; but our ill usage or neglect, or, which is very frequent, our over care of them, bring on a numerous train, which are often fatal. They sleep but little, and this in general on their legs. If properly treated, they will live forty or fifty years.

There are various ways of judging of the age of a horse. The following are the most general:—The eye-pits of old horses are commonly hollow: but that mark is equivocal, young horses begot by old stallions having them also hollow. The teeth afford the best criterion of the age of horses. The horse has in all forty teeth, viz. twenty-four grinders, four canine teeth, or tusks, and twelve fore-teeth: mares have either no tusks, or very short ones; five days after birth four teeth in front begin to shoot; these are called nippers, and are cast at the age of two years and a half.—They are soon renewed; and the next year he again casts two above and two below, one on each side of the nippers. At four years and a half, other four fall out, next those last placed; these last four foal teeth are succeeded by other four, which grow much more slowly than the first eight; and it is from these last four corner teeth, that the age of a horse is distinguished; they are somewhat hollow in the middle, and have a black mark in the cavities. At five years these teeth scarcely rise above the gums; at six, their cavities begin to fill up, and turn to a brownish spot, like the eye of a garden bean; and before eight years the mark generally disappears. The tusks generally indicate the age of a horse. Those in the under jaw generally shoot at the age of three years and a half; and the two in the upper jaw at four: till six, they continue sharp at the points; but at ten, they appear long and blunt. These are the general rules for ascertaining the age of a horse; but there are frequent exceptions, as some horses retain the mark two or three years longer.

But the unwary are often taken in with regard to the age of a horse, by a diabolical practice among many dealers called Bishoping.—It is an operation performed upon the teeth of a horse, and supposed to have derived its modern appellation from an *eminent* and *distinguished* dealer of the name of Bishop; whether from any peculiar neatness in, or reputed celebrity for, a personal performance of the deception, it is most probably not possible, or necessary, to ascertain. The purport of the operation is to furnish horses of ten or twelve years old with a *regeneration of teeth*, bearing the appearance of five or six; and is thus performed:—The horse being powerfully twitched by

was only a horse degenerated: however, they are perfectly distinct, and there is an inseparable line drawn between them, for the mule they produce is barren. This seems to be the barrier between every species of animals; this keeps them asunder, and preserves the unities of their form. If the mule, or the monster, bred between two animals, whose form nearly approaches, is no longer fertile, we may then conclude, that these animals, however resembling, are of different kinds. Nature has providently stopped the fruitfulness of these ill-formed productions in order to preserve the form of every animal uncontaminated: were it not for this, the races would quickly be mixed with each other; no one kind would preserve its original perfection; every creature would quickly degenerate; and the world would be stocked with imperfection and deformity.

The horse and the ass, therefore, though so nearly approaching in form, are of two distinct kinds different in their natures; and were there but one of each kind, both races would then be extinguished. Their shapes and their habits may, indeed, be very nearly alike; but there is something in every animal, besides its conformation or way of life, that determines its specific nature.

both the nose and ears, a cushioned roller, large enough to keep the jaws extended, is then placed in the mouth; which done, the teeth of the under jaw are somewhat reduced in their length (according to their growth,) by the friction of a blacksmith's cutting-file: an engraver's tool is then employed in taking as much from the surface of each tooth as will leave a conspicuous cavity in the middle: this cavity (or rather every individual cavity) is then burned black with an iron instrument red hot, and adapted to the purpose; a composition of cement is then insinuated, so well prepared in both colour and consistence, that it is frequently not discoverable (at least to slight observers,) for many months after its introduction.

† The head of the ass is large and thick; the ears very long; the mane short and erect, with a dark brown stripe from the shoulders to the insertion of the tail, which is thick, covered with short hairs, and stunted towards its end. A dark stripe extends from the top of the withers to the insertion of the thigh, on each shoulder: the whole animal is covered with thickset woolly like hair. His general colour is ash-coloured brown; sometimes chestnut; very dark brown, approaching to black; and sometimes, though rarely, white.

The ass is three or four years in coming to perfection, but will propagate when two years old, and will continue to do so till about twenty-five years of age; Ælian says till thirty; alluding, probably, to those in eastern climates. The female goes with young above eleven months, and rarely brings forth more than one at a time. This animal seldom lies down to rest, unless extremely fatigued; he sleeps standing, and requires much less repose than the horse.

Thus there is much greater resemblance between the horse and the ass, than between the sheep and the goat: and yet the latter produce an animal that is by no means barren, but which quickly reproduces an offspring resembling the sheep; while the mule of the former is marked with certain sterility. The goat and the sheep may be therefore said to be of one kind, although so much unlike in figure; while the horse and the ass are perfectly distinct, though so closely resembling. It has, indeed, been said by Aristotle, that their male is sometimes prolific; this, however, has not been confirmed by any other testimony, although there has elapsed a period of near two thousand years to collect the evidence.

But what tends to put the subject out of dispute, is that the two animals are found in a state of nature entirely different. The onager, or wild ass, is seen in still greater abundance than the wild horse; and the peculiarities of its kind are more distinctly marked than in those of the tame one. Had it been a horse degenerated, the likeness would be stronger between them, the higher we went to the original stock from whence both have been supposed to be sprung. The wild animals of both kinds would, in such a case, resemble each other, much more than those of the tame kind, upon whom art has, for a succession of ages, been exercising all its force, and producing strange habits and new alterations. The contrary, however, obtains, and the wild ass is even more assinine, if I may so express it, than that bred in a state of domestic servitude; and has even a natural aversion to the horse, as the reader will shortly learn.

The wild ass has, by some writers, been confounded with the zebra, but very improperly, for they are of a very different species. The wild ass is not streaked like the zebra, nor is his shape so beautiful; his figure is pretty much the same as that of the common ass, except that he is of a brighter colour, and has a white list running from his head to his tail. This animal is found wild in many islands of the Archipelago, particularly in that of Cerigo. There are many wild asses in the deserts of Libya and Numidia, that run with such amazing swiftness that scarcely even the coursers of the country can overtake them. When they see a man, they set up a horrid braying, and stop short all together, till he approaches near them; they then, as if by common consent, fly off with great speed; and it is upon such occasions that they generally fall into the traps which

are previously prepared to catch them. The natives take them chiefly upon account of their flesh, which they esteem as delicious eating; and for their skins, of which that kind of leather is made which is called *shagreen.**

* Wild asses live in herds, each consisting of a chief, and several mares and colts, sometimes to the number of twenty.—They are excessively timid, and provident against danger. A male takes upon him the care of the herd, and is always on the watch. If they observe a hunter who, by creeping along the ground, has got near them, the centinel takes a great circuit, and goes round and round him, as if discovering somewhat to be apprehended.—As soon as the animal is satisfied, he rejoins the herd, which sets off with great precipitation. Sometimes his curiosity costs him his life; for he approaches so near as to give the hunter an opportunity of shooting him. The senses of hearing and smelling in these animals are most exquisite; so that they are not in general to be approached without the utmost difficulty. "The wild asses did stand in the high places," says the prophet Jeremiah; "they snuffed up the wind like dragons." The Persians catch them, and break them for the draught. They make pits, which they fill about half way up with plants; into these the asses fall without bruising themselves, and are taken thence alive. When completely domesticated, they are very valuable, and sell at a high price, being at all times celebrated for their amazing swiftness.

The food of the wild asses is the saltest plants of the desert; such as the artriplex, kali, and chenopodium; and also the bitter musky tribe of herbs. They also prefer salt water to fresh.—This is exactly conformable to the history given of this animal in the book of Job; for the words "barren land," expressive of his dwelling, ought according to the learned Bochart, to be rendered *salt places*. The hunters generally lie in wait for the asses near the ponds of brakish water, to which they resort to drink.

In the principal streets of Cairo, asses stand ready bridled and saddled for hire, and answer the same purpose as the hackney coaches in London. The person who lets them, accompanies his ass, running behind to goad him on, and to cry out to those on foot to make way. They are regularly rubbed down and washed, which render their coat smooth and glossy. Their food is the same as that of the horse, usually consisting of chopped straw, barley, and beans. They here seem, says M. Denon, to enjoy the plenitude of their existence: they are healthy, active, cheerful, and the mildest and safest animals that a person can possibly have. Their natural pace is a canter or gallop; and without fatiguing his rider, the ass will carry him rapidly over the large plains which lie between different parts of this straggling city.

Sudden and unexpected internal impressions produce violent effects upon the animal system. Strong emotions of mind may deprive a man of his intellects, and of his life; and there are many instances of persons having died in consequence of having received sudden intelligence either of a joyful or distressing nature. The animal resembles man in this respect: any thing unexpected throws them into astonishment, and as the circulation of the blood is thereby at first accelerated, and afterwards suddenly stopped, the animal falls dead to the ground.

Host relates, in his account of Fez and Morocco, that he once saw at Mcknes a live ass given to lions to be devoured by them.—As soon as the ass

Olearius relates, that the monarch of Persia invited him on a certain day to be present at an entertainment of a very peculiar nature, which was exhibited in a small building, near the palace, resembling a theatre. After a collation of fruits and sweetmeats, more than thirty of these wild asses were driven into the area, among which the monarch discharged several shot, and some arrows, and in which he was imitated by some of the rest of his attendants. The asses, finding themselves wounded, and no way of escaping, instantly began to attack each other, biting with great fierceness, and braying terribly. In this manner they continued their mutual animosity, while the arrows were poured in from above, until they were all killed: upon which they were ordered to be taken, and sent to the king's kitchen at Ispahan. The Persians esteem the flesh of this animal so highly, that its delicacy is even become a proverb among them. What may be the taste of wild ass's flesh, we are unable to say; but certain it is, that the flesh of the tame ass is the worst that can be obtained, being drier, more tough, and more disagreeable than horse-flesh. Galen even says that it is very unwholesome. Yet we should not judge hastily upon the different tastes of different people, in the preference they give to certain meats. The climate produces very great changes in the tenderness and the savour of several viands: that beef, for instance, which is so juicy and good in England, is extremely tough and dry when killed

entered the den and saw the lions, he immediately fell down dead. One of the lions instantly seized upon him, and sucked out his blood; but life had previously been extinguished in him, for he did not move a limb.

An ass at Chartres used to go to the chatean of Quarville, to near the music that was often performed there. The owner of the chateau was a lady, who had an excellent voice, and whenever she began to sing, the ass never failed to draw nearer the window, and listen very attentively. Once when a piece was performed, which no doubt pleased him better than any he had ever heard before, he left his ordinary post, walked without ceremony into the music-room, and, in order to add to the concert what he thought was alone wanting to render it perfect, began to bray with all his might.

In Egypt and Arabia asses are frequently seen of great size and elegance; and in their attitudes and movements they exhibit a degree of gracefulness unknown even in those of Spain. Their step is light and sure, and their pace is brisk and easy. They are not only in common use for riding in Egypt, but the Mahometan merchants, the most opulent of the inhabitants, and even ladies of the highest rank, use them; and not long since, they were the only animals on which Christians of any rank or quality were permitted to appear in the Capita.

under the line; on the contrary, that pork, which is with us so unpalatable in summer, in the warmer latitudes, where it is always hotter than here, is the finest eating they have, and much preferable to any hog's flesh in Europe.

The ass, like the horse, was originally imported into America by the Spaniards, and afterwards by other nations. That country seems to have been peculiarly favourable to this race of animals; and where they have run wild, they have multiplied in such numbers, that in some places they are become a nuisance. In the kingdom of Quito, the owners of the grounds where they are bred, suffer all persons to take away as many as they can, on paying a small acknowledgment, in proportion to the number of days their sport lasts. They catch them in the following manner. A number of persons go on horseback, and are attended by Indians on foot: when arrived at the proper places, they form a circle, in order to drive them into some valley; where, at full speed, they throw the noose, and endeavour to halter them. Those creatures, finding themselves enclosed, make very furious efforts to escape; and, if only one forces his way through, they all follow with an irresistible impetuosity. However, when noosed, the hunters throw them down, and secure them with fetters, and thus leave them till the chase is over. Then, in order to bring them away with greater facility, they pair them with tame beasts of the same kind; but this is not easily performed, for they are so remarkably fierce that they often hurt the persons who undertake to manage them. They have all the swiftness of horses, and neither declivities nor precipices can retard their career. When attacked, they defend themselves with their heels and mouth with such activity, that without slackening their pace, they often maim their pursuers. But the most remarkable property in these creatures is, that, after carrying their first load, their celerity leaves them, their dangerous ferocity is lost, and they soon contract the stupid look and dulness peculiar to the assinine species. It is also observable, that these creatures will not permit a horse to live among them. They always feed together; and if a horse happens to stray into the place where they graze, they all fall upon him; and, without giving him the liberty of flying, they bite and kick him till they leave him for dead upon the spot.[1]

1 Ulloa, vol. i. p. 316.

Such is this animal in its natural state, swift, fierce, and formidable: but, in the state of tameness, the ass presents a very different picture; the moment his native liberty is repressed, he seems entirely to give up all claims to freedom; and he assumes a patience and submission even humbler than his situation. He is, in a state of tameness, the most gentle and quiet of all animals. He suffers with constancy, and, perhaps, with courage, all the ill-treatment that cruelty and caprice are pleased to inflict. He is temperate with regard to the quantity and the quality of his provision. He is contented with the most neglected weeds; and makes his humble repast upon what the horse and other animals leave behind. If he gives the preference to any vegetable, it is to the plantain; for which he is often seen to neglect every other herb in the pasture: but he is chiefly delicate with respect to his water; he drinks only at the clearest brooks, and chiefly those to which he has been accustomed. He drinks as soberly as he eats; and never, like the horse, dips his nose into the stream. As he is seldom saddled, he frequently rolls himself upon the grass; and lies down, for this purpose, as often as he has an opportunity, without minding what becomes of his burden. He never rolls, like the horse, in the mud; he even fears to wet his feet; and turns out of his way to avoid the dirty parts of a road.

When very young, the ass is sprightly, and even tolerably handsome; but he soon loses these qualifications, either by age or bad treatment, and he becomes slow, stupid, and headstrong. He seems to show no ardour, except for the female, having been often known to die after the covering. The she-ass is not less fond of her young than the male is of her; and we are assured that she will cross fire and water to protect or rejoin it. This animal is sometimes not less attached to his owner; by whom he is too often abused. He scents him at a distance, and distinguishes him from others in a crowd; he knows the ways he has passed, and the places where he inhabits.

When overloaded the ass shows the injustice of his master, by hanging down his head and lowering his ears; when he is too hard pressed, he opens his mouth and draws back his lips, in a very disagreeable manner. If his eyes are covered he will not stir a step; and, if he is laid down in such a manner, that one is covered with the grass while the other is hidden with a stone.

or whatever is next at hand, he will continue fixed in the same situation, and he will not so much as attempt to rise to free himself from those slight impediments. He walks, trots, and gallops, like a horse; but although he sets out very freely at first, yet he is soon tired; and then no beating will make him mend his pace. It is in vain that his unmerciful rider exerts his whip or his cudgel; the poor little animal bears it all with patience, and without a groan; and, conscious of his own imbecility, does not offer even to move.

Notwithstanding the stupid heaviness of his air, he may be educated with as much ease as any other animal; and several have been brought up to perform, and exhibit as a show. In general, however, the poor animal is entirely neglected. Man despises this humble useful creature, whose efforts are exerted to please him, and whose services are too cheaply purchased. The horse is the only favourite, and upon him alone all expense and labour are bestowed. He is fed, attended, and stabled, while the ass is abandoned to the cruelty of the lowest rustics, or even to the sport of children; and instead of gaining by the lessons he receives, is always a loser. He is conducted along by blows; he is insulted by unnecessary stripes; he is overloaded by the lazy; and, being generally the property of the poor, he shares with them in their distresses. Thus this faithful animal, which, were there no horses, would be the first of the quadruped kind in our esteem, is now considered as nothing: his properties and qualifications being found in a higher degree elsewhere, he is entirely disregarded; and, from being the second, he is degraded into one of the most useless of the domestic quadrupeds.*

* In early times, the ass was not, as is now the case with us, considered a despicable animal; for we find that he was rode by the rich and noble, in preference to the horse; as will appear from the following instances, from many that are recorded in the Sacred Writings:—When Abraham went to offer his son Isaac, he rode upon an ass; Joseph and his brethren rode on asses when they went down to Egypt to purchase corn; and we are told, that when Moses left Jethro, his father-in-law, he took his wife and his sons, and set them upon asses, and returned to Egypt. In the enumeration of Job's property, which appears to have been very great, we find, that he had five hundred she asses; and, in his prosperity, he is said to have had a thousand she asses. It is likely that the preference of females arose from the circumstance, that the ass can subsist on a scanty and coarse fare; so that, in the patriarchal ages, the she ass would not only bear the rider through the de

For this reason, very little care has been taken to improve the breed; it is suffered to degenerate; and it is probable, that of all other animals this alone is rendered feebler and more diminutive, by being in a state of domestic servitude. The horse, the cow, and the sheep, are rendered larger by the assiduity of man; the ass is suffered to dwindle every generation, and particularly in England, where it is probable that, but for the medicinal qualities of its milk, the whole species would have ere now been extinguished. Nevertheless, we have good reasons to believe that, were the same care bestowed on the ass that is spent upon the horse, were the same industry used in crossing the breed and improving it, we should see the ass become, from his present mean state, a very portly and serviceable animal; we should find him rival the horse in some of his perfections, and exceed him in others. The ass, bulk for bulk, is stronger than the horse; is more sure-footed; and though more slow in his motions, he is much less apt to start out of the way.

The Spaniards, of all people in Europe, seem alone to be acquainted with the value of the ass. They take all proper precautions to improve the breed; and I have seen a jackass, from that country, above fifteen hands high. This animal, however, seems originally a native of Arabia. A warm climate is known to produce the largest and the best; their size and spirit decline in proportion as they advance into colder regions.

sert and barren tracts, but also, with her milk, contribute to the support of her master. Jair, the Gileadite, one of the judges of Israel, had thirty sons, who rode on thirty ass colts. Anah, the Horite prince, did not think it derogatory to his rank, to feed the asses of Zibeon, his father. In ancient times, the ass was used for drawing chariots; for, when Isaiah predicted the fall of Babylon, he describes the watchman as seeing "a chariot with a couple of horsemen, a chariot of asses, and a chariot of camels." Herodotus says, the Indians had war chariots drawn by wild asses.

The Jews considered the ass as an unclean animal, because his hoof was not cloven, and he did not chew the cud; therefore refrained from eating his flesh, and offering him as a sacrifice. But we find that, in cases of want, these laws were disregarded; for, when Samaria was besieged by the Syrians, "an ass's head was sold for fourscore pieces of silver." The contempt of the Jews for this beast did not cease with his existence; for, unlike other animals, which, when they died, were buried under ground, he was thrown into the fields or ditches, to be eaten by wild beasts or birds. Such also was the burial of their criminals, or those they wished to treat with ignominy; Jehoiakim, king of Judah, was doomed to be thus treated,—"He shall be buried with the burial of an ass, drawn and cast forth beyond the gates of Jerusalem."

Though now so common in all parts of England, the ass was entirely lost among us during the reign of queen Elizabeth. Holingshead informs us that our land did yield no asses.[1] However, there are accounts of their being common in England before that time. In Sweden, they are at present a sort of rarity; nor does it appear by the last history of Norway, that they have yet reached that country. It is in the hotter climates alone that we are to look for the original of this serviceable creature. In Guinea, they are larger and more beautiful than even the horses of the same country. In Persia, they have two kinds; one of which is used for burdens, being slow and heavy; the other, which is kept for the saddle, being smooth, stately, and nimble. They are managed as horses, only that the rider sits nearer the crupper, and they are taught to amble like them. They generally cleave their nostrils to give them more room for breathing, and many of these are sold for forty or fifty pounds.

The ass is a much more hardy animal than the horse, and liable to fewer diseases. Of all animals covered with hair, he is the least subject to vermin, for he has no lice, probably owing to the dryness and the hardness of his skin. Like the horse, he is three or four years in coming to perfection; he lives till twenty or twenty-five; sleeps much less than the horse; and never lies down for that purpose, unless very much tired. The she-ass goes above eleven months with young, and never brings forth more than one at a time. The mule may be engendered either between a horse and a she-ass, or between a jack-ass and a mare.* The latter breed is every way preferable, being larger,

1 British Zoology, vol. i. p. 11.

* Mules have not unfrequently been known to bring forth young, especially in hot countries; and instances have not been wanting, though they are rare, both in England and Scotland. But it would require a succession of experiments to prove that mules will breed with each other, and produce an offspring equally capable of continuing the race.

The common mule is very healthy, and will live above thirty years. It is found very serviceable in carrying burdens, particularly in mountainous and stony places, where horses are not so sure-footed. The size and strength of our breed have lately been much improved by the importation of Spanish male asses; and it were much to be wished, that the useful qualities of this animal were more attended to; for, by proper care in its breaking, its natural obstinacy would, in a great measure, be corrected; and it might be formed with success for the saddle, the draught, or the burden.

People of the first quality in Spain are drawn by mules, where fifty or sixty guineas is no uncommon price for one of them; nor is it surprising, when

stronger, and better shaped. It is not yet well known whether the animal called the Gimerro be one of these kinds; or, as is asserted, bred between the ass and the bull. While naturalists affirm the impossibility of this mixture, the natives of the alpine countries, where this animal is bred, as strongly insist upon its reality. The common mule is very healthy, and will live above thirty years, being found very serviceable in carrying burdens, particularly in mountainous and stony places, where horses are not so sure-footed. The size and strength of our asses is at present greatly improved by the importation of Spanish jack-asses; and it is probable we may come in time to equal the Spaniards in breeding them, where it is not uncommon to give fifty or sixty guineas for a mule; and, indeed, in some mountainous countries, the inhabitants cannot well do without them. Their manner of going down the precipices of the Alps, or the Andes, is very extraordinary; and with it we will conclude their history. In these passages, on one side, are steep eminences, and, on the other, frightful abysses; and, as they generally follow the direction of the mountain, the road, instead of lying in a level, forms at every little distance steep declivities, of several hundred yards downward. These can only be descended by mules; and the animal itself seems sensible of the danger, and the caution that is to be used in such descents. When they come to the edge of one of these descents, they stop, without being checked by the rider; and, if he inadvertently attempts to spur them on, they continue immoveable. They seem all this time ruminating on the danger that lies before them, and preparing themselves for the encounter. They not only attentively view the road, but tremble and snort at the danger. Having prepared for the descent, they place their fore-feet in a posture as if they were stopping themselves; they then also put their hinder-feet together, but a little forward, as if they were going to lie down. In this attitude, having taken as it were a survey of the road, they slide down with the swiftness of a meteor. In the meantime, all the rider has to do is to keep himself fast on the saddle, without checking the rein, for the least motion is sufficient to disorder the equilibrium of the mule; in which case

we consider how far they excel the horse in travelling in a mountainous country, the mule being able to tread securely where the former can hardly stand.

they both unavoidably perish. But their address in this rapid descent, is truly wonderful; for in their swiftest motion when they seem to have lost all government of themselves, they follow exactly all the different windings of the road, as if they had previously settled in their minds the route they were to follow, and taken every precaution for their safety. In this journey, the natives, who are placed along the sides of the mountains, and hold by the roots of the trees, animate the beast with shouts, and encourage him to perseverance. Some mules, after being long used to these journeys, acquire a kind of reputation for their safety and skill; and their value rises in proportion to their fame.[2]

CHAP. III.

OF THE ZEBRA.

THERE are but three animals of the horse kind.* The horse, which is the most stately and courageous; the ass, which is the most patient and humble; and the zebra, which is the most beau-

2 Ulloa, vol. i.

* As mentioned in a former note, there are other two species of the horse genus, namely, the Dziggtai and the Quagga. The mountain zebra, and the zebra of the plains, are also different species. The *specific characters* of the dziggtai are,—his skin is isabella, or light bay in summer, of a clean and thriving appearance; of a redder hue in winter, and the hair very long; his mane and dorsal line, which enlarges on the crupper, are generally black; and his tail terminated by a black tuft. He is generally the size of an ordinary wild horse; and his proportions are intermediate between the horse and the ass. He is probably the wild mule of the ancients. He lives in troops in the sandy deserts of Central Asia.

Messerschmit was the first who noticed this animal; but we had no precise description, till it was given by Pallas. His name in the Mongol language signifies *large ear*. His ears are much longer than those of the horse, but straighter and better formed than those of the mule.

His head is strong and rather heavy; the forehead narrow and flattened, with a peculiar projection above the nostrils, from whence the nose suddenly droops; the bristles or beard numerous, and about two and a half inches in length; the mane short and thick; the chest capacious; the back long and curved; and the crupper is somewhat thin: the shoulders are narrow, and the limbs light; pasterns long, with the hoofs like those of the ass; the tail resembles that of a bull, very thick at its base, is black, nearly two feet long, with a thick tuft at its point, reaching nearly three inches beyond his hock.

tiful, but at the same time, the wildest animal in nature. Nothing can exceed the delicate regularity of this creature's colour, or the lustrous smoothness of its skin; but on the other hand, nothing can be more timid or more untameable.

The dziggtai is a light and nimble animal; his limbs beautifully fine, with flat shank bones, the knee joints long and straight, that seem peculiarly formed for speed, which he possesses in an astonishing degree, as he runs with the speed of the wind, carrying his head in an erect position, with the nostrils expanded. His air betrays extreme energy, being wild, fiery, and untameable in his disposition. The flesh of this animal is esteemed a great delicacy by the Mongols, Tungooses, and other hordes, on the borders of the Great Desert. Like the rest of the genus he is gregarious, and is seen in troops of from twenty to thirty in number, and some have said even in herds of one hundred. Like the horse, his character is pacific, and he never attacks other animals. Each troop has a chief, who watches over its safety, conducts its general movements, and gives the signal of alarm, in cases of danger. This signal is said to consist in leaping several times round the object he dreads. This temerity often occasions his death; in which event the herd disperses, in opposite directions, and become more easily a prey to the hunters. It is in vain to attempt following the dziggtai on horseback, as it would quickly leave the fleetest courser of the desert far behind. It is remarkable, that all means to domesticate this animal have hitherto proved abortive, and this even when taken young. They are considered by the natives as untameable; for the individuals which have been tried generally killed themselves in their exertions to escape their thraldom. Pallas, however, thinks they might be subdued by proper treatment. Indeed, it has been found, that all animals are susceptible of some degree of domestication; and if this were persisted in, the dziggtai might eventually become a useful servant of man. Sonnini is of opinion, that this species will become extinct, from the circumstance of man not being able to subjugate them; and from their being such a favourite delicacy with the Asiatics.

The head and neck of the Quagga are dark blackish brown, the rest of a clear brown growing paler below, and underneath is nearly white, as well as the legs. The head and neck are striped with grayish white, longitudinal on the forehead and temples, and transverse on the cheeks; between the mouth and eyes they form triangles; there are ten bands on the neck; the mane is blackish, short, much thicker than that of the zebra, commencing on the forehead, and is, like theirs, striped; a longitudinal black band runs from the termination of the mane along the spine, and loses itself in the tail, which is like that of a cow, with a dark brown or black tuft of hair at its extremity. The height of the quagga or couagga, is about four feet, or twelve hands, at the withers. In his form, proportions, lightness of figure, and smallness of head and ears, he bears a greater resemblance to the horse than the zebra, but his tail is like that of a cow.

Quaggas associate in herds, frequently to the number of one hundred, in the most solitary regions of Southern Africa. Delalande observed great flocks of them at the mouth of the Grootvis river, which, during the night, would approach near to his tent; but they are never to be found in company with zebras, the species to which they are most nearly allied in general

It is chiefly a native of the southern parts of Africa; and there are whole herds of them often seen feeding in those extensive plains that lie towards the Cape of Good Hope. However, their watchfulness is such, that they will suffer nothing to come near

conformation. The cry of this animal bears a strong resemblance to the barking of a dog, and is particularly sharp in the rutting season. He is very easily tamed, and rendered obedient to domestic purposes. Of late years they have freqently been seen in pairs, running in the curricles of the *kaut-ton* in London; often forming part of the parade of Hyde Park, and other fashionable places of resort. They seem as obedient to the reins and whip as horses.

It is a matter of surprise, that this animal has not long before now been domesticated by man, because his constitution is fitted for the hottest climate; so that he would be extremely valuable in those burning regions where the heat destroys the capabilities of the horse. In a wild state the quagga is possesed of great natural courage; for, according to the report of travellers, he effectually repels the attacks of wolves and hyænas, with which his native country abounds. The natural pliability of his disposition, his great activity and physical strength, peculiarly fit him for the service of man; and when these become more generally known, I have no doubt he will be added to our domestic animals. The name of this animal in his native country, expresses the sound of his voice. The late Earl of Morton succeeded in engendering mules between a male quagga and a mare. They were not, however, handsome animals. Some time after this quagga died, the mare which had propagated with him produced a foal, three seasons after having the mule, which had the indistinct markings of the quagga, although she had not been with that animal from the time she had the hybrid foal to him.

The zebra of the plains was first ascertained by Mr Burchell to be different from the common or mountain zebra. The following is Mr Gray's specific description of the zebra of the plains:—"Body white; head with numerous narrow brown stripes, which gradually unite together and form a bay nose, the neck and body with alternate broad stripes of black and narrow ones of brown, the latter of which nearly fill up the interstices between the black stripes, and only leave a narrow whitish margin. The dorsal line is narrow, and becomes gradually broader in the hinder part, distinctly margined with white on each side. The belly, legs, and all, quite white; the mane alternately banded with black and white."

This beautiful animal differs materially from the common zebra; the ground colour of his body being entirely white, interrupted by a regular series of black stripes commencing on the ridge of the back, and terminating at the bottom of his sides: betwixt these are narrower and fainter ones of a brownish colour. On the shoulders and over the haunches, these stripes assume somewhat of a bifurcated appearance, between the divisions of which there are a few transverse lines of the same colour; but these suddenly and abruptly disappear, and are not continued on the legs, as in the common zebra, being perfectly white. Along the spinal ridge there is a narrow longitudinal line bordered on each side with white. The mane is long, stiff, and erect, with the transverse bands of the neck broadly continued through it, and distinctly tipped with deep black. The lines of the face are narrow, and perfectly regular; from the centre of the forehead they radiate downwards over each

them, and their swiftness so great, that they readily leave every pursuer far behind. The Zebra in shape rather resembles the mule, than the horse or the ass. It is rather less than the former, and yet larger than the latter. Its ears are not so long as those of the ass, and yet not so small as in the horse kind. Like the ass, its head is large, its back straight, its legs finely placed, and its tail tufted at the end; like the horse its skin is smooth and close, and its hind quarters round and fleshy. But its greatest beauty lies in the amazing regularity and elegance of its colours. In the male, they are white and brown; in the female, white and black. These colours are disposed in alternate stripes over the whole body, and with such exactness and symmetry, that one would think Nature had employed the rule and compass to paint them. These stripes which like so many ribands, are laid all over its body, are narrow, parallel, and exactly separated from each other. It is not here as in other party coloured animals, where the tints are blended into each other; every stripe here is perfectly distinct, and preserves its colour round the body or the limb, without any diminution. In this manner are the head, the body, the thighs, the legs, and even the tail and the ears, beautifully streaked, so that at a little distance one would be apt to suppose that the animal was dressed out by art, and not thus admirably adorned by nature.

In the male zebra, the head is striped with fine bands of black and white, which in a manner centre in the forehead. The ears are variegated with a white and dusky brown. The neck has broad stripes of the same dark brown running round it, leaving narrow white stripes between. The body is striped also cross the back with broad bands, leaving narrower spaces of white between them, and ending in points at the sides of the belly, which is white, except a black line pectinated on each side, reaching from between the fore-legs, along the middle of the

eye; along the front of the muzzle they are longitudinal, with the outer ones slighty curved outwards; and on the sides they form broader transverse fillets. From where the bands unite on the extremity of the muzzle, the nose, and the upper lip, those parts become nearly of a uniform blackish brown. The tail is of a yellowish white. There is no longitudinal ventral line; and the back part of the ears are occupied towards the tips by patches of black. The hoofs are moderately large, deep in front, and shallow behind, and considerably expanded at their margin.

belly, two-thirds of its length. There is a line of separation between the trunk of the body and the hinder quarters, on each side: behind which, on the rump, is a plat of narrow stripes, joined together by a stripe down the middle, to the end of the tail. The colours are different in the female; and in none the stripes seem entirely to agree in form, but in all they are equally distinct; the smooth hair equally and fine; the white shining and unmixed; and the black, or brown, thick and lustrous.

Such is the beauty of this creature, that it seems by nature fitted to satisfy the pride and the pleasure of man: and formed to be taken into his service. Hitherto, however, it appears to have disdained servitude; and neither force nor kindness have been able to wean it from its native independence and ferocity. But this wildness might, perhaps, in time be surmounted: and it is probable the horse and the ass, when first taken from the forest, were equally obstinate, fierce, and unmanageable. Mr Buffon informs us, that the zebra, from which he took his description, could never be entirely mastered, notwithstanding all the efforts which were tried to tame it. They continued, indeed, to mount it, but then with such precautions as evidently showed its fierceness, for two men were obliged to hold the reins, while the third ventured upon its back; and even then it attempted to kick, whenever it perceived any person approaching. That which is now in the Queen's menagerie at Buckingham-Gate, is even more vicious than the former; and the keeper who shows it takes care to inform the spectators of its ungovernable nature. Upon my attempting to approach it, it seemed quite terrified, and was preparing to kick, appearing as wild as if just caught, although taken extremely young, and used with the utmost indulgence. Yet still it is most probable that this animal, by time and assiduity, could be brought under subjection. As it resembles the horse in form, without all doubt it has a similitude of nature, and only requires the efforts of an industrious and skilful nation, to be added to the number of our domestics. It is not *now* known what were the pains and dangers which were first undergone to reclaim the breed of horses from savage ferocity; these, no doubt, made an equal opposition; but by being opposed by an industrious and enterprising race of mankind, their spirit was at last subdued, and their freedom restrained. It is otherwise with regard to the zebra; it is the na-

tive of countries where the human inhabitants are but little raised above the quadruped. The natives of Angola, or Caffraria, have no other idea of advantage from horses but as they are good for food; neither the fine stature of the Arabian courser, nor the delicate colourings of the zebra, have any allurements to a race of people, who only consider the quantity of flesh, and not its conformation. The delicacy of the zebra's shape, or the painted elegance of its form, are no more regarded by such, than by the lion that makes it his prey. For this reason, therefore, the zebra may hitherto have continued wild, because it is the native of a country where there have been no successive efforts made to reclaim it. All pursuits that have been hitherto instituted against it, were rather against its life than its liberty: the animal has thus been long taught to consider man as its most mortal enemy; and it is not to be wondered that it refuses to yield obedience where it has so seldom experienced mercy. There is a kind of knowledge in all animals, that I have often considered with amazement; which is, that they seem perfectly to know their enemies, and to avoid them. Instinct, indeed, may teach the deer to fly from the lion; or the mouse to avoid the cat; but what is the principle that teaches the dog to attack the dog-butcher wherever he sees him? In China, where the killing and dressing dogs is a trade, whenever one of those people moves out, all the dogs of the village or the street are sure to be after him. This I should hardly have believed, but that I have seen more than one instance of it among ourselves. I have seen a poor fellow who made a practice of stealing and killing dogs for their skins, pursued in full cry for three or four streets together, by all the bolder breed of dogs, while the weaker flew from his presence with affright. How these animals could thus find out their enemy, and pursue him, appears, I own, unaccountable, but such is the fact; and it not only obtains in dogs, but in several other animals, though perhaps to a less degree. This very probably may have been in some measure a cause that has hitherto kept the zebra in its state of natural wildness; and in which it may continue, till kinder treatment shall have reconciled it to its pursuers.

It is very likely, therefore, as a more civilized people are now placed at the Cape of Good Hope, which is the chief place where this animal is found, that we may have them tamed and rendered serviceable. Nor is its extraordinary beauty the only

motive we have for wishing this animal among the number of our dependents: its swiftness is said to surpass that of all others; so that the speed of a zebra is become a proverb among the Spaniards and Portuguese. It stands better upon its legs also than a horse; and is consequently stronger in proportion. Thus, if by proper care we improve the breed, as we have in other instances, we should probably in time to come have a race as large as the horse, as fleet, as strong, and much more beautiful.

The zebra, as was said, is chiefly a native of the Cape of Good Hope. It is also found in the kingdom of Angola; and, as we are assured by Lopez, in several provinces also of Barbary. In those boundless forests it has nothing to restrain its liberty; it is too shy to be caught in traps, and therefore seldom taken alive. It would seem, therefore, that none of them have ever been brought into Europe, that were caught sufficiently young, so as to be untinctured by their original state of wildness. The Portuguese, indeed, pretend that they have been able to tame them, and that they have sent four from Africa to Lisbon, which were so far brought under, as to draw the king's coach;[1] they add, that the person who sent them over, had the office of notary conferred upon him for his reward, which was to remain to him and his posterity for ever: but I do not find this confirmed by any person who says he saw them. Of those which were sent to Brazil, not one could be tamed; they would permit one man only to approach them; they were tied up very short; and one of them, which had by some means got loose, actually killed his groom, having bitten him to death.[2] Notwithstanding this, I believe, were the zebra taken up very young, and properly treated, it might be rendered as tame as another animal; and Merolla, who saw many of them, asserts, that when tamed, which he speaks of as being common enough, they are not less estimable for their swiftness than their beauty.

This animal, which is neither to be found in Europe, Asia, nor America, is nevertheless very easily fed. That which came over into England some years ago, would eat almost any thing, such as bread, meat, and tobacco; that which is now among us, subsists entirely upon hay. As it so nearly resembles the horse

1 Dapper. 2 Pyrard. tom. ii. p. 376.

and the ass in structure, so it probably brings forth annually as they do. The noise they make is neither like that of a horse nor an ass, but more resembling the confused barking of a mastiff dog. In the two which I saw, there was a circumstance that seems to have escaped naturalists; which is, that the skin hangs loose below the jaw upon the neck, in a kind of dewlap, which takes away much from the general beauty. But whether this be a natural or accidental blemish, I will not take upon me to determine.

These animals are often sent as presents to the princes of the East. We are told, that one of the governors of Batavia gave a zebra, which had been sent to him from Africa, to the emperor of Japan, for which he received, as an equivalent for the company, a present, to the value of sixty thousand crowns [1] Teller also relates, that the Great Mogul gave two thousand ducats for one of them. And it is frequent with the African ambassadors to the court of Constantinople, to bring some of these animals with them, as presents for the Grand Signior.

1 Navendert.

BOOK II.

OF RUMINATING ANIMALS.

CHAP. I.

INTRODUCTION.

Of all animals, those that chew the cud are the most harmless, and the most easily tamed. As they live entirely upon vegetables, it is neither their interest nor their pleasure to make war upon the rest of the brute creation; content with the pastures where they are placed, they seldom desire to change, while they are furnished with a proper supply; and fearing nothing from each other, they generally go in herds for their mutual security. All the fiercest of the carnivorous kinds seek their food in gloomy solitude; these, on the contrary, range together; the very meanest of them are found to unite in each other's defence; and the hare itself is a gregarious animal, in those countries where it has no other enemies but the beasts of the forest to guard against.

As the food of ruminant animals is entirely of the vegetable kind, and as this is very easily procured, so these animals seem naturally more indolent and less artful than those of the carnivorous kinds; and as their appetites are more simple, their instincts seem to be less capable of variation. The fox or the wolf are for ever prowling; their long habits of want give them a degree of sharpness and cunning; their life is a continued scene of stratagem and escape: but the patient ox, or the deer, enjoy the repast that nature has abundantly provided; certain of subsistence, and content with security.

As nature has furnished these animals with an appetite for such coarse and simple nutriment, so she has enlarged the capacity of the intestines, to take in a greater supply. In the carnivorous kinds, as their food is nourishing and juicy, their stomachs

are but small, and their intestines short; but in these, whose pasture is coarse, and where much must be accumulated before any quantity of nourishment can be obtained, their stomachs are large and numerous, and their intestines long and muscular. The bowels of a ruminating animal may be considered as an elabora tory, with vessels in it, fitted for various transmutations. It requires a long and tedious process before grass can be transmuted into flesh; and for this purpose, nature, in general, has furnished such animals as feed upon grass with four stomachs, through which the food successively passes and undergoes the proper separations.[1]

Of the four stomachs with which ruminant animals are furnished, the first is called the *paunch*, which receives the food after it has been slightly chewed; the second is called the *honeycomb*, and is properly nothing more than a continuation of the former; these two, which are very capacious, the animal fills as fast as it can, and then lies down to ruminate; which may be properly considered as a kind of vomiting without effort or pain. The two stomachs above mentioned being filled with as much as they can contain, and the grass, which was slightly chewed, beginning to swell with the heat of the situation, it dilates the stomachs, and these again contract upon their contents. The aliment, thus squeezed, has but two passages to escape at; one into the third stomach, which is very narrow; and the other back, by the gullet, into the mouth, which is wider. The greatest quantity, therefore, is driven back, through the largest aperture, into the mouth to be chewed a second time; while a small part, and that only the most liquid, is driven into the third stomach, through the orifice which is so small. The food which is driven to the mouth, and chewed a second time, is thus rendered more soft and moist, and becomes at last liquid enough to pass into the conduit that goes to the third stomach, where it undergoes a still farther comminution. In this stomach, which is called the *manifold*, from the number of its leaves, all which

1 All quadrupeds that chew the cud have suet instead of the soft fat of other animals; and they have the awkward habit of rising, when in a recumbent posture, upon their hind legs first. A cow, when she rises from the ground, places herself on the fore-knees, and then lifts up the whole hinder parts. A horse springs up first on his fore-legs, and then raises up his hinder parts. This may be owing to the different conformation of the stomach.

tend to promote digestion, the grass has the appearance of boiled spinnage, but not yet sufficiently reduced, so as to make a part of the animal's nourishment; it requires the operation of the fourth stomach for this purpose, where it undergoes a complete maceration, and is separated to be turned into chyle.

But nature has not been less careful in another respect, in fitting the intestines of these animals for their food. In the carnivorous kinds they are thin and lean; but in ruminating animals they are strong, fleshy, and well covered with fat. Every precaution seems taken that can help their digestion: their stomach is strong and muscular, the more readily to act upon its contents; their intestines are lined with fat, the better to preserve their warmth; and they are extended to a much greater length, so as to extract every part of that nourishment which their vegetable food so scantily supplies.

In this manner are all quadrupeds of the cow, the sheep, or the deer kind, seen to ruminate; being thus furnished with four stomachs, for the macerating of their food. These, therefore, may most properly be called the *ruminant kinds;* although there are many others that have this quality in a less observable degree. The rhinoceros, the camel, the horse, the rabbit, the marmotte, and the squirrel, all chew the cud by intervals, although they are not furnished with stomachs like the former. But not these alone, there are numberless other animals that appear to ruminate; not only birds but fishes and insects. Among birds are the pelican, the stork, the heron, the pigeon, and the turtle; these have a power of disgorging their food to feed their young. Among fishes are lobsters, crabs, and that fish called the *dorado*. The salmon also is said to be of this number: and, if we may believe Ovid, the *scarus* likewise; of which he says,[1]

> Of all the fish that graze beneath the flood,
> He *only* ruminates his former food.

Of insects, the ruminating tribe is still larger; the mole, the cricket, the wasp, the drone, the bee, the grasshopper, and the beetle. All these animals either actually chew the cud, or seem at least to ruminate. They have the stomach composed of mus-

1 At contra herbosa pisces laxantur arena.
Ut scarus epastus *solus* qui ruminant escas.

cular fibres, by means whereof the food is ground up and down, in the same manner as in those which are particularly distinguished by the appellation of *ruminants*.

But not these alone; men themselves have been often known to ruminate, and some even with pleasure. The accounts of these calamities, for such I must consider them, incident to our fellow-creatures, are not very pleasant to read: yet I must transcribe a short one, as given us by Slare, in the Philosophical Transactions, as it may, in some measure, show the satisfaction which the lower tribes of animals enjoy while they ruminate. The man in question was a citizen of Bristol, of about twenty years of age, and, what seemed more extraordinary still, of a ruminating family, for his father was frequently subject to the same infirmity, or amusement, as he himself perhaps would call it. This young man usually began to chew his meat over again within about a quarter of an hour after eating. His ruminating after a full meal generally lasted about an hour and a half; nor could he sleep until his task was performed. The victuals, upon the return, tasted even more pleasantly than at first; and returned as if they had been beaten up in a mortar. If he ate a variety of things, that which he ate first came up again first; and if this return was interrupted for any time, it produced sickness and disorder, and he was never well till it returned. Instances of this kind, however, are rare and accidental; and it is happy for mankind that they are so. Of all other animals, we spend the least time in eating; this is one of the great distinctions between us and the brute creation; and eating is a pleasure of so low a kind, that none but such as are nearly allied to the quadruped, desire its prolongation.

CHAP. II.

OF QUADRUPEDS OF THE COW KIND.[1]

Of all ruminant animals, those of the cow kind deserve the first rank, both for their size, their beauty, and their services.

1 The animals of this kind have the horns hollow, smooth, turned outwards

The horse is more properly an animal belonging to the rich; the sheep chiefly thrives in a flock, and requires attendance; but the cow is more especially the poor man's pride, his riches, and his support. There are many of our peasantry that have no other possession but a cow; and even of the advantages resulting from this most useful creature, the poor are but the nominal possessors. Its flesh they cannot pretend to taste, since then their whole riches are at once destroyed; its calf they are obliged to fatten for sale, since veal is a delicacy they could not make any pretensions to; its very milk is wrought into butter and cheese for the tables of their masters; while they have no share, even in their own possession, but the choice of their market. I cannot bear to hear the rich crying out for liberty while they thus starve their fellow-creatures, and feed them up with an imaginary good, while they monopolize the real benefits of nature.

In those countries where the men are under better subordination, this excellent animal is of more general advantage. In Germany, Poland, and Switzerland, every peasant keeps two or three cows, not for the benefit of his master, but for himself. The meanest of the peasants there kills one cow at least for his own table, which he salts and hangs up, and thus preserves as a delicacy all the year round. There is scarcely a cottage in those countries that is not hung round with these marks of hospitality; and which often make the owner better contented with hunger, since he has it in his power to be luxurious when he thinks proper. A piece of beef hung up there is considered as an elegant piece of furniture, which, though seldom touched, at least argues the possessor's opulence and ease. But it is very different, for some years past, in this country, where our lower rustics at least are utterly unable to purchase meat any part of the year, and by them even butter is considered as an article of extravagance.

The climate and pasture of Great Britain, however, are excellently adapted to this animal's moderate nature; and the verdure and the fertility of our plains are perfectly suited to the manner of its feeding; for wanting the upper foreteeth, it loves

and forwards, in a semicircular form; in the lower jaw there are eight front teeth, but none in the upper: and there are no tusks in either.

to graze on a high rich pasture. This animal seems but little regardful of the quality of its food, provided it be supplied in sufficient abundance; it makes no particular distinction in the choice of its herbage, but indiscriminately and hastily devours the proper quantity. For this reason, in our pastures, where the grass is rather high than succulent, more flourishing than nutritious, the cow thrives admirably; and there is no part of Europe where the tame animal grows larger, yields more milk, or more readily fattens, than with us.

Our pastures supply them with abundance, and they in return enrich the pasture; for, of all animals, the cow seems to give back more than it takes from the soil. The horse and the sheep are known, in a course of years, to impoverish the ground. The land where they have fed becomes weedy, and the vegetables coarse and unpalatable; on the contrary, the pasture where the cow has been bred, acquires a finer, softer surface, and becomes every year more beautiful and even. The reason is, that the horse being furnished with fore-teeth in the upper jaw, nips the grass closely, and therefore only chooses that which is the most delicate and tender; the sheep also, though, with respect to its teeth, formed like the cow, only bites the most succulent parts of the herbage: these animals, therefore, leave all the high weeds standing; and while they cut the finer grass too closely, suffer the ranker herbage to vegetate and overrun the pasture. But it is otherwise with the cow: as its teeth cannot come so close to the ground as those of the horse, nor so readily as those of the sheep, which are less, it is obliged to feed upon the tallest vegetables that offer; thus it eats them all down, and in time, levels the surface of the pasture.

The age of the cow is known by the teeth and horns. This animal is furnished with eight cutting teeth in the lower jaw; at the age of ten months the two middlemost of these fall out, and are replaced by others that are not so white, but broader; at the age of sixteen months the two next milk-white teeth fall out likewise, and others come up in their room; thus, at the end of every six months, the creature loses and gains, till at the age of three years all the cutting-teeth are renewed, and then they are long, pretty white, and equal; but in proportion as the animal advances in years, they become irregular and black, their inequalities become smoother, and the animal less capable of

chewing its food. Thus the cow often declines from this single cause; for as it is obliged to eat a great deal to support life, and as the smoothness of the teeth makes the difficulty of chewing great, a sufficient quantity of food cannot be supplied to the stomach. Thus the poor animal sinks in the midst of plenty, and every year grows leaner and leaner, till it dies.

The horns are another and a surer method of determining this animal's age. At three years old it sheds its horns,* and new ones arise in their place, which continue as long as it lives; at four years of age, the cow has small pointed, neat, smooth horns, thickest near the head; at five, the horns become larger, and are marked round with the former year's growth. Thus, while the animal continues to live, the horns continue to lengthen; and every year a new ring is added at the root; so that allowing three years before their appearance, and then reckoning the number of rings, we have, in both together, the animal's age exactly.

As we have indisputably the best breed of horned cattle of any in Europe, so it was not without the same assiduity that we came to excel in these, as in our horses. The breed of cows has been entirely improved by a foreign mixture, properly adapted to supply the imperfections of our own. Such as are purely British are far inferior in size to those on many parts of the continent; but those which we have thus improved by far excel all others. Our Lincolnshire kind derive their size from the Holstein breed; and the large horniless cattle that are bred in some parts of England came originally from Poland. We were once famous for a wild breed of these animals, but these have long since been worn out; and perhaps no kingdom in Europe can furnish so few wild animals of all kinds as our own.† Cultivation and agriculture are sure to banish these

* This is a mistake: the horns are not cast; but at the age of three years, the animal rubs off a very slight external shell coating from them.

† The *White Urus* (*Urus Scoticus*) is a wild breed of the Ox, the probable remains of the genuine Urus. It is of small size, and ranged formerly through the woods of southern Scotland and the north of England. When this breed was exterminated from the open forests is unknown; but some time before the reformation, the remnants were already confined in parks belonging to ecclesiastical establishments, from whence they were transferred at the dissolution to that of Drumlarig, and other places. Those in the park of Burton Constable were all destroyed in the middle of the last century by a distemper. The race is entirely of a white colour; the muzzle invariably black; the inside of the ear, and about one-third part of the out-

wherever they are found; and every addition a country receives from art drives away those animals that are only fitted for a state of nature.

Of all quadrupeds the cow seems most liable to alteration from its pasture. In the different parts of our own country we easily perceive the great varieties produced among these animals, by the richness or poverty of the soil. In some they grow to a great bulk; and I have seen an ox sixteen hands high, which is taller than the general run of our horses. In others they appear as diminutive; being not so large as an ass. The breed of the Isle of Man, and most parts of Scotland, is much less in general than in England or Ireland: they are differently shaped also, the dewlap being much smaller, and, as the expression is, the beast has more of the ewe neck. This, till some years ago

side from the tip downwards, red; the horns are white with black tips of a fine texture, and as in the fossil skull, bent downwards. Bulls weigh from thirty-five to forty-five stone, and cows from twenty-five to thirty-five, fourteen pounds to the stone. Before they were kept in parks, they were probably larger and more rugged; old bulls still acquire a kind of mane about two inches long, and their throat and breast is covered with coarser hair. Those at Burton Constable differed from the others, they having the ears and tips of the tail black.

Their manners differ from domestic oxen, and may be in part those of the ancient urus. Upon perceiving a stranger they gallop wildly in a circle round him, and stop to gaze, tossing their heads, and showing signs of defiance: they then set off, and gallop a second time round, but in a contracted circle, repeating this circular mode of approaching till they are so near that it becomes prudent to retire from their intended charge. The cows conceal their young calves for eight or ten days, going to suckle them twice or three times in a day: if a person comes near the calf, it conceals itself by crouching. One not more than two days old being discovered by Dr Fuller,* was very lean and weak. On his stroking its head, it got up, pawed the ground, bellowed very loud, went back a few steps, and bolted at his legs: it then began to paw again, and made another bolt, but missing its aim, fell, and was so weak as not to be able to rise; but by this time, its bellowing had roused the herd, which came instantly to its relief, and made the doctor retire. When one of this breed happens to be wounded, or is enfeebled by age or sickness, the others set upon it and gore it to death.

These animals were killed to within a few years, by a grand assemblage of horsemen and country people armed with muskets: the former rode one from the herd, and the latter took their stations on walls or in trees. There was grandeur in the chase, but from the number of accidents which occurred

* This anecdote is elsewhere ascribed to Mr Bailey of Chillingham. We understand that there is a large breed, not perfectly white, in the Duke of Hamilton's park in Scotland.

was considered in cattle as a deformity; and the cow was chosen according to Virgil's direction, with a large dewlap: however, at present it is the universal opinion, that the cow wants in udder, what it has in neck; and the larger the dewlap, the smaller is the quantity of its milk. Our graziers now, therefore, endeavour to mix the two breeds; the large Holstein with the small northern; and from both results that fine milch breed, which excels the cattle of any other part of the world.

This difference, arising from pasture, is more observable in other countries than in our own. The cow kind is to be found in almost every part of the world, large in proportion to the richness of the pasture; and small as the animal is stinted in its food. Thus Africa is remarkable for the largest and the smallest cattle of this kind; as is also India, Poland, Switzerland, and several other parts of Europe. Among the Eluth Tartars, where the pastures are remarkably rich and nourishing, the cow becomes so large that he must be a tall man who can reach the tip of its shoulder. On the contrary, in France, where the animal is stinted in its food, and driven from the most flourishing pastures, it greatly degenerates.*

it was laid aside. We believe that at present none remain, excepting at Chillingham Castle, the property of the Earl of Tankerville, near Berwick-upon-Tweed; at Wollatoo, in Nottingham; at Gisburne, in Craven; at Limehall, in Chesshire, and at Chartly, in Staffordshire.

* The breeds of the Kisguise and Calmuck Tartars, those of Podolia and Ukraine, of European Turkey, of Hungary, and of the Roman States, are among the largest known. They are nearly all distinguished by ample horns spreading sideways, then forwards and upwards, with dark points: their colour is a bluish-ash passing to black. That in the Papal dominions is not found represented on the ancient bas-reliefs of Rome, but was introduced most probably by the Goths, or at the same time with the buffalo. Italy possesses another race, presumed to have existed in the Pagan times, valued for its fine form and white colour: it is not so large, but the horns are similarly developed. Tuscany produces this race, and droves of them were transplanted to Cuba and imported into Jamaica.

Ancient Egypt nourished a large, white breed, which, however, is not the most common upon the monuments of that country, where the cattle are usually represented with large irregular marks of black or brown upon a white ground.

In Abyssinia there is also a large white breed, but the greater number are variously coloured. The Caffres and Hottentots rear a fine race, likewise marked with large brown or black clouds: some are of extraordinary size, with the horns directed forward and upwards. It is from these that their Bakely, or war oxen, are chosen: they ride them on all occasions, being

But the differences in the size of this animal are not so remarkable as those which are found in its form, its hair, and its horns. The difference is so very extraordinary in many of them, that they have been even considered as a different kind of crea-

quick, persevering, extremely docile, and governed by the voice or a whistle of the owners with surprising intelligence. They thrive most on the *Zuure Velden* or saline pastures, and that kind of food may cause the peculiarly fetid smell of their breath, noticed by Mr Barrow. The long horns of some of this breed are often trained by the Namaguas and other tribes, so as to twist in spiral curves or other fanciful forms, said to be managed by means of a warm iron.

Denmark rears a breed of large stature, which most likely produced the tall Dutch race, of which we have seen one weighing a thousand pounds; from this race sprung the Holstein, which was the parent of the old unimproved English breeds; the Vandals or Goths may have conducted it into Spain, and left its traces in the large breeds of Salamanca, and transported from thence to South America, furnished the root of the fine races which cover the Pampas, near Buenos Ayres, and in Cuba; while the large English supplied that of the United States.

Breeds with small and middle-sized horns exist in the Crimea, in a great part of Germany, Sweden, France, England, Italy, and Spain; and the Polled races, or hornless cattle, originally, as it would appear, a German breed, "ne armentis quidem honor aut gloria frontis," according to Tacitus, have spread to Iceland and Norway, where they are often fed on dried fish. They are now abundant in Scotland, exist in France, and about Penaranda, in Spain, from whence they may have been transported to form the Polled breed of Assomption in Paraguay. They are also common in Abyssinia and Madagascar.

The following is a short account of the principal British breeds, derived from the several above-noticed races.

1. The *Long-horned* or *Lancaster* breed, distinguished by long horns and thick firm hides, long close hair, large hoofs, and depth of the fore-quarter, give in proportion less milk but more cream. They are of various colours, but in general *finched*, that is, with a white streak along the spine, and a white spot inside of the houghs. The *Improved Leicester* is a slight variety originally bred at Canly near Coventry.

2. The *Short-horned*, sometimes called the Dutch, includes the varieties named the *Holderness, Teeswater, Yorkshire, Durham, and Northumberland*. This has been the most improved, produces milk, usually twenty-four quarts per day, and butter to three firkins per season. Their colours are much varied, but generally red and white mixed, or what the breeders call *fleeked*. The oxen commonly weigh from sixty to one hundred stone (fourteen pound to the stone); they have been fed to one hundred and twenty, one hundred and thirty, and particular ones to one hundred and fifty stone, the fore-quarters only.

3. The *Middle-horned*, comprehending the *Devon, Hereford*, and *Sussex*, most esteemed for draught, active and hardy, do not milk so well as the former, but fatten early. The *Devons* to be pure, must be of a high red colour without white spots, a light dun ring round the eye, and the muzzle of the same colour; fine in bone, and clear neck; thin faced, the tail set on high

ture, and names have been given them as a distinct species, when in reality they are all the same.[1] In this manner the urus and the bison have been considered, from the variety in their make, to be distinct in their production; but they are all, in fact,

The cows weigh from thirty to forty stone, and the oxen from forty to sixty. The north Devon is the most esteemed for its flesh. The Sussex and Hereford are larger, of a deep red colour, well made, and bone not larger: an ox weighs from sixty to one hundred stone.

4. The *Polled* breeds, of which the most esteemed is the Galloway, straight in the back, well moulded, with soft hair, black or dark brindled; not large, weighing generally about forty stone, before they are regularly fattened. They travel well, and reach the London markets, without deterioration. The *Suffolk Duns* are a variety of this race, introduced from Scotland, and crossed.

5. The *Highland* race consists of several varieties, of which the West Highland Argyleshire or Skye form the most valuable: of these the *Kyloe* from the Hebrides, so named, because in their progress to the south, they cross the Kyloes or ferries in the main land and Western Islands. The bulls are of middle size, of a black dark brown, or reddish-brown colour without white; head small; muzzle fine; horns rather slender, of a waxy green: they weigh about fifty stone. The other variety is the *Norlands*, their hides are coarse, the make narrow and long legged. The *Orkney* or Shetland are of a diminutive size; an ox weighing about sixty pounds a quarter, and a cow forty. They are of all colours, and their shapes generally bad; but they give a quantity of excellent milk, and fatten rapidly.

6. The Fifeshire appears to be an improved breed of the Highland crossed with the Cambridgeshire. They are black, spotted or gray; the horns small, white, very erect: the Aberdeenshire are a variety of them.

7. The *Welsh* have two breeds; one large, dark-brown, with some white, denoting a cross from the long-horned: they have long legs, and slender; the horns white, and turned upwards, and next to the Devon, the best for the yoke. The second is lower, well formed, black, with little white, and good milkers.

8. The Alderney or more properly Guernsey, is small, mostly yellow, or light red, with white about the face and limbs; they have crumpled horns, and till lately ill-shaped. The true breed is distinguished by a yellow colour within the ears, at the root of the tail, and of the tuft at the end of it: they give excellent milk and fine beef.

The races of France are principally distinguished into two divisions among both of which fine breeds are found. The first is commonly designated as *Bœufs de haut cru*, or those who are of middle or small stature; with a fierce look, thick hide, coarse hair, large dewlap, horns greenish or black; living in the mountainous departments formed of the ancient provinces of Limousin, Saintonge, Angoumois, Marche, Berri, Gascony, Auvergne, Bourbonois, Charolois, and Burgundy. The others styled *Bœufs de Nature*. Their stature is large or middle sized, head and body small, ears and muzzle fine; horns white, hide thin; hair soft, and aspect kind: they fatten easily,

[1] Buffon, vol. xxiii. p. 73.

the descendants of one common stock, as they have that certain mark of unity, they breed and propagate among each other. Naturalists have, therefore, laboured under an obvious error, when, because of the extreme bulk of the urus, or because of the

and belong to low or level lands. Such are the Cholets, Nantz, Anjou, Marcais, Breton, Maus, Dutch, Cotentin, and Comtois breeds.

The difference between the straight-backed races, and the hunched, are, beside the hunch on the back, a certain liveliness and activity, also a different voice, for they groan or produce a sound like the shriller and weaker tones of the Gayals; and in the Chinese, some breeds have the horns placed further back, so that the forehead is actually arched. These races occupy all Southern China, India, and Ceylon. In Persia they appear not to have existed at an early period, if we may judge by the bas-reliefs of Chelminar, where oxen with straight backs and Taurine horns are represented forming part of the tribute of several Satrapies. They now abound in that country, and are spread westward to Morocco and Guinea, and through the Galla states to the Caffres of Madagascar. They have in general small and crumpled horns, and much white in their colouring.

The large species of India, equal to the bulls of largest stature, have a lump on the back, weighing sometimes fifty pounds; it is usually red or brown: the horns are short and bent backwards.

The middle-sized race, Common-Zebu or Deswali of India and Northern Africa, white or blue-gray and white, brown and even black, breeds commonly with the straight-backed, and loses the hump on the shoulders in the fourth generation. This race has horns mostly bent forward and upwards. It is not unfrequently in England.

The Chinese breed, in size equal to the smaller British race; hump not very large; forehead round; very short horns, bent back; dewlap loose; colour often white. It is often figured on china-ware.

The small Zebu race, with small or no horns, commonly whitish-gray: size of a hog.

The Abyssinian breed, white and black in clouds, low on the legs, with the horns hanging loose, forming small horny hooks, nearly of equal thickness to the point; turning freely either way, and hanging against the cheeks. This breed transferred to Caffraria, and mixed with the straight-backed, has lost its hump, retaining the other characters, and is esteemed very valuable.

Besides these varieties, a race remains to be mentioned, reared in Abyssinia, the Galla country, and Northern Central Africa: it is of large size, generally white, and armed with immense horns. Travellers agree that they are hunched; but in some accounts they are considered as buffaloes, nor does it appear proved, that the hunch is a simple fatty excrescence; there is even some probability, that the ridge of the withers is the principal cause, in which case, the true location of this race would become doubtful. Of this the *Galla* or Zanga race, generally white, with small hunch, black muzzle, small bone, and high legs, is the longest known. The horns turn up vertically, are of a pale horn colour, extremely bulky, and near four feet in length. The next is the *Bornou* race, likewise white, of a very large size, with hunched back, and very large horns, but not rising vertically; they are couched outwards and downwards, like those of the African buffalo, with

lump upon the back of the bison, they assigned them different places in the creation, and separated a class of animals which was really united. It is true, the horse and the ass do not differ so much in form. as the cow and the bison; nevertheless, the former are distinct animals, as their breed is marked with sterility; the latter are animals of the same kind, as their breed is fruitful, and a race of animals is produced, in which the hump belonging to the bison is soon worn away. The differences, therefore, between the cow, the urus, and the bison, are merely accidental. The same caprice in nature that has given horns to some cows, and denied them to others, may also have given the bison a hump, or increased the bulk of the urus; it may have given the one a mane, or denied a sufficiency of hair to the other.

But before we proceed farther, it may be proper to describe these varieties, which have been thus taken for distinct kinds.[1] The urus, or wild bull, is chiefly to be met with in the province of Lithuania; and grows to a size that scarcely any other animal, except the elephant, is found to equal. It is quite black, except a stripe mixed with white, that runs from the neck to the tail, along the top of the back; the horns are short, thick, and strong; the eyes are fierce and fiery; the forehead is adorned with a kind of garland of black curled hair, and some of them are found to have beards of the same; the neck is short and strong; and the skin has an odour of musk. The female, though not so big as the male, exceeds the largest of our bulls in size; nevertheless, her udder and teats are so small, that they can scarcely be perceived. Upon the whole, however, this animal resembles the tame one

the tip forming a small spiral revolution. We are indebted to captain Clapperton for the knowledge of this species. The corneous external coat is very soft, distinctly fibrous, and at the base not much thicker than a human nail; the osseous core full of vascular grooves, and inside very cellular; the pair together, scarcely weighing four pounds. The skin passes insensibly to the horny state, so that there is no exact demarcation where the one commences or the other ends. The dimensions of a horn, are, length measured on the curve, three feet seven inches; circumference at base, two feet; circumference midway, one foot six inches; circumference two-thirds up the horn, one foot; length in a straight line, from base to tip, one foot five inches and a half. The species has a small neck, and is the common domestic breed of Bornou where the buffalo is said to have small horns.

1 This description is chiefly taken from Klein.

very exactly, except in some trifling varieties, which his state of wildness, or the richness of the pastures where he is found, may easily have produced.

The bison, which is another variety of the cow kind, differs from the rest, in having a lump between its shoulders. These animals are of various kinds; some very large, others as diminutively little. In general, to regard this animal's fore-parts, he has somewhat the look of a lion, with a long shaggy mane, and a beard under his chin; his head is little, his eyes red and fiery, with a furious look; the forehead is large, and the horns so big, and so far asunder, that three men might often sit between them. On the middle of the back there grows a bunch almost as high as that of a camel, covered with hair, and which is considered as a great delicacy by those that hunt him. There is no pursuing him with safety, except in forests where there are trees large enough to hide the hunters. He is generally taken by pitfalls: the inhabitants of those countries where he is found wild, digging holes in the ground, and covering them over with boughs of trees and grass; then provoking the bison to pursue them, they get on the opposite side of the pit-fall, while the furious animal, running head foremost, falls into the pit prepared for him, and is there quickly overcome and slain.

Besides these real distinctions in the cow kind, there have been many others made, that appear to be in name only. Thus the bonasus, of which naturalists have given us long descriptions, is supposed by Klein and Buffon to be no more than another name for the bison, as the descriptions given of them by the ancients coincide. The bubalus also of the ancients, which some have supposed to belong to the cow kind, Buffon places among the lower class of ruminant quadrupeds, as it most resembles them in size, shape, and the figure of its horns. Of all the varieties, therefore, of the cow kind, there are but two that are really distinct; namely, the cow and the buffalo: these two are separated by nature; they seem to bear an antipathy to each other; they avoid each other, and may be considered as much removed as the horse is from the ass or the zebra. When, therefore, we have described the varieties of the cow kind, we shall pass on to the buffalo, which, being a different animal, requires a separate history.

There is scarcely a part of the world, as was said before, in

which the cow is not found in some one of its varieties; either large, like the urus, or humped, as the bison; with straight horns, or bending, inverted backwards, or turning sideways to the cheek, like those of the ram; and, in many countries, they are found without any horns whatsoever. But, to be more particular, beginning at the north, the few kine which subsist in Iceland, are without horns, although of the same race originally with ours. The size of these is rather relative to the goodness of the pasture, than the warmth or coldness of the climate. The Dutch frequently bring great quantities of lean cattle from Denmark, which they fatten on their own rich grounds. These are in general of a larger size than their own natural breed; and hey fatten very easily. The cattle of the Ukraine, where the pasture is excellent, become very fat, and are considered as one of the largest breeds of Europe. In Switzerland, where the mountains are covered with rich nourishing herbage, which is entirely reserved for their kine, these animals grow to a very large size. On the contrary, in France, where they get no other grass but what is thought unfit for horses, they dwindle and grow lean. In some parts of Spain the cow grows to a good size: those wild bulls, however, which they pride themselves so much in combating, are a very mean despicable little animal, and somewhat shaped like one of our cows, with nothing of that peculiar sternness of aspect for which our bulls are remarkable. In Barbary, and the provinces of Africa, where the ground is dry, and the pasturage short, the cows are of a very small breed, and give milk in proportion. On the contrary, in Ethiopia, they are of a prodigious bigness. The same holds in Persia and Tartary; where, in some places, they are very small, and, in others, of an amazing stature. It is thus, in almost every part of the world, this animal is found to correspond in size to the quantity of its provision.

If we examine the form of these animals, as they are found tame, in different regions, we shall find, that the breed of the urus, or those without a hump, chiefly occupies the cold and the temperate zones, and is not so much dispersed towards the south. On the contrary, the breed of the bison, or the animal with a hump, is found in all the southern parts of the world; throughout the vast continent of India; throughout Africa, from mount Atlas to the Cape of Good Hope. In all these

countries, the bison seems chiefly to prevail; where they are found to have a smooth soft hair, are very nimble of foot, and in some measure supply the want of horses. The bison breed is also more expert and docile than ours; many of them, when they carry burdens, bend their knees to take them up, or set them down: they are treated, therefore, by the natives of those countries, with a degree of tenderness and care equal to their utility; and the respect for them in India has degenerated even into blind adoration. But it is among the Hottentots where these animals are chiefly esteemed, as being more than commonly serviceable. They are their fellow-domestics, the companions of their pleasures and fatigues; the cow is at once the Hottentot's protector and servant, assists him in attending his flocks, and guarding them against every invader: while the sheep are grazing, the faithful backely, as this kind of cow is called, stands or grazes beside them; still, however, attentive to the looks of its master, the backely flies round the field, herds in the sheep that are straying, obliges them to keep within proper limits, and shows no mercy to robbers, or even strangers, who attempt to plunder. But it is not the plunderers of the flock alone, but even the enemies of the nation, that these backelies are taught to combat. Every army of Hottentots is furnished with a proper herd of these, which are let loose against the enemy, when the occasion is most convenient. Being thus sent forward, they overturn all before them; they strike every opposer down with their horns, and trample upon them with their feet; and thus often procure their masters an easy victory, even before they have attempted to strike a blow. An animal so serviceable, it may be supposed, is not without its reward. The backely lives in the same cottage with its master, and, by long habit, gains an affection for him; and in proportion as the man approaches to the brute, so the brute seems to attain even to some share of human sagacity. The Hottentot and his backely thus mutually assist each other; and when the latter happens to die, a new one is chosen to succeed him, by a counsel of the old men of the village. The new backely is then joined with one of the veterans of his own kind, from whom he learns his art, becomes social and diligent, and is taken for life into human friendship and protection.

The bisons, or cows with a hump, are found to differ very

much from each other in the several parts of the world where they are found.* The wild ones of this kind, as with us, are much larger than the tame. Some have horns, and some are without any; some have them depressed, and some raised in

* Among the bisons are found indications of an ancient and colossal species existing at one time in Europe and Northern Asia, and even in America, attested by the repeated discovery of enormous skulls in the diluvian strata of the earth, on the vegetable mould, and even beneath them, among the remains of the mastadon and rhinoceros. But there seem to be fossil remains of two different epochs; the first or deepest belonging to the colossal, and the second perhaps to the existing aurochs, or, to speak more correctly, bison. In order to establish this group upon a clear foundation, and separate it from the urus and domestic species with which it has long been confounded, it is necessary to give the luminous view which baron Cuvier furnishes on the subject. He says "the forehead of the ox is flat and even slightly concave; that of the aurochs (bison) is arched, though somewhat less than in the buffalo: it is in the ox nearly equal in height and breadth, taking the base between the orbits; in the aurochs, measured in the same place, the breadth greatly surpasses the height, in the proportion of three to two: the horns of the ox are attached to the extremity of the highest salient line of the head; that which separates the forehead from the occiput: in the aurochs this line is two inches behind the root of the horns: the plane of the occiput forms an acute angle with the forehead in the ox; that angle is obtuse in the aurochs: finally, that plane of the occiput quadrangular in the ox, is semicircular in the aurochs."

These characters are constant in all the varieties deriving from the ox, including those with hunched backs: besides, the bison has fourteen pair of ribs, while the ox, in common with most ruminants, numbers only thirteen pair: the legs are more slender than those of the ox or buffalo, and the tongue is blue, while the ox has it flesh colour. Mr Gilibert who reared an individual, naming the species by its true appellation, represents the hair of the female bison as soft, placed in the skin at an obtuse angle: of two sorts, one long and the other soft; while those of the cow are of one kind, hard and close to the hide. Those of the male bison are very long under the jaw and throat, and upon the shoulders and upper arms; also upon the back, but less prominent: the tail descends to the houghs, and is provided with abundance of long black hair; the summit of the head is covered with a bushy and spreading space of long hairs, strongly impregnated with musk; and the horns are short, lateral, black, and pointed: the eyes large, round, and full. The back part of the body is covered with shorter hair, which also predominates in summer on the shoulders. The hide is double in thickness to that of the ox, and the species shows a decided aversion to domestic cattle.

The name aurochs, applied to the bison by the Germans, is evidently the origin of the Latin urus; but baron Cuvier, following up with his usual research the observations of Herberstein, establishes beyond a doubt, that the true urus may still have existed in some parts of Massovia by the name of Thur in the time of the last-mentioned author, but that it is now extinct in Europe and Western Asia, and its name transferred to the bison of the ancients, which the Poles at this day still distinguish by the appellation of

such a manner that they are used as weapons of annoyance or defence; some are extremely large, and others among them, such as the zebu, or Barbary cow, are very small. They are all, however, equally docile and gentle when tamed; and, in

Zubr, and the ancient Germans called Wizend and Bisam (Mnsk.) The baron explains the causes which have misled naturalists, and caused them to overlook the bison in the bonasus, bolinthus, monepus, monapus, and the Pœonian oxen of Aristotle and Pliny, who clearly distinguishes the maned bison from the rapid urus, and Seneca still more distinctly says,

> Tibi dant variæ pectora tigris
> Tibi villosi terga bisontes
> Latisque feri cornibus uri.

Pausanias and Oppian both represent the bison as very hairy about the neck and breast, place it in Pœonia and Thrace, and repeat almost the very words which Aristotle uses for the bonasus.

But the bisons of Europe are not the only species of the group: for, beside the American, Asia, in all probability, contains two more. All appear to live in small families, which assemble into herds only in certain seasons: those of the old world prefer woods and mountains. In America, from causes probably local, they are mostly found on open elevated plains or savannas. Notwithstanding the hostility between the bison and the ox, it is asserted that in America, the males often drive the bull from the cows, and cover them, and that the intermediate animal is prolific. But this is not fully authenticated.

The animal commonly known by the names of Aurochs and Zubr is, as before explained, the true bison of the ancients. It is distinguished by an elevated stature, measuring six feet at the shoulder, and ten feet three inches from the nose to the tail. In adult specimens the withers are elevated, but when old they do not appear so, nor are they conspicuous in the females. The head is broad, and the horns far distant, short, robust, pointed, slightly turned forwards, and dark-coloured; the forehead is arched; the eye large, full, and dark; the body is formed with fourteen pair of ribs; the mammæ are four, disposed in a square; the anterior half of the animal, with the exception of the chaffron, is covered with a heavy coat of mixed woolly and long harder hair measuring more than a foot in winter; the internal parts of the woolly, is gray or whitish, as also in general that on the top of the head, throat, and breast; the external browner on the throat and breast, abundant and bearded; the lower extremities, back, flanks, and croup, short haired, of a brownish-black colour. The females are smaller, with shorter and less hair on the shoulders and throat, and the colour paler.

Mr Gilibert, who resided a long time in Poland, and reared a female, is the author who dissected and best described this species. As we have observed, it was known to the ancients, and their bones are often found in the superficial strata of temperate Europe. At present they are nearly destroyed in Lithuania, though they were still common in Germany in the eighth century. They may now be looked upon as residing only in the forests of Southern Russia in Asia, the Carpathian and Caucasian mountain-forests, and the Kobi Desert; but none exist in Siberia. They prefer high

general, furnished with a fine lustrous soft hair, more beautiful than that of our own breed; their hump is also of different sizes, in some weighing from forty to fifty pounds, in others less; it is not, however, to be considered as a part necessarily

wooded localities to the plain or the low lands, live in small troops, and have a groaning voice. The *Gaw-Kottah* of the Persians is probably this animal.

The *Gaur. (B. Gaurus.)* The Gaur is a species of bison, which, from al accounts, appears to be among the largest now living; and although in Indian phraseology the word buffalo has been used, no doubt can exist respecting its affinity to the bison: indeed the gaur may be no other than the true bison, though from certain testimonies we are inclined to regard it as an intermediate species.

The head of the gaur exhibits nearly all the characters of the domestic ox, but the forehead is more arched and raised; the horns, strong and rough, are not bent back as in the buffalo; the top of the forehead is covered with white woolly hair; the rest of the hair is smooth, close, and shining, of a dark-brown colour, almost black; the eyes are smaller than in the ox; and pale blue; the muscles of the legs and thighs very prominent and strong. But the most remarkable character of the gaur, that which should distinguish it from all other ruminants, consists in a series of spinous processes along the back, beginning at the last vertebræ of the neck, shortening gradually till they are lost half way down the spine; the foremost are at least six inches higher than the ridge of the back. These gaurs live in families of ten or twenty, graze on the meadows, and feed on leaves and buds of trees; the female bears a twelvemonth, and calves in August. Buffaloes fear their presence, and never invade their localities. Although the existence of this animal is more questionable in Africa, yet Pliny's Æthiopian bull with blue eyes might refer to this species, and even the white variety, as large as a camel, known in Madagascar by the name of Bouri, may be the same.

The *American Bison. (Bos Americanus.)* This species is commonly known by the name of Buffalo, and was long confounded with the bison of Europe, though it is anatomically more remote from it, than the yak, notwithstanding the great external similarity between them. This species is distinguished by small horns, round, lateral, black, very distant, turned sideways and upwards; the height at the shoulder is about five feet, and at the croup four; length from nose to tail eight feet: but these dimensions must be considerably increased in some individuals, being reported sometimes to weigh sixteen hundred and even two thousand pounds. The structure of the animal is heavy in front, meagre and weak behind; the body is long, having fifteen pair of ribs and only four coccigian vertebræ; the eyes round and dark; the chaffron short; the forehead broad, and the muzzle wide. Upon the summit of the head there is a vast quantity of long woolly hair, hanging over the face, ears, and horns; the neck is a little arched, and the withers are greatly elevated; upon the face the hair is rather curled, but on the cheeks, throat, neck, shoulders, breast, and upper arms, very long; the back, flanks, croup, thighs, and legs covered with close short hair; the tail, about eighteen inches long, is terminated by a long tuft of coarse hair: the colour in winter is a purplish brown-black, turning rusty by the effects of the sun and weather, so as to become light-brown in summer. The female is smaller, the horns still less, and the quantity of hair on the anterior parts much smaller.

belonging to the animal; and probably it might be cut away without much injury: it resembles a gristly fat; and, as I am assured, cuts and tastes somewhat like a dressed udder. The bisons of Malabar, Abyssinia, and Madagascar, are of the great

These animals are in the habit of standing with the feet much more under them than domestic cattle, and then they appear as if their body was shorter. They reside in winter as much as possible in the woods of temperate North America, ascending the mountains and penetrating into New Mexico. Towards the summer they migrate northwards, and in their passage both in spring and autumn, occasionally form herds of several thousands. They are not naturally dangerous, but irritable; we have seen them leap over fences four feet high, and defend themselves against the bull-dogs with much spirit and more activity than the domestic bull: they turn with great quickness, and being covered by their shaggy hair, dogs seldom seize them firmly. When a dog thus snaps into the hair, they toss him over the head in an instant; and if at length they are, what is termed, pinned by the nose, they spread the forelegs, bring the hind feet forward, till they tread the dog under them, and then tear the head loose, regardless of the wound they thus inflict upon themselves, provided their enemy be crushed by their feet. They defend themselves against troops of wolves by forming a circle with the strongest outside; a practice which is common to most gregarious ruminants of the northern hemisphere.

About the middle of June the rutting season commences with the most determined battles among the males: they are then not to be approached with safety. Young animals acquire a certain temporary docility, and might be used to the plough; but the elevation of the shoulders, and their weakness about the loins, will never allow such profitable use to be made of them as of the domestic ox. The females besides do not retain their milk long, yield a smaller quantity, and it is said to smell musky: they are also very restless, leaping the fences and enticing the other cattle to stray by following them, and damage the corn-fields. We have seen many of these animals, but none that were estimated to weigh more than eight hundred pounds, and suspect the reality of such ponderous individuals as before mentioned, unless they belong to a larger species, said to be found in the interior, and differing somewhat in their form, and much more in their size; though it must be confessed that old bulls, sometimes concealed singly in good pasture, will fatten so enormously as to run with difficulty, and fall an easy prey.

Formerly the species was known to the eastward of the Apalachian mountains, but they are no longer found in the remote parts of Pennsylvania or in Kentucky, and only seen beyond the Mississipi; on the Ohio and Missouri they are in great numbers. The Indians shoot them or encompass a herd by firing the grass, when a number are destroyed without difficulty. In the northern parts they drive them into a kind of staked avenues, or keddah, while the snow is on the ground, and kill them from a tree in the centre of the recess, and from around it: they make cloaks, &c, of hides. The buffalo dance is one of the principal ceremonies of the year among many tribes. It takes place before the hunting season of the bison, and has been fully described by Pennant.

The *Yak*. (*B. Poephagus.*) This animal was originally noticed by Elian under the above name, and since described by Pallas, who preferred as a

kind, as the pastures there are plentiful. Those of Arabia Petræa, and most parts of Africa, are small, and of the zebu or little kind. In America, especially towards the north, the bison is well known. The American bison, however, is found to

specific designation *grunniens* or grunting: but it should rather be groaning, as its voice has no similarity with the grunt of a hog. The yak bears some resemblance to a buffalo in the form of the head; but it is shorter, more convex, and thicker about the muzzle; the ears are wide, horizontal; the eyes large; the muzzle itself small, and the nostrils almost transverse; the lips tumid; the forehead rather flat, the top of the head convex between the ears, and covered with frizzled woolly hair; the neck of the male thick; the withers elevated but not hunched; the mammæ placed in a transverse line, and the body furnished with fourteen pair of ribs. The hair of the forehead whirls, and is close; that on the neck, back, and sides, is long, woolly, pendent in winter and upon high mountains, but shorter on the sides in summer and in low warm situations. From the shoulders along the spine, there is a streak of hair generally grayish, and turned forwards; the tail more furnished with long and finer hairs than in the horse, reaches to the heels. The stature of the animal varies, the smaller being only seven feet long, and three feet ten inches at the shoulder; but there are larger varieties, the tail of one in the British Museum measuring six feet in length. The horns are round, smooth, pointed, lateral, bending forward and upwards, black or white with black tips, or even pure white, and there are some hornless. The colour varies greatly, but in general it is black; but many have their fine tails pure white, as also the ridge on the shoulders, which is abundantly covered with light frizzled hair, that it appears like a hunch; two or four legs are commonly of the same colour, and the line of the back sometimes extends in a broad white streak to the tail: a few have locks of rufous among the white about the shoulders.

Like the rest of the bisontes, the yaks are more fond of mountainous woods and valleys, than the open plains, keeping on the south side in winter, and on the north in summer. They are said to be fond of wallowing in water, and to swim well: but to take the water, can only be in the summer heats, and the countries where their fleece drops. The species is both wild and domesticated, but the latter have still much of the sombre menacing, and down aspect of wild animals, and all their irascibility at the sight of the gay colours. They will attack strangers, or at least throw out signals of hostility, stamping with the feet, whisking their tails aloft, and tossing the head: they are active in running and climbing. The mountains of Bhotan and Thibet offer the principal asylum to the wild species, where they appear to enjoy the vicinity of the snow; but they are also domesticated in that country, spreading from thence over a great part of China, and even to Central India, where they seem to be without woolly hair, but still marked by the white feet. We are inclined to consider the *white* species of wild cattle in the Ramghur mountains as a variety of this species; for a country which includes the course of the Ganges from beyond the Himalaya range to the sea, contains every degree of climate, and may therefore, well be supposed to mark also its various impressions upon animals, to the two extremes of which the nature is capable; and the practice of the Brahminical cast, to give liberty to

be rather less than that of the ancient continent; its hair is longer and thicker, its beard more remarkable, and its hide more lustrous and soft. There are many of them brought up tame in Carolina; however, their wild dispositions still seem to con-

certain cattle at their deaths, may produce great differences upon animals, who are thus restored to a state of nature. The yak inhabits also the Altaic mountains, and supplies milk to the Calmucks, the Mongolian and Doukta Tartars, and affords materials of trade in the sale of their white tails, of which the Turks and Persians make standards, commonly named horse-tails, dyed of various colours, but principally crimson. In India and Persia, *chowries* or fly-drivers are made of them, and they adorn the ears of elephants, the throat band and croups of horses, as may be seen to have constituted a practice of antiquity in the bas-reliefs of Chelminar, (Persepolis) and Naktchi Roustam, the temple of Salsette, and is still in vogue at this day. The Tartars lead a wandering life with these cattle, preserving the milk, which is very good and abundant, in bladders, till they load the animals with their own produce, and carry it to market; they make tents and ropes of the hair; caps and clothes of the skin. The Chinese name them Si-nyn or water-ox, and adorn their caps with the fringes of the hair.

The *Gayal*. It appears that the gayal is nearly the size and shape of an English bull, with a dull heavy appearance; but at the same time, of a form equal in strength and activity with the wild buffalo. It has short horns, which are distant at the bases, and rise in a gentle curve directly out and up. The head at the upper part is very broad and flat, and contracted suddenly towards the nose, which is naked like that of the common cow; from the upper angles of the forehead, proceed two thick short horizontal processes of bone, which are covered with a tuft of lighter coloured hair: on these are placed the horns, shorter than the head, and lying nearly on the plane of the forehead: at the base they are very thick, and slightly compressed, the flat sides being towards the front and tail; the edge next the ear is rather the thinnest, so that a transverse section would somewhat ovate; towards their tips they are rounded, and end in a sharp point. The eyes resemble those of a common ox, the ears much longer, broader, and blunter than those of that animal; the neck is very slender near the head, at some distance from which a dewlap commences; but this is not so deep, nor so much undulated as in the zebu. The dewlap is covered with strong longish hair, so as to join a kind of mane on the lower part of the neck; but is not very conspicuous, especially when the animal is young.

In the place of the hump, the gayal has a sharp ridge, which commences on the hinder part of the neck, slopes gradually up till it comes over the shoulder joints, then runs horizontally almost a third part of the back, where it terminates with a very sudden slope. The height of this ridge makes the neck appear much depressed, and also adds greatly to the clumsiness of the chest, which although narrow is very deep; the sternum is covered by a continuation of the dewlap; the belly is protuberant, but in its hinder part, is greatly contracted; the rump, or *os sacrum*, has a more considerable declivity than that of the European ox, but less than that of the zebu. The tail is covered with short hair, except near the end, where it is tufted, but descends no lower than the shins. The legs, especially the fore ones, are thick

time, for they break through all fences to get into the corn-fields, and lead the whole tame herd after them, wherever they penetrate. They breed also with the tame kinds originally brought over from Europe; and thus produce a race peculiar to that country.

and clumsy; the false hoofs are much larger than those of the zebu; the hinder parts are weaker in proportion than the forehead; and owing to the construction of the belly, the hinder legs, although, in fact, the shortest, appear to be the longest.

The whole body is covered with a coat of short hair: from the summit of the head, there diverges, with a whirl, a bunch of rather long coarse hair, which lies flat, is usually white or lighter-coloured than the rest, and extends towards the horns and over the forehead. The general colour is brown in various shades, which very often approaches to black, but sometimes is rather light; the legs and belly are usually white, as also the tip of the tail.

The head is about one foot eight inches long, and the distance between the roots of the horns ten inches; total length from nose to tail about nine feet six inches; height at the shoulders, four feet nine or ten inches; height at the loins, four feet four or five inches. Circumference of the chest, six feet seven inches; circumference of the loins, five feet ten inches; length of the horns, one foot two inches; length of ears, ten inches.

The voice of the gayal has no resemblance to the grunt of the Indian ox; it is a kind of lowing, but shriller, and not near so loud as that of the European ox, but resembling it more than the buffalo's. The Cucis or Lunctas, a people inhabiting the hills to the eastward of Chayaon, (Chitagong) have herds of the gayal in a domestic state, from time immemorial, and without any variation in their appearance from the wild stock: no difference whatever being observable in the colour, both having the same variations of the brown shades; nor in their stature, both being bred in nearly the same habits of freedom, on the same food, and the domestic not undergoing any labour. By them it is called Shial, from which, most probably, its name of Gayal. It is possible that the wild cattle of Siam, who use their terrible horns with great success against the tiger, noticed by colonel Syms under the name Catin, are of this species.

Beside the above existing species, it may be proper to mention the fossil Bisons.

The *Broad-headed Fossil Bison (B. Latifrons)* of Dr Harlan, is described by baron Cuvier. The skull differs little from that of the bison, except in its greater dimensions; the forehead is arched, broader than high; the horns are attached two inches before the line formed by the union of the facial and occipital surfaces, which latter form an obtuse angle; the plane of the occiput represents a semicircle; the horn is twenty-one inches in circumference at its base; a fragment of this size was found in Kentucky, and similar skulls were discovered near Melnick in Bohemia, in Italy, and on the Rhine, in Russia, Siberia, and probably over the whole northern hemisphere.

The *Bos Bombifrons* of the same American author is described by Mr Wistar from a skull presented by Mr Jefferson to the American Philosophical Society. The top of the head between the horns is strongly arched and projecting; facial line forming rather an acute angle, with the occipital

From all this it appears,[1] that naturalists have given various names to animals in reality the same, and only differing in some few accidental circumstances. The wild cow and the tame, the animal belonging to Europe, and that of Asia, Africa, and America, the bonasus and the urus, the bison and the zebu, are all one and the same, propagate among each other, and, in the course of a few generations, the hump wears away, and scarcely any vestiges of savage fierceness are found to remain. Of all animals, therefore, except man alone, the cow seems most extensively propagated. Its nature seems equally capable of the rigours of heat and cold. It is an inhabitant as well of the frozen fields of Iceland, as the burning deserts of Libya. It seems an ancient inmate in every climate, domestic and tame in those countries which have been civilized, savage and wild in the countries which are less peopled, but capable of being made useful in all; able to defend itself in a state of nature against the most powerful enemy of the forest; and only subordinate to man, whose force it has experienced, and whose aid it at last seems to require. However wild the calves are, which are taken from the dam in a savage state, either in Africa or Asia, they soon become humble, patient, and familiar; and man may be considered in those countries, as almost helpless without their assistance. Other animals preserve their nature or their form with inflexible perseverance; but these, in every respect, suit themselves to the appetites and conveniences of mankind; and as their shapes are found to alter, so also does their nature; in no animal is there seen a greater variety of kinds, and in none a more humble and pliant disposition.*

surface; horns first projecting laterally from the sides of the head, then curving downwards: they are placed on the skull at a considerable distance anterior to the union of the facial and occipital surfaces. The specimen, injured, and wanting the face and jaws, was found in Big-bonelick, near the falls of Ohio. The affinity seems to be nearest to the Tartaric Yak.—See the Animal Kingdom of Baron Cuvier. Supplement to the order Ruminantia. By Major Smith.

1 Buffon, vol. xxiii. p. 130.

* There is a musk-bull which inhabits the interior parts of North America, on the west side of Hudson's Bay. It is in size equal to a Guernsey cow; the hair is browuish-black, occasionally marked with large white blots; it grows to a very great length, and is composed of a long and soft down, intermixed with straight hairs; the summit of the head of the male is covered by the horns, which form a kind of scalp, in the female it is covered with

THE BUFFALO.

If we should compare the shape of our common cow with that of the bison, the difference will appear very great. The shaggy mane of the latter, the beard, the curled forehead, the inverted horns, the broad breast, and the narrow hinder parts, give it the appearance rather of a lion than a cow; and fit it more for a state of war with mankind than a state of servitude. Yet notwithstanding these appearances, both animals are found to be the same; or at least so nearly allied that they breed among each other, and propagate a race that continues the kind.*

hair: the legs are generally white, and the hair spreads forward under the heels, so as to cover the greater part of the frog.

These animals live in herds of thirty or forty; the bulls are few in proportion to the cows, caused as it appears by the mortal conflicts among them for the possession of the females; for it is observed that dead males are often found, and that in the rutting season the bulls are so jealous, that they run bellowing at every animal, even ravens, to drive them off. They rut in August, and the females calve about the end of May, never bearing more than one; they prefer mountains and barren grounds, to wooded countries, climb rocks with agility and secure footing; they feed principally on grass, when in season, but mostly on mosses, the tops of pine shoots, and willows. The flesh is flavoured like that of the elk; the fat clear white with a tint of azure; but the calves and heifers are the best for the table, the meat of old bulls being so impregnated with a musky smell, as to be very disagreeable food. The genitals of the male are always lubricated with a musky unctuous secretion, which is so powerful as to retain its smell for several years; the dung is in small round kobs like that of the varying hare: several thousand weight of the flesh are usually brought frozen by the Indians for winter store, to Prince of Wales Fort. Captain Parry met this species as far north as Melville Island, with the first appearance of the spring; each carcass furnishing him with from three hundred to three hundred and fifty pounds of beef. It descends as far south and west as the Province of Guivira according to Lopez Gomara, where the Spaniards found sheep as large as a horse, with long hair, short tails, and enormous horns. Messrs Hearne, Dobbs, and Graham, have supplied the fullest information relative to this animal, which was first described by Mr Pennant, though noticed long before by Mr Jeremie, a French officer, who was stationed in Canada, during the succession war.

* Buffaloes in general are animals of a large stature, resembling a bull low in proportion to their bulk, and supported by strong and solid limbs. The head is large, the forehead, though narrow, is remarkably strong and convex: the chaffron straight, flat, prolonged, and terminated by a broad muzzle; the horns being flat or bending laterally, with a certain direction to the rear, and therefore not very applicable in goring; the ears are rather large, never erect, funnel-shaped; the eyes large; they have no hunch on the back, but a small dewlap on the breast. The females bear an udder with four mammæ.

On the other hand, if we compare the buffalo with our common cow, no two animals can be more nearly alike, either in their form or their nature; both equally submissive to the yoke, both often living under the same roof, and employed

two of which are sometimes not developed; the tail is long and slender; the back rather straight; the hide black, more or less covered with hair of an ashy or blackish colour; sometimes it is brown or white. They avoid hills, preferring coarse plants of the forest and such as grow in swampy regions, to those of open plains; they love to wallow and lie for hours sunk deep in water; they swim well, or rather float on the surface, and consequently pass the broadest rivers without hesitation; their gait is heavy, and unwieldy and run almost always with the nose horizontal, being principally guided by their sense of smelling; but this attitude prevents their seeing beneath them and conceals their horns. In their combats, they usually strike or but with the forehead, endeavour to lift the opponent on their horns, and when thrown to crush him with their knees: they trample on the body, and their vindictive fury is so lasting, that they will return again and again to glut their vengeance upon the same inanimate corpse; they herd together in small flocks, or live in pairs, but are never strictly gregarious in a wild state, they have a tenacious memory, and they low in a deep tone. The females bear calves two years following, but remain sterile during the third; gestation is said to last twelve months, but it appears not to exceed ten, they propagate at four and a half years old, and discontinue after twelve. Parturition (in Europe) takes place in the spring, and never exceeds one calf. Dr Pallas asserts that they breed with domestic cattle, but that the produce usually dies: their life may extend to twenty-five years.

Although in a domestic state they are not remarkable for docility or attachment to their keepers, yet a feeling of this kind, mixed no doubt with instinctive antipathy, is exemplified in an anecdote related by Mr D. Johnson. "Two biparies, or carriers of grain and merchandise on the backs of bullocks were driving a loaded string of these animals from Palamow to Chitrah: when they were come within a few miles of the latter place, a tiger seized on the man in the rear, which was seen by a *guallah* (herdsman), as he was watching his buffaloes grazing: he boldly ran up to the man's assistance, and cut the tiger very severely with his sword; upon which he dropped the biparie, and seized the herdsman. The buffaloes observing it, attacked the tiger, and rescued the herdsman; they tossed him about from one to the other and, to the best of my recollection, killed him. Both the wounded men were brought to me; the biparie recovered, and the herdsman died." This anecdote reveals, if not attachment, great antipathy and courage; and it is well known that neither the tiger or the lion are inclined to prey upon the buffalo, whose vengeance is probably kept alive by occasional depredations upon their young, and Indian herdsmen do not scruple to pass the night in the most dangerous jungle, seated upon the back of some one favourite animal.

Their extreme hostility to red colours is often remarked in India: the same antipathy is observed at the Cape and in Europe. A general officer, now living, relates, that while a young man he was employed in surveying in Hungary, and happening to use a small plane table, the back of which was covered with red morocco: as he walked from one station to another,

in the same domestic services; the make and the turn of their bodies so much alike, that it acquires a close attention to distinguish them: and yet after all this, no two animals can be more distinct, or seem to have greater antipathies to each other.

1 Buffon.

he sometimes carried it with the paper against his breast, and the crimson colour in front. On a sudden, he perceived at a considerable distance a herd of grazing buffaloes throw out signs of defiance, and come down in full gallop towards him with their tails up, and evincing the most tumultuous frenzy. Not suspecting the cause, he paused and dropped his hand, when the whole troop stopped and looked about, as if at a loss; he went on, and unconsciously raising the table again, brought the red colours in sight. They set off a second time towards him, but guessing the cause, he turned the obnoxious colours towards his body, and was suffered to proceed unmolested.

The *Cape Buffalo.* (*Caffer.*) This species is designated among the Hottentots by the name of Qu'araho. It is distinguished by dark and rugous horns spreading horizontally over the summit of the head in the shape of a scalp, with the beams bent down laterally, and the points turned up. They are from eight to ten inches broad at the base, and divided only by a slight groove, dark coloured, extremely ponderous, cellular near the root, and five feet long, measured from tip to tip along the curves. The incisor teeth are almost always loose in the gums of the adult animal, whose height is about five feet six inches at the shoulder, and the length from nose to tail about nine feet; the legs are short and strongly knit; the dewlap is rather considerable; the ears large, hanging open; on each side of the chin and nether jaw, there is a beard of stiff hairs; the hide extremely thick, hard and black, almost naked in old animals, and quite naked, excepting some distichous hairs at the end. In younger beasts, a scattered brown hair covers the neck, back, and belly; and in the young heifer, the colour is brown-black, the hair more abundant, and a sort of standing mane four inches long, spreads from behind the horns, along the neck, down the spine to the tail, darker than the rest of the hair, almost black. At that age, the horns are only six inches long, thirteen inches distant from tip to tip, pale in colour, originating at the side of the frontal crest, and rising obliquely upwards, with some slight indication of wrinkles. The forehead and nuccha are covered with loose black hair, as also the throat, dewlap, and top of the tail, the shin bones and pasterns furnished with curling woolly dark hair. The head is one foot long, and the length of the animal, from nose to tail, five feet seven inches; the tail one foot. At that age, there is so great a dissimilarity from the adult, as to give it the appearance of a different species, for which, indeed, it was taken in the specimen of Mr Burchell, had not a note within the skin established the species.

There is some doubt whether Pliny alludes to this species in his description of the fierce African wild oxen which were caught in pit-falls *: the Araho is truly a terrible and ferocious beast, possessed of a tremendous bellowing

* He gives it blue eyes, and rufous hair. Chap. xxi. l. viii., but it seems confounded with a species of bison. If Captain Clapperton's notice be referred to *B. Caffer*, it is found also in Borneo, under the name of Zamouse, the *Arabic Yamus.*

Were there but one of each kind remaining, it is probable the race of both would shortly be extinct. However, such is the fixed aversion formed between these creatures, that the cow refuses to breed with the buffalo, which it nearly resembles; while

voice, and moving with considerable swiftness, but so ponderous as to be disinclined to ascend; its scent is keen, but the breadth of the horns impede its sight. This species of buffalo lives in families or small herds in brushwood and open forests of Caffraria, occasionally uniting in droves upon the plain. Old bulls are often met alone, but though these are, if possible, still fiercer than the younger, they are less swift or inclined to exertion. In the woods, they make paths for themselves, where it is extremely dangerous to fall in with them. Professor Thunberg gives an appalling account of the destruction of two horses by one of these animals, the riders providentially escaping by climbing trees, and the professor himself driven to the same expedient, though his horse remained unhurt, owing to the buffalo turning into the wood. Sparmann, who first fully described this species, is no less animated in the dangerous hunting exploits he witnessed.

They are excited to madness by the sight of red colour, and swim with great force. The hide is made into shields, cut into whips and traces, and is so hard that a musket ball will scarcely penetrate into it, unless the lead be mixed with tin. If this animal could be rendered tractable, it would make the most powerful in agriculture existing. Since the increase of the settlements about the Cape of Good Hope, the buffalo is become more scarce in the colony, but they spread along the eastern side of Africa to an unknown distance in the interior.

The *Pagasse.* (*B. Pegasus.*) The names of Pacasse of Gallini and Carli, Empaguessa of Merolla, Empacasse of Lopes and Marmol, indicate an animal, presumed to be a species of buffalo, but not described with sufficient precision to be admitted into the catalogues of nomenclators. The word is evidently of great antiquity and extent, as may be gathered from Pliny, although at present banished from the regions where the Arabic has usurped the ancient language, and confined to the regions of Angola and Congo, where it is coupled with the generic name *Em* or *En*, denoting a Bovine animal. Thus Engamba a cow, Empalanga, another large ruminant which is conjectured to be the Tackhaitze of Daniell; and Em-pacasse. Pliny relates that Æthiopia produces winged horses, armed with horns named Pegasi. Fathers Gallini and Carli observe, that, "On the road to Loando in the kingdom of Congo, they saw two pacasses, which are animals very similar to buffaloes, roaring like lions; the male and female being always together. They are white with rufous and black spots; *with ears half a yard in length*, and the horns always straight. When they see human beings they do not flee, nor do they harm, but stand and look on." Lopes describes them as somewhat less than an ox, but similar in head and neck. Dapper reports them to be buffaloes of a reddish colour with long horns.

These testimonies are very vague, but still indicate one and the same animal, partially misrepresented. To these accounts might be added the notice of Captain Lyons respecting the Wadan, "a fierce buffalo, the size of an ass, having large tufts of hair on the shoulders, and very long heavy horns"

The *Arnee* (*B. Arni.*) India and China are the native regions of another

it is known to propagate with the bison, to which it has, in point of form, but a very distant similitude.

The buffalo is, upon the whole, by no means so beautiful a creature as the cow; his figure is more clumsy and awkward;

group of true buffaloes, both wild and tame, which Baron Cuvier's investigations refer to one species, divided into mere varieties. It appears that the wild buffalo in the central districts of Bengal, is commonly named Arnee or Arnaa, and distinguished by the lunate form of the horns and black colour; while the second sort, usually but not always domestic, is known by the appellation of *bhain* or byne. Of this sort, the horns are much shorter, bent back towards the neck with the points turned upwards: thus constructed, their arms are but indifferent instruments of attack, and serve only to lift, while in the former they are invariably used for goring. But neither of these are the gigantic or taurelephant arnee, which appears to be a rare species, only found single or in small families, in the upper eastern provinces and forests at the foot of Himalaya, though formerly met in the Ramghur districts. It is probably the same which the Mugs and Burmas name Phang, and consider next to the tiger the most dangerous and fiercest animals of their forests. A party of officers of the British cavalry, stationed in the north of Bengal, went on a three months' hunting expedition to the eastward, and destroyed in that time forty-two tigers, but only one arnee, though numerous wild buffaloes became their quarry. When the head of this specimen rested perpendicular on the ground, it required the outstretched arms of a man to hold the points of the horns. These are described as angular, with the broadest side to the rear, the two others anterior and inferior, wrinkled, brownish, standing outwards, not bent back, straight for near two-thirds of their length, then curving inwards with the tips rather back; the face is nearly straight, and the breadth of the forehead is carried down with little diminution to the foremost grinder. The best figure, we are assured, is in Captain Williamson's *Oriental Field Sports.*

Captain Williamson evidently speaks of the true arnee in the anecdote, where one of these animals pursued a sportsman to his elephant, and ran its horns under his belly to lift him up. This individual was killed, and was upwards of six feet high at the shoulder, nearly three feet in breadth at the breast, and the horns five feet and a half long.

The other or common arnee is also a very large animal, though nearly a foot lower at the shoulders than that last mentioned. It is not much less in weight; the head is smaller, the body longer, the tail reaching to near the heels, and the hide more scantily covered with hair. These are much more common, live gregariously in woody swamps or plains, occasionally floating in whole droves down the Ganges, seemingly asleep, until the current lands them on some island, or on the bank: boats are sometimes endangered by sailing in among them unawares. They are said to plunge under water, and raise aquatic plants with their horn to the surface, where they feed on them, while driving with the stream. An animal of this kind drifted down to near Shangur Island, in 1790, and was shot by the crew of the Hawkesbury Indiaman, towed alongside, and hoisted in; the meat weighed three hundred and

his air is wilder; and he carries his head lower, and nearer the ground; his limbs are less fleshy, and his tail more naked of hair; his body is shorter and thicker than that of the cow kind; his legs are higher; his head smaller; his horns not so round,

sixty pounds per quarter, exclusive of the head, legs, hide, and entrails, and the whole could, therefore, be scarcely less than two thousand pound, though the ship's butcher pronounced it not above two years old.

A herd of these animals was observed by a column of troops, some years ago, on the n arch to Patna, by the inland road. On discovering the red dresses of the soldiers, they threw out their usual signals of hostility, and galloped off; then suddenly wheeling round, came in a body, as if they intended to charge, and their horns overtopping the heads, rendered it doubtful whether they were not mounted by some hostile force; part of the column, therefore, halted and formed, and the animals suddenly struck by the glittering of the arms, stopped, turned tumultuously round, and dashed into cover.*

These anecdotes show the scepticism of some continental naturalists, respecting the existence of wild buffaloes in India, to be quite misplaced. Formerly, this race was occasionally reduced to a precarious domesticity, by order, and for the amusement of, the native princes; but now they use the largest of the domestic breeds: these are mounted by their keepers and brought into the arena to engage in battle with the tiger, who is almost invariably defeated. The race of the common arnee is also, it would appear, domesticated in the eastern states: a white variety is found in Tinean, and other islands of the Indian Archipelago. On the coast of Cochinchina, and the Malayan peninsula, this race appears to predominate: they are of very great bulk, with the horns, when seen in front, forming a true crescent; their skulls are the usual arnees of European museums. Although the skin of the white variety be rosy, the muzzle and edge of the lips are jet black, the eyes are large and dark, the snout longer and narrower than in the black-skinned buffalo, and their height at the shoulder is not five feet, owing to the legs being short. Those of Siam, both wild and domesticated, are ashy gray, larger than an ox, the muzzle much prolonged, and the horns very long forming a cresent above the head. This variety has a shrill weak voice, and the domesticated are more easily managed by children than by grown men.

The *Domestic Buffalo.* (*B. Bubalus.*) Whether or not the arnee of Bengal be the stock from which the domestic buffalo is descended, certain it is that the species now under consideration, is still found in a wild state, as well as domesticated, and that in all countries, sufficiently uninhabited and affording the requisite conditions, the black-skinned domestic animal will soon supply a wild breed. This occurs whenever local circumstances are favourable, even in the kingdom of Naples, and we might draw an inference from this fact alone, that the species with crescent horns, are distinct from the present, although both have breeds which have received the yoke of man; nor if it were proved that a prolific intermediate race exist, produced by the intermixture of both, would it fully determine that both form only one original

* It is not impossible, that more than one species is confounded under the name Arnee, and that even the genuine Urus of the ancients, still exists in the remote temperate forests of Asia.

black, and compressed, with a bunch of curled hair hanging down between them; his skin is also harder and thicker, more black, and less furnished with hair; his flesh which is hard and blackish, is not only disagreeable to the taste but likewise to the

species. What forms a species, and what a variety, is, as yet, far from well understood.

The Bhain of India may be regarded as the true stock of the domestic buffaloes of southern and western Asia, north Africa, and eastern Europe Little doubt can be raised, that in India that animal was first subdued, perhaps, by means of the intelligence and powers of the elephant, who alone could compel it to subjection; from thence, commerce or remote military expeditions seem to have introduced it into Tartary and eastern Persia, till by either of these means the domestic buffalo was found on the shores of the Caspian. Here they resided at the time of the Macedonian invasion, though the Tartars seem to have used their busan as beasts of burden, at least, as early, and about that period, or soon after, to have led them to the banks of the Tereck. They were found by the Mahomedan Arabs in Persia, and during their wars brought westward into Syria, and Egypt. Baron Cuvier, with his accustomed research, proves the pilgrims and writers concerning Palestine to have noticed them by the name of Buffus, early in the eighth century.

The stature of the buffalo varies according to the circumstances of food and climate. The Hungarian and Italian are about eight feet and a half long, by five feet at the shoulders; the horns are directed sideways, compressed, with a ridge in front, reclining towards the neck and the tips turned up, placed at a great distance from each other, with a convex forehead between them; the mammæ of the male placed in a transverse line; the hair scattered, coarse, and black, and the tail long, termiuated by a tuft; the hide is of a purplish black, in India almost naked, in Egypt, sometimes totally without hair, and in the Indian Archipelago the anterior half is occasionally covered with long hair, and the posterior naked; it varies also to rufous, and white occurs in some breeds.

It is an animal at all times of very doubtful docility, with a sombre malignant eye, active, daring, swift, and persevering when excited; dull, slow, wallowing in his ordinary state; naturally preferring flats and swampy soil; possessed of great strength for burden and for the plough, two being equal in power to four horses: but furnishing little, and indifferent milk and worse flesh: the hide and horns are alone valuable. In India, however, they furnish more milk from which a kind of liquid butter is made, well known by the name of *ghee*. The domestic breed in Bengal, is not more than four feet and a half high, and used to labour; but for burden, care must be taken that the goods they carry do not suffer from wet, their propensity to lie down in water being invincible; wood and bricks are, therefore, the most common load. The largest of the wild breed, are used by the native princes to supply the place of Arnees, and fight with tigers in public shows. With the natives especially the Guallah, cast or herdsmen, they are docile: they ride on their favourites, and spend the night with them in the midst of jungles and forests, without fear of wild beasts. When driven along the herds keep

smell. The milk of the female is by no means so good as that of the cow; it is however produced in great abundance. In the warm countries almost all their cheese is made of the milk of the buffalo; and they supply butter also in large quantities. The veal of the young buffalo is not better eating than the beef of the old. The hide of this animal seems to be the most valuable thing he furnishes. The leather made of it is well known for its thickness, softness, and impenetrability. As these animals are, in general, larger and stronger than the cow, they are usefully employed in agriculture. They are used in drawing burdens, and sometimes in carrying them; being guided by a ring, which is thrust through their nose. Two buffaloes yoked in a waggon, are said to draw more than four strong horses; as their heads and necks are naturally bent downward, they are thus better fitted for the draught, and the whole weight of their bodies is applied to the carriage that is to be drawn forward.

From the size and bulk of the buffalo, we may be easily led to conclude that he is a native of the warmer climates. The largest quadrupeds are generally found in the torrid zone; and the buffalo is inferior in point of size only to the elephant, the rhinoceros, or the hippopotamus. The camelopard or the camel may indeed be taller, but they are neither so long, nor near so corpulent. Accordingly, we find this animal wild in many parts of India; and tamed also wherever the natives have occasion for his services. The wild buffaloes are very dangerous animals, and are often found to gore travellers to death, and then trample them with their feet, until they have entirely mangled the whole body: however in the woods they are not so much to be

close together, so that the driver, if necessary, walks from the back of one to the other, perfectly at his convenience. The females are dangerous, while they nurse their calf. In Italy, it is asserted that buffaloes are again become wild; the domestic, however, both there and in Hungary, are managed by means of a ring passed through the cartilage of the nose: in India it is a mere rope. The practice is ancient, and it would seem that the Sclavonic *Wenden*, brought buffaloes with them to the shores of the Baltic, if we may judge from the armorial bearings of provinces and families, not unfrequent in the North of Germany and Switzerland; unless we prefer to believe that the urus or parent of the domestic ox, required to be ringed for many generations before it became tractable.—See the Animal Kingdom of Baron Cuvier. Supplement to the order Ruminantia. By Major Smith.

feared as in the plains, because in the violence of their pursuit their large horns are apt to be entangled in the branches of the trees, which gives those who have been surprised by them time to escape the danger. There is scarcely any other method of avoiding their pursuit; they run with great swiftness; they overturn a tree of moderate growth; and are such swimmers, as to cross the largest rivers without any difficulty. In this manner, like all other large animals of the torrid zone, they are very fond of the water; and in the midst of their pursuit, often plunge in, in order to cool themselves. The negroes of Guinea, and the Indians of Malabar, where buffaloes are in great abundance, take great delight in hunting and destroying them: however, they never attempt to face the buffalo openly; but generally climbing up the tree, shoot at him from thence, and do not come down till they find they have effectually despatched him. When they are tamed, no animal can be more patient or humble; and though by no means so docile as the cow kind, yet they go through domestic drudgeries with more strength and perseverance.

Although these animals be chiefly found in the torrid zone, yet they are bred in several parts of Europe, particularly in Italy, where they make the food and the riches of the poor. The female produces but one at a time, in the same manner as the cow; but they are very different in the times of gestation; for the cow, as we know, goes but nine months; whereas the buffalo continues pregnant for twelve. They are all afraid of fire; and, perhaps, in consequence of this, have an aversion to red colours that resemble the colour of flame: it is said that in those countries where they are found in plenty, no person dares to dress in scarlet. In general they are inoffensive animals, if undisturbed; as indeed all those which feed upon grass are found to be; but when they are wounded, or when even but fired at, then nothing can stop their fury; they then turn up the ground with their forefeet, bellow much louder and more terribly than the bull, and make at the object of their resentment with ungovernable rage. It is happy, in such circumstances, if the person they pursue has a wall to escape over, or some such obstacle; otherwise they soon overtake, and instantly destroy him. It is remarkable, however, that although their horns are so formidable, they in general make more use of their feet in combat, and rather tread their enemies to death than gore them.

Having thus gone through the history of these animals, it may be proper to observe, that no names have been more indiscriminately used than those of the bull, the urus, the bison, and the buffalo. It therefore becomes such as would have distinct ideas of each to be careful in separating the kinds, the one from the other, allowing the cow for the standard of all. The urus, whether of the large enormous kind of Lithuania, or the smaller race of Spain, whether with long or short horns, whether with or without long hair in the forehead, is every way the same with what our common breed was before they were taken from the forest, and reduced to a state of servitude. The bison and all its varieties, which are known by a hump between the shoulders, is also to be ranked in the same class. This animal, whether with crooked or with straight horns, whether they be turned towards the cheek, or totally wanting, whether it be large or diminutive, whatever be its colour, or whatever the length of its hair, whether called the *bonasus* by some, or the *bubalus* by others, is but a variety of the cow kind, with whom it breeds, and with whom of consequence it has the closest connexion. Lastly, the buffalo, though shaped much more like the cow, is a distinct kind by itself, that never mixes with any of the former; that goes twelve months with young, whereas the cow goes but nine; that testifies an aversion to the latter; and, though bred under the same roof, or feeding in the same pasture, has always kept separate; and makes a distinct race in all parts of the world. These two kinds are supposed to be the only real varieties in the cow kind, of which naturalists have given so many varieties. With respect to some circumstances mentioned by travellers, such as that of many kinds defending themselves, by voiding their dung against their pursuers; this is a practice which they have in common with other timid creatures when pursued, and arises rather from fear than a desire of defence. The musky smell also by which some have been distinguished, is found common to many of these kinds, in a state of nature: and does not properly make the characteristic marks of any. The particular kind of noise also, which some of them are known to make, which rather resembles grunting than bellowing or lowing, is but a savage variety, which many wild animals have, and yet lose when brought into a state of tameness. For these reasons, Mr Buffon, whom I have followed in this description,

is of opinion, that the zebu, or little African cow, and the grunting, or Siberian cow, are but different races of the bison; as the shape of the horns, or the length of the hair, are never properly characteristic marks of any animal, but are found to vary with climate, food, and cultivation.

In this manner the number of animals of the cow kind, which naturalists have extended to eight or ten sorts, are reduced to two; and as the utmost deference is paid to the opinion of Mr Buffon in this particular, I have taken him for my guide. Nevertheless, there is an animal of the cow kind, which neither he, nor any other naturalist that I know of, has hitherto described, yet which makes a very distinct class, and may be added as a third species.

This animal was shown some years ago in London, and seemed to unite many of the characteristics of the cow and the hog; having the head, the horns, and the tail, of the former; with the bristles, the colour, and the grunting, of the latter. It was about the size of an ass, but broader and thicker; the colour resembling that of a hog, and the hair bristly, as in that animal. The hair upon the body was thin, as in the hog; and a row of bristles ran along the spine, rather shorter and softer than in the hog kind. The head was rather larger than that of a cow; the teeth were entirely resembling those of that animal, and the tongue was rough in like manner. It fed upon hay; and consequently its internal conformation must have resembled that of the cow kind more than the hog, whose food is always chosen of a kind more succulent. The eyes were placed in the head as with the cow, and were pretty nearly of the same colour; the horns were black and flattish, but bent rather backwards to the neck, as in the goat kind; the neck was short and thick, and the back rather rising in the middle; it was cloven-footed, like the cow, without those hinder claws that are found in the hog kinds. But the greatest variety of all in this extraordinary creature, which was a female, was, that it had but two teats, and consequently, in that respect, resembled neither of the kinds to which, in other circumstances, it bore so strong a similitude. Whether this animal was a distinct kind, or a monster, I will not pretend to say: it was shown under the name of the bonasus; and it was said, by the person who showed it, to have come from India: but no credit is to be given to interested ig-

norance; the person only wanted to make the animal appear as extraordinary as possible; and I believe would scarcely scruple a lie or two to increase that wonder in us, by which he found the means of living.

END OF VOLUME FIRST.

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