Barr's Buffon.

Buffon's Natural History.

CONTAINING

A THEORY OF THE EARTH,

A GENERAL

HISTORY OF MAN,

OF THE BRUTE CREATION, AND OF

VEGETABLES, MINERALS,

&c. &c.

FROM THE FRENCH.

WITH NOTES BY THE TRANSLATOR.

IN TEN VOLUMES.

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BUFFON'S
NATURAL HISTORY.

HISTORY OF THE BRUTE CREATION.

CHAPTER I.
Of THE NATURE OF ANIMALS.

As all our knowledge turns upon the relations by which one object differs from another, if there existed no brute animals, the nature of the human being would be still more incomprehensible. Having considered man in himself, ought we not to derive every assistance, by comparing him with the other parts of the animal creation? We will proceed then to examine the nature of animals, to compare their organization, to study their general economy, thereby to make particular applications, to mark resemblances, to reconcile the differences; and from the assemblage of those combinations, to distinguish the principal effects of the living mechanism, and to make a further progress in that important knowledge of which man is the object.

We will begin by reducing within its proper limits a subject which, at first view, appears to be immense. The properties of matter which animals possess in common with inanimate beings come not within our present consideration, and which we have already fully treated upon. For the same reason we shall reject such qualities as are found equally to belong to the vegetable and to the animal. As in the class of animals we comprehend a number of animated beings,

whose organization is highly different from that of man, as well as from more perfect animals, so we shall wave the consideration of them, and confine ourselves to those animals which have evidently the greatest affinity to us.

But as the nature of man is superior to that of animals, so of that superiority we shall study to demonstrate the cause, in order that we may distinguish what is peculiar to man, from what belongs to him in common with other animals.

Previous to an examination of the minute parts of the animal machine, and their peculiar functions, let us view the general result of this mechanism, and, without at first reasoning upon causes, confine ourselves to an elucidation and description of effects.

An animal has two modes of existence; that of motion, or awake, and rest, or asleep; and which, while life lasts, succeed each other alternately. In the former, all the springs of the machine are in action; in the latter, there is only a part of them so, and this part acts as well while the animal is asleep as while it is awake, and is therefore absolutely necessary since the animal cannot exist without it. It is also independent of the other, as it acts of itself; the former, on the contrary, depends on the latter, as it cannot exercise itself alone. The one is a fundamental part of the animal economy, since it acts continually and without interruption; the other is less essential, since it acts but by internals.

The first division of the animal economy appears general and well founded. An animal when asleep is more easy to be examined than when awake and in motion. This difference is essential, and not a simple change of situation as in an inanimate body, which may be equally and indifferently at rest or in motion; for in either of these states it would perpetually remain, unless constrained to quit it by some external power or resistance. By its own powers the animal changes its condition; and naturally, and without constraint, it passes from repose to action, and from action to repose. The period for awaking returns as necessarily as that for sleep, and both arrive independent of any foreign cause; since in either state the animal

cannot exist but for a certain time, and an uninterrupted continuity of either would be equally fatal, to life.

In the animal economy, therefore, we may distinguish two parts; the one acts perpetually without interruption, and the other acts only by intervals. The action of the heart and lungs in animals that breathe, and of the heart in the f[oe]tus, seem to constitute the former as does the action of the senses, and the movements of the members of the latter.

If we imagine beings endowed by nature with only the first part of this animal economy, though deprived of sense and progressive motion, would yet be animated, and differ in nothing from animals asleep. An oyster which appears to have no external sense or progressive motion, is a being formed to sleep for ever. In this sense a vegetable is merely a sleeping animal, and in general every organized being destitute of sense and motion may be compared to an animal doomed by Nature to a perpetual sleep.

In animals, then, sleep is not an accidental state, occasioned by the exertions of their functions while awake. It is, on the contrary, an essential mode of existence, which serves as a basis to an animal economy. By sleep our existence begins; the f[oe]tus sleeps continually, and the infant is more often asleep than awake. Sleep, therefore, which seems to be a state purely passive, resembling that of death, is, on the contrary, that which a living animal first experiences, and is the very foundation of life.

Confined solely to that part which acts continually, the most perfect animal will not appear to differ from those beings to which we can scarcely give the appellation of animal. As to external functions, it would be nearly upon a level with a vegetable; for however different the internal organization of animals and vegetables may be, the inferences will be the same. They each receive nourishment, grow, expand, have external motions, and a vegetating life. But of progressive motion, action, and sentiment, they will be equally destitute; nor be endowed with any interior or apparent character by which animal life may be distinguished. Investing, however, this

internal part with senses and members, animal life will presently manifest itself; and the more this cover shall contain of sense and members, the more will the animal life be perfect. It is by this investment that animals differ from each other. The internal part belongs, without exception, to all animals; and is nearly the same in all which have flesh and blood. The external cover, however, is widely different; and it is at its extremities that the greatest differences subsist.

In order to elucidate this argument, let us compare the body of a man with that of a horse or an ox. In each the heart and lungs, or the organs of circulation, and of respiration, are nearly the same; but the external cover is highly different. The materials of the animal body, though the parts are similar to those of the human, vary greatly as to number, size, and position; and thereby the dissimilitudes in their respective forms are rendered very wide. Besides, we shall find that the greatest differences are at the extremities; for in dividing the body into three principal parts, the trunk, the head, and the members, we find, that in the head and members, which are the extremities of the body, consist, the most material difference between man and other animals. We discover that the greatest difference in the trunk is at the two extremities; since in men there are clavicles at the upper extremity, which in animals are wanting; and the under extremity of animals is terminated by a tail, consisting of a certain number of exterior vertebræ, which the human body is without. The inferior extremity of the head also, as the jawbones, and the upper extremity, as the bones the forehead, differ prodigiously in man and beast. Finally, by comparing the members of a man with those of other animals, we plainly perceive it is at the extremities they differ most, as no two things bear less resemblance to each other, than the human hand with the foot of a horse or an ox.

Taking the heart then for the centre of the animal machine, we find in that and other adjacent parts, there is a perfect resemblance between man and other animals: but the more we remove from this centre, the more they become different; and when in the centre itself there is found any difference, then the animal is infinitely more distant from man, and possesses nothing in common with those

animals we are now considering. In most insects, for example, there is a peculiar organization of this principal part of the animal economy. Instead of heart and lungs, they have parts which, being subservient to the vital functions, have been considered as analogous to those viscera, but which in reality widely differ from them, both in structure and result of action, and therefore are insects to the last degree different from man and other animals. A minute difference in the centrical parts is always accompanied with an infinitely greater in the exterior parts. The tortoise, whose heart is of a peculiar structure, is a very extraordinary animal, and has not the smallest resemblance to any other animated being.

In considering men, quadrupeds, birds, cetaceous animals, fishes, reptiles, &c. what prodigious variety do we find in the figure and proportion of their bodies, in the number and position of their members, in the substance of their flesh and bones? Quadrupeds have generally tails and horns; cetaceous animals live in another element, and though their mode of generation is similar to that of quadrupeds, yet they differ greatly from them in form, having no inferior extremities; birds differ still more by their beaks, feathers, wings, and their propagation by eggs; fishes and amphibious animals are yet farther removed from the human form, and reptiles have no members. In the whole exterior covering there is the greatest diversity, the interior conformation being nearly the same; they have all a heart, a liver, a stomach, intestines, and organs for generation; these ought to be considered as parts the most essential to the animal economy, since they are the most fixed, and least subjected to variation.

But it is to be observed that, even in the cover, there are some parts more fixed than others. Of all the senses none of these animals are divested. We have already explained what may be their sensation of feeling. What may be the nature of their smelling and taste we know not, but we are assured they all enjoy the sense of seeing, and perhaps that of hearing also. The senses may be considered, then, as another essential part of the animal economy, as well as the brain, from which sensation derives its origin. Even insects, which differ so much in the centre of the animal economy,

have a part analogous to the brain, and its functions resemble those of other animals; and such as the oyster, which seems to be deprived of a brain, ought to be considered as only half-animated, and as filling up an intermediate space between the animal and the vegetable kingdoms.

As the heart is the centre of the interior part of the animal, so is the brain the centre of the cover. In like manner as the heart, and all the interior parts, communicate with the brain and exterior cover, by means of the blood-vessels, the brain communicates with the heart, and with all the interior parts, by means of the nerves. This union appears to be intimate and reciprocal, and though of these two organs the functions are absolutely different, yet they can never be separated without the instant death of the animal.

The heart and the whole interior part acts continually without interruption, and independent of any exterior cause; but the senses and exterior part act only by alternate intervals, when affected by external causes. Objects act upon the senses, the senses modify this action, and carry the impression modified into the brain, where it becomes what we term sensation. In consequence of this impression the brain acts on the nerves, and communicates the vibration it has received; and this vibration it is which produces progression, and all the other exterior actions of the body. Whenever a cause acts upon a body, we know that the body also acts upon the cause. Thus objects act upon animals by means of the senses, and animals act upon the object by its exterior movements. In general action is the cause, and re-action the effect.

It may be said, that in solid bodies, which follow the laws of mechanism, the re-action is always equal to the action; but that in the animal body it appears that the re-action is greater than the action, and that the other exterior movements ought not to be considered as simple effects of the impression of objects upon the senses. To this objection I reply, that though in certain cases effects appear proportioned to their causes, there is in Nature an infinite number of cases where the effects bear no kind of proportion to their apparent causes. By a single spark of fire a magazine of powder

may be set in flame, and a citadel be blown up. By electricity a slight friction produces a violent shock, which is communicated to great distances, and if a thousand persons touch each other, they would all be almost as much affected by it as if the shock had been confined to each of them individually. It is not, then, extraordinary that a slight impression on the senses should produce in the animal body a violent re-action, and should manifest itself by exterior movements.

The causes we are qualified to ascertain, and the quantity of whose effects we can precisely estimate, are less numerous than those whose mode of action is unknown, and of whose proportional relation with their effects, we are entirely ignorant. Now most effects in Nature depend on a number of causes differently combined, whose actions vary, and seem to be determined by no established law, consequently we can only form a conjectural estimate by endeavouring to approximate the truth by the means of probabilities.

I pretend not, then, to assert as a demonstrative fact, that progressive and other exterior movements of animals, are caused solely by the impression of objects upon the senses. I mention it merely as likely, and founded on principles of analogy, since all organized beings, which are destitute of sense, are likewise destitute of progressive motion, and that all those which possess the one have also the other.

To illustrate these observations let us briefly analyze the physical principles of our actions. When an object strikes any of our senses, and the sensation it produces is agreeable, it creates a desire, which desire must have a relation to some of our qualities or modes of enjoyment. The object we cannot desire but either to see, taste, hear, smell, or to touch. We desire it merely that we may render the first sensation still more agreeable, or to excite another which is a new manner of enjoying the object; for if in the moment that we perceive an object we could enjoy it fully, through all the senses at once, we should have nothing to desire. The source of desire, then, is our being badly situated with respect to the object perceived, our being either too far from, or too near to it. This being the case we

naturally change our situation, because at the same time that we perceive the object, we likewise perceive the cause which prevents our obtaining a full enjoyment of it. From the impression which the object produces upon our senses, then, the motion we make in consequence of that desire, and the desire itself, solely proceeds.

An object we perceive by the eye, and which we desire to touch, if within our reach, we stretch forth our hands, and if at a distance we put ourselves in motion to approach it. A man deeply immersed in thought, if he is hungry, and there is a piece of bread before him, he will seize it, and even carry it to his mouth and eat it, without being conscious that he has done so. These movements are a necessary consequence of the first impressions of objects, and would never fail to succeed this impression if other intervening impressions did not often oppose this natural effect, either by weakening or by destroying the action of the first.

An organized being void of sensation, as an oyster, whose sense of feeling is probably very imperfect, is deprived not only of progressive motion, but even of sentiment and intelligence, as either of these would produce desire, which would manifest itself by exterior movement. That such beings are divested of a sense of their own existence I will not assert, but at least that sense must be very imperfect, since they have no perception of the existence of others.

It is the action of objects upon the senses which creates desire, and desire progressive motion. In order to render this truth still more sensible, let us suppose a man, at the instant his will incites him to approach an object, suddenly deprived of all his members, his body reduced to a physical point, to a globular atom, and, provided the desire still subsists, he will exert his whole strength in order to change his situation. The exterior and progressive movement depends not, then, upon the organization and figure of the body and members, since whatever be the conformation any of being it will not fail to move, provided it has senses, and a desire to gratify them.

On this exterior organization, indeed, depends the facility, quickness, direction, and continuity of motion, but the cause,

principle, action, and determination, originate solely from desire occasioned by the impression of objects upon the senses; and if a man was deprived of them he would no longer have desire, and consequently remain constantly at rest, notwithstanding he might possess the faculties for motion.

The natural wants, as that of taking nourishment, are interior movements, which necessarily create desire or appetite. By these movements exterior motions may be produced in animals, and, provided they are not deprived of exterior senses relative to these wants, they will act to satisfy them. Want is not desire; it differs from it as the cause differs from the effect. Every time the animal perceives an object, relative to its wants, desire begins, and action follows.

The action of external objects must produce some effect; and this effect we readily conceive to be animal motion, as every time its senses are struck in the same manner, the same movements always follow. But how shall we comprehend the action of objects creating desire or aversion? How shall we obtain knowledge of that which operates beyond the senses, those being the intermediate between the action of objects, and the action of the animal; a power in which consists the principle of the determination of motion, since it modifies the action of the animal, and renders it sometimes null, notwithstanding the impression of objects?

This question, as it relates to man, is difficult to be resolved, being by nature so different from other animals. The soul has a share in all our movements, and to distinguish the effects of this spiritual substance, from those produced by the powers of our material being alone, is an object of very great difficulty, and of which we can form no judgment but by analogy, and by comparing our actions with the natural operations of other animals. But as man alone is possessed of this spiritual substance, which enables him to think and reflect, and as the brute is a being altogether material, which neither thinks nor reflects, nevertheless acts, and seems to determine, we cannot doubt but that the principle of the

determination of motion is in the animals an effect altogether mechanical, and absolutely dependant upon its organization.

I conceive, therefore, that in the animal the action on objects on the senses produces another on the brain, which I consider as an interior and a general sense, which receives every impression that the exterior senses transmit to it. This internal sense is not only capable of being agitated by the action of the senses, but also of retaining for a length of time the agitations thus produced; and in the continuity of the agitation consists the impression, which is more or less deep in proportion as the agitation is more or less durable.

In the first place, then, the interior sense differs from the exterior senses, in the property which it has of receiving all impressions, while the exterior senses receive them merely as they relate to their conformation; the eye, for example, being no more affected by sound than the ear is by light. Secondly, the interior differs from the exterior senses, by the duration of the agitations produced by exterior causes; but in every other respect they are of the same nature. The interior sense of the brute, as its exterior, is entirely material, and the effect of mechanical organization. We have, like the animal, this material sense; and we possess, moreover, a sense of a nature highly superior, which resides in the spiritual substance, and which animates and guides us.

The brain of the animal is, therefore, a general sense, which receives all impressions the external senses transmit to it, and these impressions continue much longer in the internal than in the external senses: for instance, the agitations which light produces in the eye, continues longer than that which sound produces on the ear.

It is on this account that the impressions, which the former transmits to the interior sense, are more strong than those transmitted by the latter; and that we represent to ourselves the things which we have seen much more forcibly than those which we have heard. It is even found, that of all the senses, the eye is that in which the agitations are the most durable, and in which, of

consequence, though seemingly they are more explicit, the strongest impressions are formed.

The eye may therefore be considered as a continuation of the interior sense. It is, indeed, nothing more than one large nerve expanded, and a prolongation of the organ, in which the interior sense resides. That in its nature there should be a greater affinity to this internal sense is not then surprising; and in effect not only its impressions are more durable, but its properties more eminent than those of the other senses.

The eye represents outwardly the inward impressions. Like the internal sense, it is active, and expresses desire or aversion, while all the other senses are wholly passive; they are merely organs formed for the reception of exterior impressions, but incapable of retaining or reflecting them.

When with violence, however, and for a length of time any sense is acted upon, the agitation subsists much longer than the action of the exterior objects. This is, however, felt most powerfully in the eye, which will retain the dazzling impression made by looking for a moment on the sun, for hours and even days.

The brain also eminently enjoys this property, and not only retains the impressions it receives but propagates their actions, by communicating the vibrations to the nerves. The organs of the exterior senses, the brain, the spinal marrow, and the nerves, which are diffused over every part of the body, ought to be considered as one continued substance, as an organic machine, in which the senses are the parts acted upon by the external objects. But what renders this machine so different from all others is its fulcrum not only being capable of resistance and re-action, but is itself active, because it long retains impressions it has received; and the brain and its membranes being of great capacity and sensibility, it may receive a number of successive agitations, and retain them in the order in which they were received, because each impression agitates one part of the brain only, and the successive impressions agitate the same or contiguous parts, in a different manner.

Should we suppose an animal which had no brain, but possessing an exterior of great sensibility and extension; an eye, for example, of which the retina was as extensive as that of the brain, and had the property of retaining, for a long space, the impressions it might receive: it is certain, that the animal so endowed would see at the same time not only the present objects, but also those it had seen before; and seeing thus the past and the present with one glance, it would be determined mechanically to act according to the number or force of the agitations produced by the images which accorded with, or were contrary to this determination. If the number of images calculated to create an appetite surpassed those that would produce disgust or loathing, the animal would necessarily be determined to move, in order to satisfy that appetite: but if their number and force were equal, having no particular cause for motion, it would remain perfectly at rest; and if the number or the force of the images of the former are equal to the number or the force of the images of the latter, the animal will remain undetermined, and in an equilibrium between these two equal powers, nor will he make any movement either to obtain or to avoid. This I say it would do mechanically, and without the intervention of memory; for as the animal sees at the same time all the images, they consequently act, and those which have an affinity to appetite and desire, counteract those which have an affinity to antipathy and disgust; and it is by the preponderance of either, that determines it to act in this or in that manner.

It is evident, therefore, that in brutes the interior sense differs in nothing from the exterior but in the property of retaining the impressions it has received, a property by which alone all the actions of animals may be explained, and some idea obtained of what passes within them; a property which likewise demonstrates the essential and infinite difference which subsists between them and us, and from which may be distinguished in what respects they are similar.

The degrees of excellence in the senses do not follow the same order in the brute as in the human species. The sense which has the strongest affinity to thought, is the touch. This is enjoyed by man in

greater perfection than by animals. That which has the strongest affinity to instinct and appetite, is that of smelling; a sense in which man must acknowledge an infinite inferiority. Man, then, has the greatest tendency to knowledge, and the brute to appetite. In the former, the sense first in point of excellence, is the touch, and smelling the last; and this difference corresponds with the nature of each. The sense of seeing is at best uncertain, without the aid of the touch, and therefore less capable of perfection in the brute than in man. The ear, though perhaps as perfect in the former as in the latter, is of much less use to the animal, from the want of speech, which in man is an appendage to the sense of hearing, an organ of communication which renders it an active sense; whereas in the other hearing is a sense almost entirely passive. Man, then, enjoys the senses of feeling, seeing, and hearing, more perfect, and the sense of smelling more imperfectly than other animals; and as the taste is an inferior smell, and has also a stronger relation to appetite than any of the other senses, there is a sufficient probability to suppose that animals enjoy it in a more exquisite degree than man. Of this a proof might be adduced from the repugnance which animals have to certain kinds of food, and from their natural appetite for such as are proper for them; while man, unless informed of the difference, would eat the fruit of one tree for that of another, and even hemlock for parsley.

The excellence of the senses proceeds from Nature; but art and habit may render them still more perfect. A painter sees, at the first glance, numbers of shades and differences, which another person will pass over unnoticed. A musician, always habituated to harmony, receives a lively sensation of pain from discord. In like manner are the senses, and even appetites of animals rendered more perfect. Birds may be taught to repeat words, and imitate tunes; and the ardour of a dog for the chace may be increased by accustoming him to a certain reward.

In proportion as these senses are acute and perfect does the animal shew itself active and intelligent. In man the improvement is not so conspicuous, because he exercises his ear and his eye by means more rational and ingenious. Those persons who see, hear,

or smell, imperfectly, are of no less intellectual capacity than others; an evident proof that in man there is something more than an internal animal sense. This is the soul of man, which is a superior sense, a spiritual substance, entirely different in its essence and action from the nature of the external senses.

From this, however, we are not to deny that there is in man an internal material sense corresponding with the external senses. But what I maintain is, that the latter is infinitely subordinate to the other; that the spiritual substance governs it, and either destroys or creates its operations. In the animal this sense is the determinating principle of motion, but in man only the means, or the secondary cause.

Let us endeavour to clear up this important point, and let us see what power this internal material sense possesses, and what it is capable of producing. The internal material sense receives promiscuously all the impressions the external senses transmit to it. These impressions proceed from the action of objects; they only pass over the external senses, and produce in them but an instantaneous vibration; they rest, however, upon the internal sense, and produce in the brain, which is its organ, durable and distinct agitations. These vibrations create appetite or disgust, inclination or repugnance, according to the present state and disposition of an animal. An animal, the instant after its birth, begins to breathe, and to feel the want of nourishment; the smell, which is the sense of appetite, receives the emanations of the milk which is contained in the teats of its mother.

The vibrations which this sense undergoes, from the odoriferous particles, are communicated to the brain, which acting, in its turn, upon the nerves, the animal is stimulated to open its mouth, to obtain that sustenance of which it feels the want. The sense of appetite being less acute in man than in brutes, the infant at its birth feels only the desire of receiving nourishment, which it announces by its cries, but it cannot obtain it of itself; it receives no information from the smell, and is obliged to have its mouth put to the nipple, when the agitations, excited by the touch and smell, are communicated to the brain and nerves, and the child makes the necessary motions for

sucking in its nourishment. Solely by the smell and taste, the senses of appetite, can the animal be informed of the presence of its food, and of the place where it is, as its eyes are still closed, and would, even if they were open, in no degree contribute towards the determination of motion. Vision has a greater relation to knowledge than to appetite, and in man the eye is open from the moment of his birth; in most animals it is shut for several days, but in whom the senses of appetite are far more expanded, and more perfect.

The same remark is alike applicable to progressive motion, and to all the other exterior movements. A new-born infant can hardly move its members, and it is a long time before it attains strength sufficient to change its place, but in a very little time does a young animal acquire these faculties. In the animal these powers relate solely to the appetite, which is vehement, quickly developed, and the sole principle of motion; in man the appetite is weak, more slowly developed, and can have less influence than knowledge upon the determination of motion; man is necessarily, in this respect, more backward than the animal.

Every thing concurs then to prove, even in a physical sense, that brutes are actuated by appetite alone, and that man is governed by a superior principle. If doubts still exist, it is from our imperfect conception how appetite alone is capable of producing, in animals, effects so much resembling those which knowledge produces among ourselves; and from the difficulty we have to distinguish what we do in virtue of knowledge, from what we do by the mere force of appetite. Yet, in my opinion, it is not impossible to dispel this uncertainty. The internal material sense retains for a long time the agitations it receives; it is a sense of which the brain is the organ, and by which all the impressions are received that each of the exterior senses transmits to it. When, therefore, an exterior impression proceeds from the senses of appetite, the animal will advance to attain, or draw back to avoid, the object of this impression. This motion, however, is liable to uncertainty when produced by the eye or the ear; because, when an animal sees, or hears, for the first time, he will be agitated by light or by sound; yet this agitation will be uncertain, since neither have any relation to

appetite. It is only by repeated acts of seeing and hearing, added to the senses of taste and feeling, that it will actually advance or recede from objects which become relative to its appetite. A dog, for instance, who has been tutored, however violent his appetite, will not seize what might satisfy that appetite, although he will use every gesture to obtain it from the hand of its master. Does not this animal seem to reason between desire and fear, nearly as a man would do, who was inclined to seize upon the property of another, but was withheld by the dread of punishment? Though this analogy may be just; yet to render it in effect well-founded, should not animals be capable of performing the same actions that we perform? Now the contrary is evident; as nothing do animals either invent or perfect; in every thing they have an uniformity, and consequently no reflection. Of this analogy then we may doubt its reality, and may with propriety enquire, whether it is not by a principle different from ours that brutes are directed? and whether, without being under the necessity of allowing them the aid of reflection, the senses they enjoy are not sufficient to produce the actions they perform?

Whatever relates to their appetites strongly agitates their interior sense; and on the object of this appetite the dog would instantly rush, did not this very sense retain the impressions of pain which had formerly accompanied this action. By exterior impressions the animal has been modified. This prey is not presented to a dog simply, but to one which has been chastised every time it obeyed this impulse of appetite; the agitations of pain, therefore, are renewed when those of appetite are felt, having been constantly felt at the same time. The animal being thus impelled at once by two contrary powers, two powers destructive of each other, remains between them in an equilibrium; and, as the determinate cause of its motion is counterbalanced, it makes no effort to attain the object of its appetite. Though the agitations of appetite and repugnance, or of pleasure and pain, destroy the effect of each other, in the brain a third vibration takes place, which accompanies the other two, and this is occasioned by the action of its master, from whose hand the animal has often received its food; and as this is in no degree opposed or counterbalanced, it becomes the determinative cause of

motion; and the dog is therefore determined to move towards its master, and to remain in motion till its appetite is entirely satisfied.

In the same manner, and upon the same principles, may we explain, however complicated they appear, all the actions of animals, without allowing them either thought or reflection; the internal sense being sufficient to produce all their movements. The nature of their sensations alone remains to be elucidated, which, from what we have asserted, must be widely different from ours. “Have animals, it may be said, no knowledge, no consciousness of their existence? Do you deprive them of sentiment? In pretending to explain their actions upon mechanical principles, do you not in fact render them mere machines, or insensible automatons?”

If I have been rightly understood, it must have appeared that, far from divesting animals of all powers, I allow them every thing, thought and reflection excepted. Feelings they have, in a degree superior to ourselves. A consciousness they also have of their present, though not of their past existence. They have sensations, but they have not the faculty of comparing them, or of producing ideas: ideas being nothing more than associations of sensations.

Each of these objects let us examine in particular. That animals have feelings, and in a degree even more exquisite than ourselves, I think we have already evinced, by what we have said of the excellence of their senses relative to appetite. Like ourselves then, animals are affected by pleasure and pain; they do not know good and evil, but they feel it; what is agreeable to them is good, what is disagreeable is bad, and both are nothing more than relations, suitable, or contrary to their nature and organization. The pleasure of tickling, and the pain from a hurt, as they depend absolutely on an action more or less strong upon the nerves, which are the organs of sentiment, are alike common to man and other animals. Whatever acts softly upon these organs, is a cause of pleasure, and whatever shakes them violently, is a cause of pain. All sensations, then, are sources of pleasure, while they are moderate, and natural; but so soon as they become too strong, they produce pain, which, in a physical sense, is the extreme, rather than the opposite of pleasure.

A light too bright, a fire too hot, a noise too loud, a smell too strong, coarse victuals and severe friction, excite in us disagreeable sensations; whereas a delicate colour, a moderate heat, a soft sound, a gentle perfume, a fine savour, and light touch, please and move us with delight. Every gentle application to the senses, then, is a pleasure, and every violent shock a pain; and as the causes which occasion violent, happen more rarely in Nature than those which produce mild and moderate effects; and as animals, by the exercise of their senses, acquire in a little time the habit of avoiding every thing offensive or hurtful to them, and of distinguishing, and of approaching such as are pleasing; so without doubt they enjoy more agreeable sensations than disagreeable ones, and the amount of their pleasures exceed the amount of their pain.

In man, physical pleasure and pain form the smallest part of his sufferings or enjoyments. His imagination, never idle, seems perpetually employed to increase his misery; presenting to the mind nothing but vain phantoms, or exaggerated images. More agitated by these illusions, than by real objects, the mind loses its faculty of judging, and even its dominion; the will, of which it has no longer the command, becomes a burthen; its extravagant desires are sorrows; and, at best, its prospects are delusive pleasures, which vanish as soon as the mind, resuming its place, is enabled to form a judgment of them.

In searching for pleasure, we create ourselves pain; and seeking to be more happy, we increase our misery; the less we desire, the more we possess. In fine, whatever we wish beyond what Nature has given is pain; and nothing is pleasure but what she offers of herself. Nature presents to us pleasures without number; she has provided for our wants, and fortified us against pain. In the physical world, there is infinitely more good than evil; and therefore it is not the realities but the chimeras which we have to dread: it is not pain of body, disease, nor death that are terrible; but the agitation of the soul, the conflict of the passions, the mental anxiety, are those only we need apprehend.

Animals have but one mode of enjoying pleasure; the satisfying their appetite by the exercise of their sensations. We likewise enjoy this faculty, and have another mode of acquiring pleasure, the exercise of the mind, whose appetite is knowledge. This source of pleasure would be the more pure and copious did not our passions oppose its current, and divert the mind from contemplation. So soon as these obtain the ascendancy, reason is silenced; a disgust to truth ensues; the charm of illusion increases; error fortifies, itself, and drags us on to misery; for what misery can be greater than no longer seeing things as they are; to have judgment perverted by passions; to act solely by its direction, to appear in consequence unjust or ridiculous to others; and when the hour of self-examination comes, of being forced to despise ourselves?

In this state of illusion and darkness we would change the nature of our soul. She was given us for the purposes of knowledge, and we would employ her solely for those of sensation. Could we extinguish her light, far from regretting the loss, with pleasure should we embrace the lot of idiots. As we no longer reason but during intervals, and as these intervals are troublesome, and spent in secret reproaches, we wish to suppress them, and thus proceeding from one illusion to another, we at length endeavour to lose all knowledge and remembrance of ourselves.

A passion without intervals is madness; and a state of madness is the death of the soul. Violent passions with intervals are fits of folly, a malady of the mind, whose danger consists in its duration and frequency. In those intervals alone it may be said to enjoy health by the resumption of wisdom, but prevents it being a state of happiness, by reflecting on and condemning the past follies.

The generality of those who call themselves unhappy, are men of violent passions, or rather madmen, who have some intervals of reason; and as in exalted stations there are more false desires, more vain pursuits, more unruly passions, more abuses of the mind, than in the inferior, the rich man, beyond a doubt, is the most unhappy.

But let us turn from these gloomy objects, these humiliating truths, and take a view of the man of wisdom, who alone is worthy our notice. Contented with his situation, he who is entitled to this character wishes not to live but as he has always lived: happy within himself, he stands in little need of other resources; continually occupied in exercising the faculties of his mind, he perfects his understanding, cultivates his talents, acquires new knowledge, and without remorse and disgust, he enjoys the whole universe by enjoying himself.

A man like this is undoubtedly the happiest being in Nature. To the pleasures of the body, which he possesses in common with other animals, he adds those of the mind, which he enjoys exclusively. He has two methods of being happy, which aid and fortify each other: and if by indisposition or accident he is subject to pain, his sufferings are not great: his strength of mind supports him, reason consoles him, and he feels a satisfaction that he is enabled to suffer.

The health of man is more precarious than that of any other animal; he is indisposed more frequently, and for a greater length of time, and dies at all ages; while brutes travel through life with an even and steady pace. This difference seems to proceed from two causes, which, though widely distinct, contribute to the same effect. The first is, the unruliness of our internal material sense; the passions have an influence on the health, and disorder the principles which animate us. Almost all mankind lead a life of timidity or contention, and the greatest part die of chagrin. The second is the imperfection of those of our senses which have an affinity with the appetite. Brute animals have a better perception of what is suitable to their nature; they are not liable to deception in the choice of their food; they are not guilty of excess in their pleasures; and guided solely by a sense of their present wants, they satisfy these without seeking new modes of gratification. As for man, independent of his propensity to excess, independent of that ardour with which he endeavours to destroy himself, by endeavouring to force Nature; he hardly knows how to distinguish the effect of this or that nourishment; he disdains simple food, and prefers artificial dishes, because his taste is depraved, and because, from being a sense of

pleasure, he has rendered it an organ of debauchery, which is never gratified but when it is irritated.

It is not surprising, therefore, that we are more subjected than animals to infirmities; since we know not so well as them, what may contribute to preserve or destroy health, our experience being less certain than their perception; nay we abuse the very senses of the appetite, which they enjoy in such superior excellence, these being to them the means of preserving health, and to us causes of disease and of destruction. By intemperance alone more men sicken and die, than by all the scourges incident to human nature.

From these reflections it would appear, that animals have a more certain, as well as a more exquisite sensation of feeling than men. In support of this superior strength of sentiment, we may advert to their sense of smelling, which some animals enjoy to such a degree that they can smell further than they can see. A sense like this is an eye which sees objects, not only where they are, but even where they have been; it is the sense by which the brute animal distinguishes what is suitable or repugnant to its nature, and by which it perceives and chooses what is proper for the gratification of its appetite.

In greater perfection, then, than man, do animals enjoy the senses which relate to appetite: and though of their present existence they have a consciousness, of their past they have none. This second proposition, as well as the first, is worthy consideration. The consciousness of existence is composed in man of the sensation of his present, and of the remembrance of his past existence. Remembrance is a sensation altogether as present as the first impression, and sometimes affects us more strongly. As these two kinds of sensations are different, and as the mind possesses the faculty of comparing and forming ideas from them, our consciousness of existence is the more certain and extensive, as remembrance more frequently and copiously recalls past things and occurrences; and as by our reflections we compare and combine them with those past and present occurrences. Every man retains within himself a certain number of sensations correspondent with the different existences or states through which he has passed; and

these sensations, by the comparison which the mind forms between them, at length become a succession, and a series of ideas. In this comparison of sensations consists the idea of time; and indeed all other ideas. But this series of ideas, this chain of existences, is often presented to us in an order very different from that in which our sensations reached us; and in this it is that the difference principally consists in the genius and disposition of mankind.

Some men have minds particularly active in comparing and forming ideas. These are invariably the most ingenious, and, circumstances concurring, will always distinguish themselves. There are others, and in a greater number, whose minds are less active, allow all sensations which have not a certain degree of force to escape, and who only compare those by which they are strongly agitated. In points of ingenuity and vivacity these yield to the former. Others still there are, and they form the multitude, in whom there is so little activity of mind, so little propensity to think, that they compare and combine nothing, at least at the first glance; sensations of force, and repeated a thousand times, are required before their minds will be influenced to compare them, and form ideas.

The consciousness of our existence being composed, then, not only of our actual sensations, but of the train of ideas which gave rise to the comparison of our sensations, and of our past existences, it is evident that the more ideas we have, the more certain we are of our existence; that the more we have of intellectual capacity, the more we exist; that it is by the power of reflection alone that we are certain of our past existence, and view our future one; the idea of futurity being nothing more than a comparison of the present with the past inverted, since in this light the present is past, and the future present.

This power of reflection being denied to animals, it is certain they cannot form ideas, and consequently their consciousness of existence is less sure, and less extensive than ours. Having no idea of time, no knowledge of the past, nor conception of the future, their consciousness of existence is simple, depends solely on the

sensations which actually affect them, and consists in the internal sentiment which these sensations produce.

May we not conceive what this consciousness of existence is in animals, by reflecting on our own state when strongly occupied with some object, or violently agitated by some passion, which banishes every reflection upon self? This state we familiarly express by saying, the man is absent or beside himself; and people are in reality beside themselves, when they are occupied with sensations actually present to them, especially if those sensations are so violent and rapid as to allow the mind no time for reflection. When thus situated we feel pleasure and pain in all their varieties; therefore, though seemingly without the participation of the mind, we have a consciousness of our existence. This state, to which we are occasionally exposed, is the habitual state of animals; deprived of ideas, and furnished with sensations, they *know* not their existence but *feel* it.

To render more sensible this difference, let us consider minutely the faculties of brutes, and compare them with the actions of man. Like us they have senses, and receive impressions from exterior objects; they have also an interior sense, an organ which retains the agitations occasioned by those impressions, and consequently sensations which, like ours, are renewable, and are more or less strong and durable. But they have neither ingenuity, understanding, nor memory; because they are denied the power of comparing their sensations, and because these three faculties of the mind depend on this power.

Have animals no memory? It will be replied, the contrary seems demonstrably evident. After a considerable absence do they not recognize the persons with whom they had lived, the places where they resided, and the roads which they had frequented? Do they not recollect the punishments, the caresses, the lessons they had received? Though deprived of imagination and understanding, every thing seems still to evince they have a memory active, extensive, and perhaps more faithful than our own. However persuasive these appearances may be deemed, and however strong may be the

prejudices created by them, I presume I can demonstrate, that they deceive us, and that brute animals have no knowledge of past events, no idea of time, and of consequence no memory.

In man memory flows from the power of reflection, for the remembrance of things past supposes not only the duration of the impressions on our internal material sense, or renovation of former sensations, but also the comparison which the mind has made of those sensations, or the ideas it has formed. If memory consisted merely in the renovation of past sensations, those sensations would be represented to our internal sense without leaving any determined impressions; they would present themselves without order or connection, as they do in a state of intoxication, or in dreams, when they are so incongruous, and so incoherent, that we immediately lose all recollection of them. Of such things only as have a relation to others, which preceded or followed them, do we retain a remembrance; and every solitary sensation, however powerful, passes away without leaving the smallest trace on the mind. Now it is the mind which establishes these relations of objects, by the comparison it makes between them, and connects our sensations by a continued thread of ideas. As memory consists, then, in a succession of ideas, so it necessarily supposes the power by which ideas are produced.

But, if possible, to leave no doubt on this important point, let us enquire into the nature of that remembrance left by our sensations when they are accompanied with ideas. Pain and pleasure are pure sensations, and the strongest of any, yet we but feebly recollect them, and with confusion. All we remember is, that we were pleased or hurt; but this remembrance is not distinct; we cannot represent to ourselves either the kind, the degree, or the duration of those sensations by which we had been so violently agitated; and the less are we capable of representing those we had but seldom felt. A pain, for example, which we have experienced but once, which only lasted a few minutes, and differed from all former pains, would be soon forgotten; we might recollect we felt great pain, yet, though we distinctly recollected the circumstances which accompanied it, and

the period at which it happened, we should have but an imperfect remembrance of the pain itself.

Why is almost every thing forgotten that passed during our infancy? Why have old men a more distinct remembrance of what happened in their prime of life than what occurred in their more advanced years? Can there be a stronger proof that sensations alone are not sufficient to produce memory, and that it exists solely in the train of ideas which our minds derive from those sensations? In infancy the sensations are as lively and rapid as in manhood, yet they leave few or no traces, because at this era the power of reflection, which alone can form ideas is almost totally inactive; and because in the moments it does act, its comparisons are only superficial. In manhood reason is completely developed, because the power of reflection is in full exercise; we then derive from our sensations every possible advantage, and form many orders of ideas, and chains of thought, whereof each, from being often revolved, forms so durable and indelible an impression, that when old age comes on, those very ideas present themselves with more force than those derived from present sensations, because at that period the sensations are feeble, slow and dull, and the mind itself partakes of the languor of the body. In infancy, the time present is every thing; in manhood, we equally enjoy the past, the present and the future; in old age we have little sense of the present, we turn our eyes to the future, and exist in the past. In the infant that prattles, and the old man that dotes, reason is alike imperfect, because they are alike void of ideas; the former is as yet unable to form them, and the latter has ceased.

An idiot, whose corporeal senses and organs appear to be sound, has, like us, sensations of all kinds; he will also have them in the same order, if he lives in society, and is obliged to act as other men. As these sensations do not create in him ideas, as there is no correspondence between his mind and his body, and as he is incapable of reflection, so he is necessarily destitute of memory, and all knowledge of himself. In nothing does such a man differ from a brute, as to the exterior faculties, for though he has a soul, and possesses the principle of reason, yet as this principle remains in a

state of inaction, and receives nothing from the corporeal organs, it can have no influence upon his actions which are like those of an animal, solely determined by its sensations, and by a sentiment of its existence and present wants. Thus the idiot and the brute are beings whose operations are in every respect the same, because the one has no soul, and the other makes not any use of it; they are both destitute of the power of reflection, and of course have neither understanding nor memory.

Should it still be said, "Do not the idiot and the brute often act as if they were determined by the knowledge of things past? Do they not distinguish persons with whom they have lived; places where they have resided; and perform many other actions, which necessarily imply memory? And does not all this prove that memory proceeds not from the power of reflection?"

It must already have been perceived, that I distinguish two kinds of memory, infinitely different in their causes, though somewhat similar in their effects. The one consists in the impressions of our ideas; and the other, which I would rather term reminiscence than memory, is nothing more than the renovation of our sensations, or of the vibrations by which they were occasioned. The former issues from the mind, and is much more perfect in man than the latter; which is produced merely by the renovation of the vibrations of the internal sense, and is the only memory possessed by brutes or idiots. Their preceding sensations are renewed by their present ones; the present, and principal, calls forth the former, and the accessory images; they feel as they have felt, and therefore they act as they have acted; they behold together the present and the past, but without distinguishing or comparing, and consequently without knowing them.

As another proof of the existence of memory in animals, I may be told of their dreams. It is certain that brutes, while asleep, have the things represented to them with which they have been occupied while awake. Dogs bark when they are asleep; and though this barking is feeble, yet it is easy to distinguish in it the cry of the chace, accents of rage, sounds of desire, of murmur, &c. It is not to

be doubted, then, but that dogs have a lively and active memory, different too from that of which we have now been speaking, since it acts independent of any exterior cause.

To clear up this difficulty, it is necessary to examine the nature of dreams, and to inquire whether they proceed from the mind, or depend entirely on our internal material sense. If we could prove that they reside solely in the latter, it would be an answer to the objection, and another demonstration, that in brutes there is neither understanding nor memory.

Idiots, whose minds are without action, dream like other men; therefore dreams are produced independent of the mind. Let any person reflect upon his dreams, and endeavour to discover why the circumstances are so unconnected, and the events so extravagant. To me it appears, that it is principally because they turn solely upon sensations, and not upon ideas. With the idea of time, for example, they have no affinity. Persons are represented whom we never saw, and even those who have been dead for many years, as alive, and as they formerly were when living; but we indifferently connect them with things and persons of the present, or of a different period. Thus it is also with the idea of place; we must perceive objects where they are not, or we should not see them at all. Did the mind act in a single instant it would give order to this incongruous train of sensations. Instead of which it allows the representations to succeed each other in disorder; and though each object appears in lively colours, the succession is often confused, and always chimerical. If the mind is rather roused by the enormity or force of these sensations, it will in the midst of this darkness produce a spark of light, and create in the midst of chimeras a real idea. We then dream, or rather we will think so, for though this action is but a small sign of the soul, it is yet neither a sensation nor a dream; it is a thought, a reflection, but being too weak to dispel the illusion, it mixes with and forms a part of the dream, and prevents not the representations from succeeding; insomuch, that on awaking, we imagine we had dreamed the very things we had thought.

In dreams we see much, though we but seldom understand; we are powerfully agitated by our sensations, images follow each other, without the least intervention of the mind, either to compare or reconcile them. We have sensations, then, but no ideas, the latter being comparisons of the former; so dreams must reside solely in the internal material sense; and as the mind does not produce them, they must form a part of that animal reminiscence, of which we have already treated. Memory, on the contrary, cannot exist without the idea of time, without a comparison of ideas, and as these extend not to dreams, it seems to be obvious that they can neither be a consequence nor an effect, nor a proof of memory. But though it should be maintained that to some dreams ideas certainly belong; and as a proof of it, those people be quoted who walk, speak, and converse connectedly while asleep; still it would be sufficient for my argument, that dreams may be produced by the renovation of sensations alone, for in consequence thereof the dreams of animals must be merely of this species, and such dreams, far from supposing memory, indicate nothing but a material reminiscence.

By no means am I inclined to believe, that persons who walk and converse while asleep are in reality occupied with ideas. In all such actions the mind seems to have no concern. Sleep-walkers go about, return and act, without reflection or knowledge of their situation or danger; alone are their animal faculties exercised, and even of these some remain unemployed; and while in this state, a sleep-walker is of course more stupid than an idiot. As to persons who speak while asleep, they never say any thing new. An answer to certain common questions, a repetition of a few familiar expressions, may be produced, independent of the principle of thought or action of the mind. Why should we not speak without thought when asleep, since when most awake, and under the influence of passion, man utters numberless things without reflection.

As to the occasional cause of dreams, by which former sensations are renewed without being excited by present objects, it is to be observed, that we never dream when our sleep is sound: every thing is then in a state of inaction, and we sleep both outwardly and inwardly. The internal sense, however, falls asleep the last, and

awakes the first, because it is more active, and more easily agitated, than the external senses. It is when our sleep is less sound that we experience illusive dreams, and former sensations, those especially which require not reflection, are renewed. The internal sense being unoccupied by actual sensations from the inaction of the external senses, exercises itself upon its past sensations. Of these the most strong appear the most often; and the more they are strong, the more the situations are extravagant; and for this reason it is, that almost all dreams either terrify or charm us.

That the internal material sense may act of itself, it is not necessary that the exterior senses should be absolutely in a state of repose: it is sufficient if they are without exercise. Accustomed regularly to resign ourselves to repose, we do not easily fall asleep: the body and the members, softly extended, are without motion; the eyes veiled by darkness, the tranquillity of the place, and the silence of the night, render the ear useless; alike inactive are the other senses; all is at rest, though nothing is yet lulled to sleep. In this condition, when the mind is also unoccupied with ideas, the internal material sense is the only power that acts. Then is the time for chimerical images and fluttering shadows. We are awake, and yet we experience the effects of sleep. If we are in full health, the images are agreeable, the illusions are charming; but if the body is disordered or oppressed, then we see grim and hideous phantoms, which succeed each other in a manner not more whimsical than rapid. It is a magic lanthorn, a scene of chimeras, which fill the brain, when destitute of other sensations. We remember our dreams, from the same cause that we remember sensations lately experienced; and the only difference which subsists between us and brutes is, that we can distinguish what belongs to dreams, from what belongs to our real ideas or sensations; and this is a comparison, an operation of the memory, to which the idea of time extends. While brutes, who are deprived of memory, and of this power of comparison, cannot distinguish their dreams, from their real sensations.

I presume, that in treating of the nature of man, I have demonstratively shewn that animals enjoy not the power of reflection. Now the understanding, which is the result of that power, may be distinguished by two different operations. The first is the capacity to compare sensations, and form ideas from them; the second is the faculty to compare ideas themselves, and form arguments or conclusions thereon: by the first we acquire particular ideas, or the knowledge of sensible objects; by the other we form general ideas, which are necessary for the comprehension of abstract truths. Neither of these faculties do the animals possess, because they are void of understanding; and to the first of these

operations does the understanding of the bulk of men seem to be limited.

Were all men equally capable of comparing ideas, of rendering them general, they would equally manifest their genius by new productions, always different from, and sometimes more perfect than those of others; all would enjoy the power of invention, or at least the talents for improvement. This, however, is far from being the case. Reduced to a servile imitation, the generality of men execute nothing but what they see done by others; they only think by memory, and in the same stile as others have thought, and their understanding being too confined for invention, they proceed to follow imitation.

Imagination is likewise a faculty of the mind. If, by *imagination*, we understand the power of comparing images with ideas; of giving colours to our thoughts; of aggrandizing our sensations; of perceiving distinctly all the remote affinities of objects; it is the most brilliant and most active faculty of the mind of which brutes are still more destitute than of understanding or memory. But there is another kind of imagination which depends solely upon the corporeal organs, and which we possess in common with brutes; it is that tumultuous emotion, excited by objects analogous or contrary to our appetites; that lively and deep impression of the images of objects, which is constantly and against our inclinations, renewed, and forces us to act without reflection; this representation of objects, which is more active than even their presence, exaggerates and falsifies every thing. This imagination is forever hostile to the human mind; it is the source of illusion, the parent of these passions, which, in defiance of the efforts of reason, bear us away, and expose us to a continual combat, in which we are almost always worsted.

HOMO DUPLEX.

The interior man is double, being composed of two principles different in their nature, and contrary in their action. The soul, that principle of all knowledge, is perpetually opposed by another purely material principle. The former is a pure light, accompanied with

serenity and peace, a salutary source, whence flow science, reason, and wisdom; the latter is a false light, which never shines but in the midst of darkness and hurricane, an impetuous torrent fraught with error and passion.

The animal principle is first developed. As it is altogether material, and consists in the duration of vibrations, and the renovation of impressions formed in the internal material sense, by objects analogous, or contrary to our appetites, it begins to act as soon as the body is capable of feeling pain or pleasure. The spiritual principle manifests itself much later, and is developed and perfected by means of education; it is by the communication of the thoughts of others that the infant becomes a thinking, a rational being; and without this communication it would be fantastic or stupid, according to the degree of activity or inactivity of its internal material sense.

Let us consider a child, when at liberty, and far from the eye of his master. By his exterior actions we may judge of what passes within him. A stranger to thought or reflection, he acts without reason; treads with indifference through all the paths of pleasure; obeys all the impressions of exterior objects; amuses himself like a young animal, in running and bodily exercise; all his actions and motions are without order, or design. Called on by the person who has taught him to think, he composes himself, directs his actions, and proves that he has retained the thoughts which have been communicated to him. In infancy, the material principle is predominant, and would so continue, were not education to develop the spiritual principle and to put it in motion.

The existence of these two principles is easily discovered. In life there are moments, nay, hours and days, in which we may not only determine of the certainty of their existence, but also of the contrariety of their action. I allude to those periods of languor, indolence, or disgust, in which we are incapable of any determination, when we wish one thing and do another; I mean that state, or distemper, called *vapours*; a state to which idle persons are so peculiarly subject. If in this situation we observe ourselves, we shall appear as divided into two distinct beings, of which the first, or

the rational faculty, blames every thing done by the second, but has not strength sufficient effectually to subdue it; the second, on the contrary, being formed of all the illusions of sense and imagination, constrains, and often overwhelms the first, and makes us either act contrary to our judgment, or remain inactive, though disposed to action by our will.

While the rational faculties reign, we are calmly occupied with ourselves, our friends, and affairs. But when the material principle prevails, we devote ourselves with ardour to dissipation, to all the pursuits and passions it creates; and are hardly capable of reflecting upon the very objects by which we are so engrossed. In both these states we are happy; in the former we command with satisfaction, and in the latter, we are still more pleased to obey. As only one of these principles is then in action, and acts without opposition from the other, we feel no internal contrariety; our self appears to be simple, because we experience but one impulse. In this unity of action consists our happiness; for, whenever our reason condemns our passions, or, from the violence of our passions, we attempt to discard reason, from that minute we cease to be happy; the unity of our existence, in which consists our tranquillity, is destroyed; the internal contrariety commences, and the two contending principles are manifested by doubts, inquietude and remorse. Of all states, that is the most unhappy in which these two sovereign powers of human nature are both in full motion, and produce an equilibrium. Then it is man feels that horrible disgust which leaves no desire but that of ceasing to exist, no power but to effect his own destruction, by coolly plunging into himself the weapons of despair and madness. What a state of horror! in its blackest colours it is here presented; but by how many gloomy shades must it be preceded? all the situations approaching an equilibrium must necessarily be accompanied with melancholy, irresolution, and unhappiness. From these internal conflicts the body suffers; and from the agitation it undergoes, languishes and decays.

The happiness of man consists in the unity of his internal existence. In infancy he is happy, for then the material principle rules alone and acts almost continually. Constraints, remonstrances, and

even chastisements, affect not the real happiness of children, but are only accompanied with a momentary sorrow, for as soon as they find themselves at liberty they resume all the activity and gaiety which the vivacity and novelty of their sensations can give them. If a child was left to himself he would be completely happy, but this happiness would cease and be productive of misery ever after; it is, therefore, necessary that he should be constrained, though it gives him a momentary grievance, as it is, in fact, a prelude to all his future happiness in life.

In youth, when the spiritual principle begins to act, and is capable of conducting us, a new material sense appears, which assumes an absolute sway over our faculties, the soul itself seems with pleasure to incline to the impetuous passions which it produces. The material principle has, then, more power than ever, for it not only effaces reason but perverts it, and uses it for its own gratification. We only think and act to encourage and to gratify some passion; and while this intoxication lasts we are happy. The external contradictions, and difficulties, seem to render the unity of the interior existence still more firm; they fortify the passion, and fill up the languid intervals; they call forth our pride, and direct all our views towards one object, all our powers towards effecting one end.

But this happiness passes away as a dream; the charm disappears, disgust ensues, and a horrid vacuity of sentiment succeeds. Hardly, on rousing from this lethargy, is the soul capable of distinguishing itself; by slavery it has lost its strength, and the habit of commanding; of that slavery it even regrets the privation, and longs for another master, a new object of passion, which presently disappears in its turn, and is followed by another passion more transitory still. Thus excess and disgust succeed each other; pleasure flies, the organs decay, and the material sense, instead of commanding, has no longer strength to obey. After a youth like this, what is there left for a man? A body enervated, a mind enfeebled, and the inability to make use of either.

It is remarked, that at the middle period of life men are chiefly subjected to those languors, or vapours. At this period we still run

after the pleasures of youth, not from an absolute propensity but from habit. In proportion as we advance in years, our ability for the enjoyment of pleasure decreases, and so often are we humiliated by our own weakness, that we cannot help condemning our actions and desires.

Besides, it is at this age that the cares and solicitudes of life begin; we then, whether by accident or by choice, assume a certain character which it is alway disgraceful to abandon, and dangerous to support. Full of pain, we tread between contempt and hatred, two rocks alike formidable; by the efforts we make to avoid them we weaken our powers, and sink into despondency, for after having experienced the injustice of mankind, we contract a habit of accounting it a necessary evil; when we have accustomed ourselves to have less regard for the opinions of the world than for our own repose, and when the heart, hardened by the wounds it has received, has become insensible, we easily attain that state of indifference, that indolent tranquillity, of which, a few years before, we should have been ashamed. Glory, that powerful motive of great souls, which seen at a distance appears as the most desirable object, and excites us to perform great and useful actions, loses its attractions upon a near approach. Sloth assumes the place of ambition, and seems to present to us paths less rugged, and advantages more substantial; but it is preceded by disgust, and followed by discontent, that gloomy tyrant of every thinking mind, against which wisdom has less influence than folly.

It is, therefore, from being composed of two opposite principles, that man has so much trouble to be reconciled with himself; and hence proceeds his inconstancy, irresolution, and languor. Brute animals, on the contrary, whose nature is simple, and altogether material, experience no interior combats, no compunctions, no hopes, nor any fears.

If we were divested of memory, understanding, and every faculty belonging to the soul, the material part alone would remain, which constitutes us animals, and we should still have wants, sensations,

appetites, pain, pleasure, and even passion; for what is passion but a strong sensation, which may be renewed at every instant?

But the great difficulty is to distinguish the passions which belong solely to man, from those which he possesses in common with the brutes. Is it certain, or probable, that the latter have passions? Is it not, on the contrary, allowed, that every passion is an emotion of the soul? Ought we, therefore, to search any where else, but in this spiritual principle, for the seeds of pride, envy, ambition, avarice, and of every other passion by which we are governed?

To me it appears, that nothing which governs the mind forms any part of it; that the principle of knowledge is not the principle of sentiment; that the seeds of the passions is in our appetites; that illusions proceed from our senses, and reside in our internal material sense; that the mind is at first passive with respect to them; that when it countenances them, it is subdued, and when it assents to them, it is perverted.

Let us then distinguish in the human passions, the physical from the moral; that is, the cause from the effect. The first emotion is in the internal material sense; this the mind may receive but cannot produce. Let us likewise distinguish momentary from durable emotions, and we shall immediately perceive, that fear, horror, rage, love, or rather the desire of enjoyment, are sensations which, though durable, depend solely on the impressions of objects upon our senses, combined with the remaining impressions of our preceding sensations; and that, of consequence, those passions we enjoy in common with the brutes. I mention the actual impressions of objects, as being combined with the impressions that remain of our former sensations, for neither to man nor beast nothing is horrible, nor attractive, when seen for the first time. Of this we have proof in young animals, who will run into the fire the first time it is presented to them. By reiterated acts, of which the impressions subsist in their internal sense, do they alone acquire experience; and though this experience is not natural, it is not less sure, and is even on that account more circumspect. A violent motion, a great noise, an extraordinary figure, which is seen or heard suddenly, and for the

first time, produces in the animal a shock of which the effect is similar to the first movements of fear. But this sentiment is only instantaneous; for as it cannot be combined with any preceding sensation, so it must communicate to the animal a transitory vibration, and not a durable emotion, such as the passion of fear supposes.

A young and peaceful tenant of the forests, who suddenly hears the sound of the huntsman's horn, or the report of a gun, leaps, bounds, and flies off, by the sole violence of the shock which it has experienced. Yet if this noise is without effect and ceases, the animal distinguishing the wonted silence of Nature, composes itself, halts, and returns to its tranquil retreat. But age and experience render it circumspect and timid, and having been wounded after a particular noise, the sensation of pain is retained in its internal sense, and when the same noise shall be again heard, it is renewed, combines itself with the actual agitation, and produces a permanent passion, a real fear; the animal flies with all its might, and frequently never returns to its usual abode.

Fear, then, is a passion of which brute animals are susceptible, though they have not, like us, rational or foreseen apprehensions. Of horror, rage, and love, they are also susceptible; but they have not our aversions, founded on reflection, our durable hatreds, or our constant friendships. These passions in brutes imply no knowledge, no ideas, and are founded solely on the experience of sentiment, or repetitions of pain and pleasure, and renovation of preceding sensations of the same kind. Fury, or natural courage, is remarkable in animals which have experienced and ascertained their strength, and found it superior to ours; fear is the portion of the weak, but love belongs to all. Love! thou innate desire! thou soul of nature! thou inexhaustible principle of existence! thou sovereign power, by which every thing breathes, and every thing is renewed! thou divine shame! thou seed of perpetuity infused by the Almighty into all which has the breath of life! thou precious sentiment, by which alone the most savage and frozen hearts are softened! thou first cause of all happiness, of all society! thou fertile source of every pleasure, of

every delight! Love! why dost thou constitute the felicity of every other being, and bring misery alone to man?

The reason is obvious. Considered in a physical sense, this passion is good; in a moral one, it is attended with every evil. In what does the morality of love consist? in vanity; vanity in the pleasure of conquest, an error which proceeds from our putting too high a value upon it; the vanity of desiring exclusive possession, of which jealousy, a passion so base that we are ashamed to own it, is the constant attendant; vanity in the very mode of enjoying, or even relinquishing the object of our desires, if the wish of separation originates with ourselves; but if, instead of forsaking, we are forsaken by the beloved object, the humiliation is dreadful! and the discovery that we have been duped and deceived, not unoften hurries us into despair.

From all these miseries brutes are free. They seek not to obtain pleasure where it is not to be found: guided by sentiment alone, they are never deceived in their choice; their desires are always proportioned to their power of gratification; they feel as much as they enjoy, and seek not to vary or anticipate them. But Man, in striving to invent pleasure, only depraves nature; in struggling to create sentiment, he perverts the intention of his being, and creates in his heart a vacuum which nothing can afterwards fill.

Every thing good in love belongs to the brutes as well as to man, and even they, as if this sentiment could never be pure, seem to have a small portion of jealousy. Among us, this passion always implies some distrust of ourselves, some distant knowledge of our own weakness, while brutes are never jealous but in proportion to their strength, ardour for, and propensity to pleasure. The reason is, that our jealousy depends on our ideas, and theirs on sentiment. Having once enjoyed, they desire to enjoy again; and feeling their strength, they drive away all that would occupy their place. Their jealousy is without reflection, they turn it not against the object of their love: of their pleasures alone are they jealous.

But are animals confined merely to those passions we have described? Are fear, rage, horror, love, and jealousy, the only durable affections they are capable of experiencing? To me it appears that, independent of these passions, which arise from their natural feelings, they have others, which are communicated to them by example, imitation, and habit. They have a kind of friendship, pride, and ambition, and though we may be convinced, that in all their operations there is neither reflection nor thought, yet as all their habits seem to imply some degree of intelligence, and to form the shade between them and man, it requires, in a peculiar manner, our strict examination.

Is there any thing exceeds the attachment of the dog to its master? On the grave that contained his dust has this animal been known to breathe its last. But (without quoting prodigies or heroes) with what fidelity does he accompany, follow, and defend his master! With what eagerness does he solicit his caresses! With what docility does he obey him! With what patience does he suffer his bad humours, and his frequently unjust corrections! With what mildness and humility does he endeavour to be restored to favour! What emotion and anxiety does he express when his master is absent! and what joy when he returns!—From all these circumstances it is possible not to distinguish true marks of friendship? Even among the human species it is expressed in characters of superior energy.

This friendship is the same as that of a female for her favourite bird, or of a child for its play-thing. Both are equally blind and void of reflection; that of the animal is more natural, since it is founded on necessity, while that of the other is only an insipid amusement, in which the mind in no degree partakes These childish habits subsist merely by idleness, and are more or less strong as the brain is more or less vacant.

Real friendship, however, supposes the power of reflection; it is of all attachments the most worthy of man, and the only one by which he is not degraded. Friendship flows from reason alone. It is the mind of a friend which we love, and to love a mind it is necessary to have one, and to have made use of it in the attainment of

intelligence, and in comparing the congeniality of different minds. By friendship, then, not only is implied the principle of knowledge, but also, from reflection, the actual exercise of that principle.

Thus, while friendship belongs solely to man, attachment may be possessed by animals; as sentiment alone is sufficient to attach them to persons whom they often see, and by whom they are fed and nourished. The attachment of females to their young is produced by the trouble they have had in carrying them in the womb, and in producing and giving them suck. If, among birds, some males seem to have an attachment to their young, and to take care of the females while they are sitting, it is because they have been employed in the construction of the nest, and continue to enjoy pleasure with their females long after impregnation. Among other animals, with whom the season of love is short, that elapsed, the male is no longer attached to the female; where there is no nest, no employment, in which they may be mutually engaged, the fathers, like those of Sparta, have no care for their progeny.

The pride and ambition of animals proceed from their natural courage; that is, from their sense of their strength, agility, &c. Large ones hold the small in defiance, and seem to contemn their insulting audacity. This courage may also be improved by instruction, for, reason alone excepted, of every thing are brute animals susceptible. In general they will learn to perform the same action a thousand times; to do without intermission what they did by intervals; to continue for a length of time what they at first ended in a moment; to do cheerfully what at first was the effect of force; to do by habit what they once have done by chance; and to perform of themselves what they have seen done by others. Of all the operations of the animal machine imitation is the most admirable. It is its most delicate and most extensive mobile, and exhibits the truest copy of thought, and though the cause of it in animals is altogether material, yet by its effects our wonder is excited. Men never more admire an ape than when they see it imitate the actions of men. In fact it is not easy to distinguish some copies from some originals. Besides, there are so few who can distinctly perceive the difference between a reality and

a counterfeit, that to the bulk of mankind an ape must always excite astonishment.

Though apes have the art of imitating the actions of men, they are not a degree superior to other brutes, who all more or less possess the talent of imitation. In most animals this talent is confined to the imitation of their own species; but the ape, though he belongs not to the human species, copies many of our actions; and this he is enabled to do from his organization being somewhat similar. So nearly, indeed, do they sometimes carry the resemblance, that many have ignorantly ascribed that to genius and intelligence, which is nothing but a gross affinity of figure and organization.

It is from the relations of motion that a dog learns the habit of its master, from the relations of figure that the ape counterfeits the gestures of a man, and from the relations of organization, that one bird repeats airs of music and another imitates speech, which forms the greatest external difference between man and man, as between man and other animals, since language in some indicates a superior understanding and an enlightened mind, in others it barely discovers a confusion of borrowed ideas, and in the idiot, or the parrot, it indicates the last degree of stupidity, plainly shewing their incapacity for reflection, although they may possess every necessary organ for expressing what passes within.

With ease may it be rendered apparent, that imitation is a mere mechanical effect, of which the perfection depends on the vivacity with which the internal material sense receives the impression of objects, and on the facility of expressing them by the similitude and the flexibility of the exterior organs. Persons whose senses are delicate and easily agitated, whose members are active and obedient, make the best actors, the best mimics, the best apes. Children, without perceiving it, imitate the habits, gestures, and manners of those they live with; they have also a great propensity to repeat, and to counterfeit every thing they hear and see. Young persons who see nothing but by the corporeal eye, are wonderfully ready in perceiving ridiculous objects: every fantastic form affects, every representation strikes, every novelty moves them. The

impression is so strong, that they relate them with transport and copy them with facility and grace. In a superior degree do they enjoy the talent of imitation, which supposes the most perfect organization, and to which nothing is more opposite than a large portion of good sense.

Thus, among men, those who reflect least are the most expert at imitation: and therefore it is not surprising that we meet with it in animals, who have no reflection. These ought to possess it in a higher degree of perfection, because they have nothing within them to counteract it; no principle by which they may have the desire to be different from each other. Among men, it is from the mind that proceeds the diversity of our characters, and the variety of our actions. Brute animals, by having no mind, have not that *self* which is the principle of the difference, the cause which constitutes the individual. Of necessity, then, when their organization is similar, or they are of the same species, they must copy each other, do the same things in the same manner, and imitate each other with a greater degree of perfection than one man can imitate another. This talent for imitation, therefore, far from implying that animals have thought and reflection, is a proof that they are absolutely destitute of both.

For the same reason it is that the education of animals, though short, is always attended with success. Almost every thing the parent knows they quickly learn by imitation. The young are modelled by the old: they perceive the latter approach or fly, when they hear certain sounds, when they see certain objects, or smell certain odours; at first they approach or fly without any determinative cause whatever, but imitation; and afterwards they approach or fly of themselves, in consequence of their having acquired a habit of doing so whenever they feel the same sensations.

Having compared man with the brute animal, taken individually, let us now compare them together collectively, and endeavour at the same time to ascertain the source of that kind of industry which we observe in certain species of animals, and those even the meanest and the most numerous. For this industry, what encomiums have not

been bestowed on particular insects. The wisdom and talents of the bee, observers speak of with admiration; they are said to possess an art peculiar to themselves, that of perfect government. A beehive, they add, is a republic, in which the labour of each individual is devoted to the public good, in which every thing is ordered, distributed, and shared, with a foresight, an equity, and a prudence, which is really astonishing. The government and policy of Athens itself, were not more exemplary. But I should never have done, were I barely to skip over the annals of this commonwealth, and to draw from the history of this insect all the incidents which have excited the admiration of its different historians.

What can we think of the excess to which the eulogiums on this animal have been carried? Among other great qualities they are said to possess the most pure republican principles, an ardent love for their country, a disinterested assiduity in labouring for the public good, the strictest economy, the most perfect geometry and elegant architecture. Notwithstanding these eulogies, a bee ought to hold no greater rank in the estimation of naturalists than it does in nature; and, in the eye of reason, this marvellous and so much extolled republic will never be any thing more than a multitude of small animals, which have no affinity to man but that of furnishing him with wax and honey.

Let people examine with attention their little man[oe]uvres, proceedings, and toils; let them describe exactly their generation, their multiplication, their metamorphoses, &c.—These are objects worthy of the attention of a naturalist; but to hear the morals of insects cried up is insufferable; and I am fully convinced, that by a strict and rational observer it would be found, that the origin and superstructure of the various wonderful talents ascribed to bees, arises from the mother bee producing 10,000 individuals at one time, and in the same place, which necessarily obliges them to arrange themselves in some order for the preservation of their existence. Is not Nature sufficiently astonishing of herself, without attempting to render her more so, and without attributing to her miracles which have no existence but in our own imagination? Is not the Creator sufficiently great by his works; and do we believe we can render him

more so by our weakness? This, were there a possibility, would be the way to debase him. Who, in effect, has the most exalted idea of the Supreme Being, he who beholds him create the universe, arrange every existence, and establish nature on invariable and perpetual laws; or he who sees him attentive in conducting a republic of insects?

Certain animals unite into societies, which seem to depend on the choice of those that compose them, and which of consequence has in it a far greater degree of intelligence and design than the society of bees, of which the sole principle is physical necessity. Elephants, beavers, apes, and many other species of animals, assemble together in bodies, assist, and defend each other. Did we not so often disturb these societies, and could we observe them with as much ease as those of the bees, we should, doubtless, meet with a multitude of other wonders; which still, however, would amount to nothing more than so many physical relations. A great number of animals, of the same species, being assembled in the same place, there will necessarily result a certain arrangement, and a certain order of common habits. Now every common habit, far from having enlightened intelligence for its cause, implies nothing more than a blind imitation.

Among men, society depends less on physical agreements than on moral relations. Man at first measured his strength, his weakness, his ignorance and his curiosity; he felt that, of himself, he could not satisfy the multiplicity of his wants; he discovered the advantage he should have in society; he reflected on the idea of good and evil, he engraved it in his heart, by the help of the natural light communicated to him through the bounty of the Creator; he saw that solitude was a state of danger, and of warfare; he sought for security and peace in society; there he augmented his power and knowledge, by uniting them with those of others: and this union is the noblest use he ever made of his reason. Solely from governing himself, and submitting to the laws of society, it is that man commands the universe.

Every thing has concurred to render man a social being; for though large and civilized societies depend on the use, and sometimes on the abuse of reason, yet they were doubtless preceded by smaller societies, whose sole dependence was on nature. A family is a natural society, which is more permanent, and better founded, because their wants and sources of attachment are more numerous. Far different is man from other animals: when he is born he hardly exists; naked, feeble, incapable of action, his life depends on the assistance he receives. This state of infantine weakness continues for a length of time; and the necessity of assistance becomes a habit, which alone is sufficient to produce an attachment between the child and parent. In proportion as the child advances, he is enabled to do without assistance; the affection of the parent continues, while that of the child daily decreases; and thus love ever descends in a much stronger degree than it ascends: the attachment of the parent becomes excessive, blind, idolatrous, while that of the child remains cold and indifferent, till, by the influence of reason, the seed of gratitude has begun to take root.

Thus society, considered even in the light of a single family, supposes in man the faculty of reason; among animals which seem to unite together freely, and by mutual agreement, society supposes experience and sentiment; and among insects which, like the bees, assemble together involuntarily, and without design, society implies nothing; and whatever may be the effects of such associations, it is evident, they were neither foreseen, nor conceived by those that execute them, and that they depend solely on the universal laws of mechanism, established by the Creator.

Let the panegyrists of insects say what they will in their favour, those animals which, in figure, and organization, bear the strongest resemblance to man, must still be acknowledged superior to all others, with respect to internal qualities; and, though they differ from those of man, though, as we have evinced, they are nothing but the effects, exercise, experience, and feeling, still are they, in a high degree, superior to insects. As in every thing that exists in nature there is a shade, a scale may be established for determining the degrees of the intrinsic qualities of each animal, by which, when

opposed with the material part of man, we shall find the preference due to the ape, the dog, the elephant, and, in different degrees, to all the other quadrupeds. Next to them will rank the cetaceous animals, which, like the quadrupeds, have flesh and blood, and, like them, are viviparous. In the third class will be the birds, because they differ more from man than either the quadrupeds, or the cetaceous animals; and, were it not that there are beings which, like the oyster and the polypus, seem to differ from him as much as is possible; the insects would occupy the lowest class of animated beings.

But if animals are destitute of all understanding, all memory, and all intelligence; if all their faculties depend on their senses, and are confined to their experience; whence proceeds that foresight we remark in several of them? By sentiment alone can they be prompted to provide in the summer provisions sufficient for their subsistence during winter. Does not this suppose a comparison of seasons, a rational inquietude concerning their future support? Why should birds build nests if they did not know that they should have occasion for them to deposit their eggs, and to rear their young?

Admitting the truth of these, and many other circumstances which might be produced; admitting that they are so many proofs of presentiment, of foresight, and even a knowledge of futurity, in animals, must it follow, on that account that they are intelligent beings? Were this the case their intelligence would far surpass our own, for our foresight is always conjectural. Our notions, with respect to futurity, are, at best, doubtful; and all the light we have is founded on probabilities of future things. Brute animals, then, who see the future with certainty, since they determine beforehand and are never deceived, must have within them a principle of knowledge greatly superior to man, must have a soul far more penetrative and acute, a consequence, which, I presume, is equally repugnant to religion and to reason.

By an intelligence similar to that of man it is impossible that brutes can have any certain knowledge of futurity, since in that respect, his ideas are always imperfect, and full of doubt. Then why, on such slight grounds, invest them with a quality so sublime? Why,

without necessity degrade the human species? Is it not unreasonable to attribute their source to mechanical laws, established, like all the other laws of Nature, by the will of the Creator? The certainty with which brutes are supposed to act, and be determined, might alone convince us, that every thing they do is merely mechanical. The essential characteristics of reason are, doubt, deliberation, and comparison; but motions and actions, which announce nothing but decision and certainty, exhibit at once a proof of mechanism and stupidity.

Previous, however, to the full admission of these asserted facts, which seem to lessen those ideas we ought to maintain of the power and will of our Divine Creator, ought we not to enquire whether they really exist, or have sufficient ground to support the supposition? The boasted foresight of ants in collecting sustenance for the winter is an evident error, since it has been found that during that season they remain in a torpid state; therefore, this pretended foresight, supposes them to provide that which it also must have informed them would be entirely necessary. Is not the sensation that they enjoy their food with more quiet and tranquillity in their fixed residence, alone sufficient to account for their conveying thither more than they can possibly make use of? The same applies to bees, in collecting more wax and honey than their necessities require. Does not this evince they are actuated by feeling, and not intelligence, especially if we reflect that if it proceeded from former experience, that would teach them to decline such unnecessary labour; which so far from being the case, they continue to extract wax and honey as long as there is a succession of fresh flowers, and were it possible to continue that their labours would never cease.

Field-mice have also been instanced, whose abodes are generally divided; in one hole they deposit their young, in the other their food, the latter of which they constantly fill; but here it should be observed that when they provide those apartments for themselves, the latter are always small, yet if they find a large hole under a tree which they chuse for their abode, they fill that also; a fact which renders it clear they have no intelligence of the nature of their wants,

but are guided by the capacity of the place they select for depositing their food.

From the same cause may be traced the pretended foresight attributed to the feathered race; nor is it necessary to suppose the Almighty has conferred on them any particular law to account for the construction of their nest. Love is the grand sentiment that excites them to the laborious undertaking; the male and female feel a mutual attachment, they wish to be alone, and therefore seek retirement from the bustle and annoyances of the world; and having sought the most obscure part of a forest, to render that privacy the more comfortable they collect straws, leaves, &c. to form a common habitation, wherein they may enjoy themselves with perfect tranquillity. Some, however, content themselves with holes in trees, or nests they find which have been formed by others. But all this does not prove a presentiment of future wants, but are rather the effects of feeling and organization. A strong evidence of their ignorance with respect to futurity, nay, even of the past, or present, may be drawn from a hen's not having the power to distinguish her own from the eggs of another bird, and not perceiving that the young ducks which she has hatched, belong not to her; nay, she will even sit with the same assiduous attention upon chalk eggs, as upon those from which a produce may be expected. Neither do domestic poultry make nests, although they are constructed by the wild duck and wood hen, and this most probably from feeling that security in being familiarized, which the latter seek for in a retreat and solitude. The nests of birds, therefore, in my opinion, any more than the cells of bees, or the food collected by the ant and field-mouse, cannot be attributed to any particular laws to each species, but depend upon those feelings arising from the general laws of nature, and with which every animated being is endowed.

It is not surprising that man, who knows so little of himself, who so frequently confounds his sensations with his ideas, who so imperfectly distinguishes the productions of the mind from the produce of his brain, should compare himself to the brute animals, and admit the only difference between them depended on the greater or less degree of perfection in the organs; it is not surprising

that he should make them reason, determine, and understand, in the same manner with himself, and that he should attribute to them not only the qualities which he has, but even those he has not. When man, however, has once thoroughly examined and analyzed himself, he will discover the dignity of his being, he will feel the existence of his soul, he will cease to demean his nature, and, with a single glance, he will see the infinite distance which the Supreme Being has put between him and the brutes.

God alone knows the past, the present, and the future; eternal is his existence, and infinite is his knowledge. Man, whose duration is but for a few moments, perceives but those moments: by a living and immortal Power are those moments compared, distinguished, and arrayed; and That Power it is which enables man to know the present, judge of the past, and foresee the future. Deprive him of this divine light and you deface and obscure his being, you render him merely an animal, ignorant of the past, without conception of the future, and barely affectable by the present.

CHAPTER II.
OF DOMESTIC ANIMALS.

Man changes the natural state of animals by forcing them to obey, and render him service: a domestic animal is a slave to our amusements or operations. The frequent abuses he suffers, and the forcing him from his natural mode of living, make great alterations in his manners and temper, while the wild animal, subject to nature alone, knows no other laws than those of appetite and liberty. The history of a wild animal is confined to a few facts drawn from simple nature; but the history of a domestic animal is complicated with all the artful means used to tame and subdue his native wildness: and not knowing how far example, constraint, or custom, may influence animals, and change their motions, determinations, and inclinations,

the design of the naturalist ought to be to distinguish those facts which depend on instinct, from those which are owing to their mode of education; to ascertain what appertains to them from what they have acquired; to separate what is natural for them from what they are made to do; and never to confound the animal with the slave, the beast of burden with the creature of God.

The empire which man has over animals is an empire which revolution cannot overthrow; it is the empire of the spirit over matter; a right of nature, a power founded on unalterable laws, a gift of God, by which man may at all times discern the excellence of his being, for he does not rule them, because he is the most perfect, strongest, or the most dexterous of animals. If he was only the first rank of the same order, the others would unite to dispute the empire with him, but it is from the superiority of his nature that man reigns and commands: he thinks, and for this reason is master over beings that are incapable of thinking. He reigns over material bodies because they can only oppose to his will a sullen resistance, or an inflexible stupidity, which he can always overcome, by making them act against each other. He is master of the vegetable creation, which by his industry he can augment, diminish, renew, multiply, or destroy. He maintains a superiority over brutes, because like them he not only has motion and sensation, but possesses also the light of reason; governs his actions, concerts his operations, and overcomes force by cunning, and swiftness by perseverance. Nevertheless, among animals some appear familiar, others savage and ferocious. If we compare the docility and submission of the dog with the cruelty and ferocity of the tiger, the one will appear to be the friend of man, the other his enemy: his empire, then, over animals is not absolute. Many species can escape his power by the rapidity of their flight, by the obscurity of their retreats, and by the elements they inhabit. Others escape him from their minuteness, while others, who, far from respecting their sovereign, openly attack him. Besides these, he is insulted by the stings of insects, poisonous bites of serpents, and teased with many other unclean, troublesome, and useless creatures, that seem only to exist to form a shade between good and

evil, and to make man comprehend how little respectable his fall has made him.

But we must distinguish the empire of God from the domain of man: God, the Creator of all beings, is the sole master of nature. Man has no influence on the universe, the motions of the heavenly bodies, nor the revolutions of the globe which he inhabits; over animals, vegetables, or minerals, he has no general dominion; he can do nothing with species, his power only extends to individuals; for species in general, and matter in the gross, belong to, or rather constitute nature. All things pass away, follow, succeed, decay, or are renewed, by an irresistible power. Man, dragged on by the torrent of time, cannot prolong his existence; his body being linked to matter, he is forced to submit to the universal law; he obeys the same power, and, like the rest, comes into the world, grows to maturity, and dies.

But the divine ray with which man is animated ennobles and raises him above all other material beings. This spiritual substance, far from being subject to matter, has the power of making it obey; and though it cannot command all Nature, it presides over particular beings; God, the sole source of all light and understanding, rules the universe and the species with infinite power; man, who possesses only a ray of this spiritual substance, has a power limited to small portions of matter and individuals.

It is by the talent of the mind, then, and not by force, and the other qualities of matter, that man has been enabled to subdue animals. In the first ages they were all equally independent; man, after he became guilty and ferocious, was very unfit to deprive them of liberty. Before he could approach, know, make choice of, and tame them, it was necessary that he should be civilized himself, to know how to instruct and command; and the empire over animals, like every other empire, was not founded till after society was instituted.

It is from society that man derives his power: from that he perfects his reason, exercises his genius, and unites his strength.

Previous to the union of society man was perhaps the most savage, and the least formidable of all creatures; naked, defenceless and without shelter, the earth to him was only a vast desert peopled with monsters, of which he frequently became the prey; and even long after, history informs us, that the first heroes were only the destroyers of wild beasts.

Engraved for Barr's Buffon

Fig. 18 *Horse*
Fig. 19 *Ass*

But when the human race multiplied, and spread over the earth, and when, by the aid of the arts and society, man was able to conquer the universe, he by degrees lessened the number of ferocious beasts, he purged the earth of those gigantic animals of which we sometimes still find the enormous bones; he destroyed, or reduced to a small number, every hurtful and voracious species; he opposed one animal to another, and conquered some by fraud, others by force; and attacking them by every rational method he arrived at the means of safety, and has established an empire which is only bounded by inaccessible solitudes, burning sands, frozen mountains, and obscure caverns, which now serve as retreats for the small number of species of ferocious animals that remains.

THE HORSE.

The noblest conquest ever made by man over the brute creation, is the reduction of this spirited and haughty animal (*fig. 18.*), which shares with him the fatigues of war, and the glory of victory. Equally intrepid as his master, the horse sees the danger, and encounters death with bravery; inspired at the clash of arms, he loves it, and pursues the enemy with the same ardour and resolution. He feels pleasure also in the chace, and in tournaments; in the course he is all fire; but equally tractable as courageous, he does not give way to his impetuosity, and knows how to check his natural and fiery temper. He not only submits to the arm which guides him, but seems to consult the desires of his rider; and always obedient to the impression he receives, he presses on, or stops, at his rider's pleasure. The horse is a creature which renounces his very being for the service of man, whose will he even knows how to anticipate, and execute by the promptitude of his movements: he gives himself up without reserve, refuses nothing, exerts himself beyond his strength, and often dies sooner than disobey.

Such is the horse, whose talents and natural qualities art has improved, and who with care has been tutored for the service of man; his education commences with the loss of his liberty, and is finished by constraint. The slavery or servitude of the horse is so universal, and so ancient, that we rarely see him in his natural state. They are always covered with harness when at work, and not wholly free from their bands even in time of rest. If they are sometimes suffered to range in the fields, they always bear about them marks of servitude, and frequently the external impressions of labour and of pain: the mouth is deformed by the wrinkles occasioned by the bit, the sides scarred with wounds inflicted by the spur, and the hoofs are pierced with nails. The attitude of the body constrained by the impression of habitual shackles, from which they would be delivered in vain, as they would not be more at liberty. Even those whose slavery is the most gentle, who are only fed and broke for luxury and magnificence, and whose golden chains only serve to satisfy the vanity of their masters, are still more dishonoured by the elegance of their trappings, and by the plaits of their manes, than by the iron shoes of their feet.

Nature is more beautiful than art, and in an animated being, the freedom of its movements makes its existence more perfect. Observe the horses in Spanish America, which have multiplied so fast and live in freedom; their motions seem neither constrained nor regular; proud of their independence, they fly the presence of man, and disdain his care; they seek and find for themselves proper nourishment; they wander and skip about in immense meadows, where they feed on the fresh productions of a perpetual spring. Destitute of any fixed habitation, without any other shelter than a mild sky, they breathe a purer air than those which are confined in vaulted palaces. Hence wild horses are stronger, swifter, and more nervous than the greater part of domestic ones; they have strength and nobleness, the gifts of nature; while the others have address and gracefulness, which is all that art can give.

The natural disposition of wild horses is not ferocious, they are only high-spirited and wild. Though superior in strength to the greatest part of animals, they yet never attack them; and if attacked

by others, they either disdain them as foes, and fly out of their way, or give a fatal blow with their heels. They unite themselves in troops, merely for the pleasure of being together, for they have no fear of, but an attachment for each other. As grass and vegetables are sufficient for their nourishment, they have quite enough to satisfy their appetites; and as they have no relish for the flesh of animals, they never make war with them, nor with themselves. They never quarrel about their food, they have no occasion to ravish prey from each other, the ordinary source of contention and quarrels among carnivorous animals. They live in peace because their appetites are simple and moderate, and having enough there is no object for envy.

All these circumstances may be observed in young horses which are brought up and led together in droves; their manners are gentle, and their tempers social; they seldom shew their ardour and strength by any other sign than emulation. They endeavour to be foremost in the course, are animated to brave danger, in crossing a river or leaping a ditch: and those which in these natural exercises set the example, it has often been observed, when reduced to a domestic state, are the most generous, docile, and gentle.

Several ancient authors speak of wild horses. Herodotus says, that on the banks of the Hypanes, in Scythia, there were wild horses quite white, and that in the northern parts of Thrace, beyond the Danube, there were others covered with hair five inches long. Aristotle also cites Syria; Pliny the northern countries; Strabo, the Alps and Spain; as places where wild horses were to be found. Among the moderns, Carden mentions the same thing of Scotland and the Orkneys; Olaus, of Muscovy; Dapper, of the Isle of Cyprus, which, as he says, contained wild horses very beautiful, of great strength and swiftness; Struys, of the Isle of May, one of the Cape de Verds, where he found wild horses very small. Leo the African also relates that there were wild horses in the desarts of Arabia and Lybia; and he assures us, that he saw in the remotest parts of Numidia a white colt with a curled mane. Marmol confirms this fact, asserting, that wild horses are found in the desarts of Arabia and Lybia, small, and of an ash-colour; others white whose manes and coats are short and rough; and that neither dogs nor tame horses

can equal them in swiftness; we read also, in the Letters Edifiantes, that in China there are wild horses of a very small size.

As almost all parts of Europe are at present peopled, and equally inhabited, wild horses are no longer found therein. Those in America originate from European tame horses, transported thither by the Spaniards; and have multiplied considerably in the vast desarts of this country. The astonishment and fear which the inhabitants of Mexico and Peru expressed at the sight of horses and their riders, is a strong presumption that this animal was entirely unknown in the New World. The Spaniards carried thither a great number, as well for service as to propagate the breed. They left them on many islands, and even let them loose on the continent, where they have multiplied like other wild animals. M. la Salle, in 1685, saw in the northern parts of America, near the bay of St. Louis, whole troops of these horses feeding in the pastures, which were so wild that no one could approach them. The author of the History of the Buccaniers, says, “That in the island of St. Domingo, horses are sometimes seen in troops of 500, all running together; that when they see a man, they all stop; and that one of them will approach to a certain distance, snorts, takes flight and is instantly followed by all the rest.” He adds, "that he does not know whether these horses, by becoming wild, have degenerated or not; but that he did not think them so handsome as those of Spain, though they are descended from the same breed. They have (continues he) large heads and limbs, and their ears and limbs are also long; the inhabitants easily tame them, and afterwards force them to work. To catch them, nooses made of ropes are spread in places where they frequent; but if they are caught by the neck they presently strangle themselves, unless assistance is near; they are then fastened by the body and legs to the trees, where they are left for two days without either food or drink. This experiment is sufficient to make them somewhat tractable, and in a little time they become as much so as if they had never been wild; and even if by chance they regain their liberty, they never become so again, but know their masters, and suffer themselves to be retaken without trouble."

This proves that horses are naturally gentle, and disposed to be familiar with man; they never seek to quit the abodes of men to recover their liberty in the forests; on the contrary, they shew great anxiety to return to their old habitations, where, perhaps they find but coarse food, always the same, and generally measured out to them with a sparing hand, without considering the strength of their appetites. Custom, however, serves them in lieu of what they lose by slavery. When worn with fatigue, the place of rest is to them the most delicious; they smell it at a distance, can even find it out in the midst of large towns, and in every thing seem to prefer slavery to liberty. The customs to which they have been forced to submit, become a second nature to them; for horses abandoned in the forests, have been known to neigh continually to make themselves heard, to gallop towards the human voice; and even to grow thin and perish in a short time, notwithstanding they were surrounded with a variety of provender. Their manners, then, almost wholly depend on their education, which is accomplished with pains and cares which man takes for no other animal, and for which he is well requited by their continual services.

It has long been the custom to separate the foals from their mothers when five, six, or seven months old; for experience has proved, that those which are suckled ten or eleven months, are not of equal value with them which are weaned sooner, though they are generally fuller of flesh. After six or seven months they are weaned; bran is then given them twice a day, and a little hay, of which the quantity is increased in proportion as they advance in age. They are kept in the stable as long as they seem to retain any desire to return to the mares; but when this desire ceases they are suffered to go out, and led to pasture; but care must be taken not to suffer them to go out to pasture fasting; they must have a little bran, and be made to drink an hour before they are suffered to graze, and should never be exposed to great cold or rain. In this manner they pass the first winter: in the May following they may be permitted to graze every day, and to remain out in the fields till the end of October, only observing not to let them eat the after-grasss, for if they are accustomed to that delicacy they will grow disgusted with hay, which

ought, however, to be their principal food during the second winter, together with bran mixed with barley or oats wetted. They are managed in this manner, letting them graze in the day time during winter, and in the night also during the summer, till they are four years old, when they are taken from the pastures, and kept on dry food. This change in food requires some precaution; for the first eight days they should have nothing but straw, and it is proper to administer some vermifuge drinks, to destroy those worms which may have been generated from indigestion and green food. M. de Gaursault, who recommends this practice, does it from experience; but at all ages, and in all seasons the stomachs of horses are stuffed with a prodigious number of worms. They are also found in the stomach of the ass; and yet neither of these animals are incommoded thereby. For this reason worms should not be looked on as an accidental complaint caused by bad digestion and green food, but rather as a common effect depending upon the nourishment and digestion of these animals.

Great attention must be paid in weaning young colts, to put them into a proper stable, not too hot, for fear of making them too delicate and too sensible of the impressions of the air. They should frequently have fresh litter and be kept very clean, by frequently rubbing them down with a wisp of straw. But they should not be tied up or curried till they are near three years old, their skin being till then too delicate to bear the comb. The rack and manger must not be too high, as the necessity of raising their heads to reach their food may give a habit of raising it in that fashion, and spoil their necks.

When about a year or eighteen months old, their tails ought to be cut, as the hair will then grow stronger and thicker. From two years old the colts should be put with the horses and the females with the mares; without this precaution, the colts would fatigue and enervate themselves. At the age of three years, or three years and a half, we may begin to make them tractable; they should at first have a light easy saddle, and wear it two or three hours every day; they should also be accustomed to have a snaffle bit in their mouths, and to have their feet lifted up and struck, to habituate them to shoeing; if designed for coach or draught horses, they should also wear a

harness. At first a curb should not be used; they may be held by a cavesson, or leather strap, and be made to trot on even ground, and with only the saddle or harness on their bodies; and when they turn easily, and willingly follow the person who holds the leather strap, the rough rider should mount him and dismount again in the same place, without making him move, till he is four years old, because before that age the weight of a man overloads him[A]; but at four years he should be made to walk or trot, a little way at a time, with the rider on his back. When a coach horse is accustomed to the harness, he should be paired with a horse that is thoroughly broke, putting on him a bridle with a strap passed through it, till he begins to be used to his duty; after this the coachman may try to make him draw, having the assistance of a man to push him gently behind, and even to give him some blows to make him do it. All this should be done before young horses have changed their food, for when once they are on grain or hay they are more vigorous, less tractable, and more difficult to break.

[A] This assertion of our author will meet with little credit in the present day, when daily practice proves they may be completely trained while rising three years, and have sufficient strength to enter the lists on the course before they are four.

The bit and the spur are two means made use of to bring them into order, the former for their guidance, and the latter to make them increase their motion. The mouth does not appear formed by nature to receive any other impressions than that of taste and appetite; but there is so great a sensibility in the mouth of a horse, that, in preference to the eyes and ears, we address ourselves to it, to make him understand our pleasure; the slightest motions, or pressure of the bit, is sufficient to inform and determine his course; and this organ of sense has no other fault than its perfection. Its too great sensibility requires particular management, for if it is abused the mouth of the horse is spoiled, and rendered insensible to the impression of the bit: the senses of sight and hearing cannot be dulled in this manner; but in all likelihood it has been found inconvenient to govern horses by these organs; besides, signs given them by the sense of feeling have more effect on animals in general

than those conveyed by the eyes or ears. The situation of the eyes of horses, with relation to those who mount or conduct them, is very unfavourable; and, though they are frequently conducted and animated by the ear, it appears that the use of this organ is limited to common horses, because in the menage they are seldom spoken to; in fact, if they are well broke the smallest pressure of the thighs, or most trifling motion of the bit, is sufficient to direct them. The spur is even useless, or at least it is only made use of to force them to violent motions; and as through the folly of the rider it often happens, that in giving the spur he checks the bridle, the horse finding himself excited on one side, and kept in on the other, only prances and capers without stirring out of his place.

By means of the bridle horses are taught to hold up their heads, and keep them in the most graceful position, and the smallest sign or movement of the rider is sufficient to make the horse shew all his different paces; the most natural is perhaps the trot, but pacing and galloping is more pleasant for the rider, and these are the two paces we particularly endeavour to improve. When the horse lifts up his fore legs to walk, this motion should be performed with spirit and ease, and the knee sufficiently bent. The leg lifted up should seem as if suspended for a moment, and when let down the foot should be firmly rested on the ground without the horse's head receiving any impression from this motion, for when the leg suddenly falls down, and the head sinks at the same time: it is usual to ease the other leg, which has not strength to support the whole weight of the body. This is a great fault, as well as that of carrying the foot too far out or in. We should also observe, that when he rests on his heel it is a mark of weakness, and when he rests on the forepart of his hoof it is a fatiguing and unnatural attitude that he cannot long support.

Though walking is the slowest of all their paces, his step should be light, brisk, and neither too long nor too short; his carriage should be easy, which depends much on the freedom of his shoulders, and is known by the manner in which he carries his head in walking; if he keeps it high and steady, he is generally vigorous and quick. When the motion of the shoulders is not free, the leg does not rise enough, and the horse is apt to stumble, and strike his foot against the

inequalities on the ground. A horse should raise his shoulders, and lower his haunches, in walking; he should also raise and support his leg; but if he keeps it up too long, or lets it fall too slowly, he loses all the advantage of his suppleness, becomes heavy, and fit for nothing but to match with another for shew and parade.

It is not sufficient that his walk should be easy, his steps must be also equal and uniform, both behind and before, for if his crupper has a swinging motion while he keeps up his shoulders, the rider is much jolted, and rendered uneasy; the same thing happens when the horse extends his hind leg so much as to rest it beyond the same place in which he rested his fore foot. Horses with short bodies are subject to this fault; those which cross their legs or strike them against each other, are not sure footed; in general those whose bodies are long, are the most easy for the rider, because he is at a greater distance from the two centres of motion, the shoulders and haunches, and therefore less sensible of the jolting.

The usual method of walking among quadrupeds is to lift, at the same time, one of the fore legs of one side, and one of the hind legs of the other. As their bodies are sustained upon four points of support, which form an oblong square, the easiest manner of moving for them is to change two at once in the diagonal, in such a manner that the centre of gravity of the body of the animal may rest always in the direction of the two points which are not in motion. In the three natural paces of the horse, the walk, the trot, and the gallop, this rule of motion is always observed, though with some difference. In the walk there are four beats, in the movement; if the right fore leg moves first the left hind leg follows the instant after; then the left fore leg moves forward in turn, and is followed instantly by the right hind leg; thus the right fore foot rests on the ground first, the left hind foot next, then the left fore foot rests, and lastly, the right hind foot, which makes a movement of four beats, and at three intervals, of which the first and last are shorter than the middle one. In the trot there are but two beats; if the right fore leg goes off the ground the left hind leg moves at the same time, and then the left fore leg moves at the same time with the right hind one, in such a manner, that there are in this movement only two beats and one interval; the right fore foot,

and the left hind foot, rest on the ground at the same time, as is also the case with the left fore foot and the right hind one. In the gallop there is usually three beats; but as in this movement there is a kind of leaping of the two fore legs, the right ought to advance more forward than the left, which ought to remain on the ground to serve as a point of rest for the sudden jerk he takes: the left hind foot moves the first, and rests the first on the ground; then the right hind leg is lifted up conjointly with the left fore leg, and both rest on the ground together; and lastly, the right fore leg is raised instantly after the left fore leg and right hind one, and rests last on the ground: thus in the gallop there are three beats and two intervals; in the first interval, when the movement is made with haste, the four legs are, for an instant, in the air at the same time, and the four shoes may be seen at once. When the horse has supple limbs and haunches, and moves with agility, the gallop is the more perfect, and the cadence is made in four times; first, the left hind foot, then the right hind foot, next the left fore foot, and, lastly, the right fore foot.

Horses usually gallop on the right foot, in the same manner as they carry the fore right leg in walking and trotting; they also throw up the dirt in galloping first with the right fore leg, which is more advanced than the left; and the right hind leg, which follows immediately the right fore one, is also more advanced than the left hind leg, from whence it results, that the left leg, which supports all the weight, and forces forwards the others, is the most fatigued; for this reason it would be right to learn horses to gallop alternately on the left and right legs, as they would then bear much longer this violent motion; this is done in the riding-schools, but, perhaps for no other reason than in traversing a circle, the centre of which is sometimes on the right and sometimes to the left, the rider is compelled to change hands.

In walking the horse almost scrapes the ground with his feet; in trotting they are somewhat raised; and in galloping they are lifted up still higher. The walk ought to be quick, light, and sure; the trot should be firm, quick, and equally sustained, and the hind feet ought to press forward the fore ones. The horse, in this pace should carry his head high, and keep his body, straight, for if the haunches rise

and fall alternately at each motion, and if the crupper moves up and down, and the horse rocks himself, he is too weak for this motion. If he throws out his fore legs it is another fault; the fore legs should tread in a line with the hind ones, and always efface their tracks. When one of the hind legs is thrown forwards, if the fore leg of the same side rests too long, the motion becomes uneasy from this resistance, and it is for this reason that the interval between the two beats of the trot should be short; but, be it ever so short, this resistance is sufficient to make this pace more uneasy than walking or galloping.

The spring of the houghs contributes as much to the motion of galloping, as that of the loins; whilst the loins use their utmost efforts to raise and push forward the hinder parts, the spring of the hough, breaks the stroke, and lessens the shock: thus, the more pliant and strong are the spring of their houghs, the more gentle and rapid is their motion in galloping.

Walking, trotting, and galloping, are the most usual natural paces; but some horses have another natural motion, called ambling, or pacing, which is very different from the other three, and, at the first glance appears extremely fatiguing to the animal, notwithstanding the quickness of motion is not so great as the hard trot or gallop. In this pace the foot of the horses grazes the ground still more than in walking, and each step is much longer. But the most remarkable circumstance is, that the two legs on the same side, for example, the fore and hind legs on the right side, part from the ground at the same time, and afterwards the two left legs, so that each side of the body alternately is without support, which cannot fail to fatigue the animal very much, being obliged to support itself in a forced balance by the rapidity of a motion which is scarcely clear of the ground: for if he raised his feet in this pace, as much as he does in trotting, or walking quick, he could not fail falling on his side; and it is only from almost grazing the earth, and the quickness of motion, that he is enabled to support himself. In the amble, as well as in the trot, there are but two beats in the motion; and all the difference is, that in the trot the two legs which go together are opposite, in a diagonal line; instead of which, in the amble, the two legs on the same side go together. This

pace is extremely fatiguing to the horse, and which he should never be suffered to use but on even ground, but is very easy for the rider; it has not the jolting of the trot, because in the amble, the fore leg rises at the same time with the hind leg on the same side, and consequently meets with no resistance in the motion. Connoisseurs assure us, that horses which naturally amble, never trot; and that they are much weaker than others who have not that pace; in fact, colts often get into this pace, when they are forced to go fast, and have not sufficient strength to trot or gallop; and we observe also, that even good horses, when much fatigued, or begin to decline, take of themselves to ambling.

We may then look upon this pace as proceeding from weakness or defect; but there are still two other paces called broken ambles, one between the amble and the walk, and the other between the trot and the gallop; both of which are more defective than the amble, and proceed from great fatigue or weakness in the loins; these paces are frequently perceivable in almost worn-out post horses.

The horse, of all quadrupeds, with the noblest stature, has the greatest proportion and elegance in all its parts. By comparing him with those animals which are superior or inferior to him, we shall see that the ass is ill-made; that the lion has too large a head; the legs of the ox too thin and short, in proportion to the size of his body; that the camel is deformed, and that those monstrous animals, the rhinoceros and the elephant, are merely rude and shapeless masses. The great length of the jaws is the principal difference between the heads of quadrupeds and the human species; it is also the most ignoble mark of all; yet, though the jaws of the horse are very long, he has not like the ass, an air of imbecility; nor of stupidity like the ox. The regularity and proportions of the parts of his head, give him an air of sprightliness, which is well supported by the beauty of his chest. He seems ambitious of raising himself above his state of a quadruped, by holding up his head; and in this noble attitude he looks man in the face. His eyes are lively and large, his ears well made, and of a just proportion, without being short, like those of the bull, or too long like those of the ass; his mane ornaments his neck, and gives him an air of strength and courage;

his long bushy tail covers and terminates advantageously the extremities of his body. Far different from the short tails of the stag, elephant, &c. and the naked tails of the ass, camel, rhinoceros, &c. the tail of the horse is formed of long thick hair, which seems to come from the crupper, because the stump from which it grows is very short; he cannot raise his tail like the lion, but it suits him better hanging down, as he can move it from side to side, and drive away the flies which incommode him; for though his skin is very firm, and well furnished with a close thick coat, it is, notwithstanding, extremely sensible.

The attitude of the head and neck contributes more than all the other parts of the body to give him a noble appearance; the superior part of the neck, on which the mane grows, should raise itself in a straight line from the withers, and, in approaching the head, form a curve somewhat resembling the neck of a swan. The inferior part ought not to have any curve, its direction should be a direct line from the chest to the nether jaw, and a little bent forwards; if it was perpendicular its beauty would be diminished. The superior parts of the neck should be slim, with a little flesh about the mane, which should be moderately ornamented with long sleek hair. A handsome chest and forehand should be long and raised, but proportioned to the size of the horse; when it is too long and thin the horse usually throws his head back, and when too short and fleshy he pushes forwards too much; for the head to be placed in the most advantageous position, the forehead should be perpendicular to the horizon.

The head should be lean and small, without being too long: the ears at a moderate distance, small, straight (but not stiff) narrow, and well-placed on the top of the head; the forehead should be narrow, and a little convex; the hollows or spaces between the eyes and ears, well filled; the eyelids thin; the eyes clear, lively, full of fire, rather large, and projecting; the pupil rather large; the nether jaw thin; the nose a little arched; the nostrils large and open, and divided by a thin partition; the lips thin, the mouth of a moderate width; the withers raised and sloping, the shoulders flat, and not confined; the back equal, insensibly arched lengthways, and raised on each side

of the back bone, which should appear indented; the flanks full and short; the rump round and fleshy; the haunches well covered with muscular flesh; the stump of the tail thick and firm; the thighs thick and fleshy; the houghs round before, and broad on the sides; the shank thin and small; the fetlock strong and covered with a tuft of hair behind; the pasterns large, and of a middling length; the coronet rather raised; the hoof black, smooth, and shining; the instep high; the quarters round; the heels wide and moderately raised; the frog small and thin, and the sole thick and hollow.

Few horses possess this assemblage of perfection; the eyes are subject to many faults, which are sometimes difficult to be known. In a sound eye, we ought to see through the cornea two or three spots of the colour of soot, above the pupil; for to see those spots, the cornea must be clear, clean, and transparent; if it appears double, or of a bad colour, the eye is not good; a small, long, and straight pupil, encompassed with a white circle, or when it is of a blueish green colour, the eye is certainly bad.

I shall at present only add some remarks, by which a judgment may be formed of the principal perfections and imperfections of a horse. It is very easy to judge of the natural and actual state of the animal by the motion of his ears; when he walks, he should incline forwards the points of his ears; when jaded his ears hang low; those which are spirited and mischievous, alternatively carry one of their ears forwards, and the other backwards: they all turn their ears to that side on which they hear any noise, and when struck on the back, or on the rump, they turn their ears backward. Horses who have the eyes deep sunk in the head, or one smaller than the other, have usually a bad sight; those whose mouths are dry, are not of so healthy a temperament as those which have their mouths moist, and make the bridle frothy. A saddle horse ought to have the shoulders flat, supple, and not very fleshy; the draft horse, on the contrary, should have them flat, round, and thick; if, notwithstanding, the shoulders of a saddle horse are too thin, and the bones shew themselves through the skin, it is a defect which proves the shoulders are not free, and consequently the horse cannot bear much fatigue. Another fault of a saddle horse is, to have the chest

project too forward, and the fore legs placed too far backward, because he is apt in this case to rest on the hand in galloping, and even to stumble and fall. The length of the legs should be proportionable to the height of the horse; when the fore legs are too long he is not sure-footed, if they are too short, he bears too heavy on the hand. It is a remark that mares are more liable than horses to be low before, and that stone-horses in general have thicker necks than mares or geldings.

The most important thing to be known, is the age of a horse. As they advance in years the eye-pits commonly sink, but it is from the teeth that we obtain the most certain knowledge of their age; of these the horse has 40, 24 grinders, four eye teeth or tushes, and 12 incisive teeth. Mares have no eye teeth, or if they have them they are very short; it is from the front and eye teeth alone we are enabled to form any judgment of their age. The front teeth begin to shew themselves a few days after the birth of the foal, these first teeth are round, short, and not very solid; they drop out at different times to make room for others. At two years and a half the four front middle teeth drop out, two at top, and two at bottom; a year after four others fall out, one on each side of the first, which are already replaced; At four years and a half, four others drop out, always on each side of those which have been shed and replaced; these four last milk teeth are replaced by four others, which do not grow near so last as those which replaced the first eight; and these four last teeth which are called the wedges, or corner teeth, as those by which the age of a horse is distinguished; these are easily known, since they are the third, as well at top as at bottom, beginning to count from the middle of the extremity of the jaw; these teeth are hollow, and have a black mark in their cavities. At four years and a half, or five years old, they scarcely project beyond the gums, and their cavities are plainly seen. At six years and a half they begin to fill up, the mark also begins to diminish gradually, till he comes to seven years and a half, or eight years, when the hollow is entirely filled up and the black mark effaced. After the animal has attained this period, it is common to attempt to judge of his age by the eye teeth, or tusks; these four teeth are placed at the side of those which we have just

described. Neither the eye teeth, nor grinders, are preceded by others which fall out. Those of the interior jaw usually begin to shoot at three years and a half, the two of the upper jaw at the age of four, and till the animal is six years old they are very sharp; at ten years old the upper ones appear already blunt, worn, and long, because the gum wears away with age, and the more it appears worn away, the more aged is the horse. From 10 till 13 or 14 years, there is hardly any indication of the age; when some of the hairs on the eye-brows begin to grow white; but this indication is equivocal, since it has been remarked that horses engendered from old stallions and old mares have the hair white on the eye-brows by the age of 10 years. There are also horses whose teeth are so hard that they do not wear, and upon which the black mark subsists and is never effaced; but these are easily known by the length of the eye teeth. We may also know, though with less precision, the age of a horse by the ridges of the palate, which are effaced in proportion to his age.

By the age of two, or two years and a half, the horse is in a state to engender; and mares, like all other females, are still more forward; but these young horses produce only foals ill-shaped, or of bad constitutions. The horse should at least be four or four years and a half before he is admitted to the mare, and even that is too early, unless for draught and large horses. It is necessary to wait till the sixth year for a fine breed, and the Spanish stallion should not be admitted before the seventh. The mares may be a year younger; they are usually in season from the end of March to the end of June; but they are most fit to receive the male for about fifteen days or three weeks, and this is the best period for admitting them to the stallion. He should be chosen with care, handsome, well made, vigorous, perfectly sound, and of a good breed. To have handsome saddle-horses, foreign stallions, as Arabian, Turkish, Barbary, and Andalusian horses, are preferable to all others; and even, notwithstanding their faults, the English horses may be successfully made use of, because they came originally from the above-mentioned, and are not much degenerated; the food being excellent in England, where they are also very careful in keeping up the breed. The stallions of Italy, especially those of Naples, are very good, and

produce handsome saddle-horses, when coupled with well-shaped mares, and fine coach-horses when with mares of a large stature. It is pretended, that in France, England, &c. the Arabian and Barbary horses usually beget horses larger than themselves, and that the Spanish horses produce a smaller breed. To have handsome coach-horses we should make use of Neapolitan and Danish stallions, or those from Holstein or Friezeland. The stallions should be full 14 hands and a half high for saddle-horses, and fifteen hands for coach-horses; a stallion should also have a good coat, black as jet, or of a fine grey, bay, or chesnut. All which seem in their colour as if they were washed or ill-coloured should be banished from the breed, as well as those which have white extremities. Besides these exterior, a stallion should also have the best interior, qualities, such as courage, docility, spirit, and agility; sensibility in the mouth, freedom in his shoulders; he should be sure footed, supple in the haunches, and have a spring in the whole body, but above all in his hind legs, and should have been well broke and trained. These particulars it is the more necessary to observe in the choice of a stallion, because it has been remarked, that he communicates by generation almost all his good and bad qualities, both natural and acquired. A horse, naturally morose, gloomy, stubborn, &c. produces foals of the same disposition: and as the defects of conformation, as well as the vices of the humours, perpetuate with still more certainty than the natural qualities, great care should be taken to exclude from the whole stud all deformed, vicious, glandered, broken-winded, or mad horses.

In these climates the mare contributes less than the stallion to the beauty of the foal, but she contributes perhaps more to his temperament and form; thus it is necessary that the mares should be strong and large bodied, and good nurses, in order to breed beautiful horses. The Spanish and Italian mares are preferred for an elegant breed, and those of England for draught and coach-horses. The mares of all countries may, nevertheless, produce handsome horses, provided they are themselves well made, of a good breed, and have proper stallions; for if they are engendered from a bad horse the foals which they produce will frequently prove defective. In this species of animals, as well as in the human race, the young

frequently resemble their male or female ancestors; only it appears, that in horses the female does not contribute so much to generation as in the human species, where the son oftener resembles the mother than the foal does the mare; and when the foal resembles the mare which has produced it, it is usually in the fore parts of the body, as the head and neck.

To judge well of the resemblance of children to their parents, the comparison should not be made in their youth; we ought to wait till they are arrived at puberty; for there happens at this period so sudden a change of the parts that it may be possible to mistake, at the first glance of the eye, a person whom we have known perfectly well before that period, but have not seen since. Till after puberty, then, we ought not to compare the child with its parents, if we would judge accurately of the resemblance, as then the son frequently resembles his father, and the daughter her mother, and frequently the child resembles both at once. Sometimes children resemble the grandfathers or grand-mothers, and even uncles and aunts. Almost always children of the same parents are like each other, and all have some family-likeness. In horses, as the male contributes more to generation than the female, mares frequently produce colts which are very like the stallion, or which always resemble their father more than their mother; and when the brood-mare has herself been begot by a bad horse, it frequently happens that, though she had a beautiful stallion and is handsome herself, she shall yet produce a foal which, however in appearance handsome and well made in its early youth, degenerates as it grows older; while a well-bred mare produces foals, which though at first they have an unfavourable appearance, grow handsomer as they advance in age.

These observations which seem all to concur in proving that in horses the male has greater influence than the female on their progeny, do not appear sufficient to establish this fact in an indisputable manner. It is not impossible, but that these observations may subsist, and yet in general the mare may contribute as much as the horse to the production of their issue; for it is not astonishing that stallions, always chosen out of a great number, generally brought from warm climates, high-fed, kept and managed with great care,

should have the sway in generation over common mares, bred in a cold climate, and frequently obliged to labour. But if the beautiful mares of warm countries were selected out, managed with equal care, and covered by common horses of our own country, I think there cannot be a doubt but the semblance of the females would be superior to the males, and that among horses, as well as in the human species, there would be an equality in the influence of the male and female in their young, supposing a similarity in the accordant circumstances. This appears natural, and the more probable, as it has been remarked in studs that an equal number of male and female foals are bred, which proves that, at least as far as regards the sex, the female has equal influence.

Mares are generally in season nine days after their delivery, when the horse ought to be taken to them, in the choice of which attention should be paid to his figure being perfect in those parts wherein the mare may be deficient. The breed of horses, at least such as are handsome, require an infinite degree of care and attention, and is accompanied with considerable expence. The mares and foals should be kept in rich inclosures, and if alternately grazed by oxen and horses it will be an advantage, as the former constantly repairs the injuries done by the latter; each of these inclosures should contain a pond, which is preferable to a running stream, and be also provided with trees to shelter them from the heat of the sun; when, however, the winter season commences they should be taken into the stable and be well supplied with hay.

The stallion should always be kept in the house; he should be fed with more straw than hay, and be moderately exercised until the season for covering, when he should be fed plentifully, though with nothing but common food. If managed with proper care he may be led to 15 or 18 mares with success in the course of the season, which, as we before observed, continues from the end of March to the end of June.

It has been remarked, that studs, situated in dry and light countries, produce active, swift and vigorous horses, with nervous legs, and strong hoofs, while those which are bred in damp places,

and in fat pasturage, have generally large heavy heads, thick legs, soft hoofs, and flat feet. This difference arises from the climate and food, which may be easily understood; but, what is more difficult to comprehend, and essential to be known, is, the necessity of always crossing, or mixing the breed of horses to prevent their degenerating.

There is in nature a general prototype of each species, from which each individual is modelled, but which seems in procreation to be debased, or improved, according to its circumstances, insomuch, that in relation to certain qualities, there is a strange variety in the appearance of individuals, and at the same time a constant resemblance in the whole species.

The first animal, the first horse, for example, has been the exterior and interior model, from which all horses that have existed, or shall exist, have been formed; but this model, of which we are only acquainted with copies, may have fallen off, or arrived at greater perfection, by multiplying and communicating its form. The original form subsists entire in each individual; but though there are millions of individuals, yet no two exactly resemble each other, nor, consequently, the model from which they are sprung. This difference, which proves how far Nature is from making any thing absolutely perfect, and how well she knows how to shade her works, is exactly the same in the human species, in all animals, and in all vegetables; and what is singular, the model of what is handsome and excellent is dispersed through all parts of the earth, and that in each climate there is a portion thereof, which perpetually degenerates, unless united with another portion taken from a distant country; so that to have good corn, beautiful flowers, &c. it is necessary to change the seeds, and that they never should be sown in the same ground where they grew. To have fine horses, dogs, &c. it is proper for the males and females to be of different countries. Without this being attended to, corn, flowers, and animals, will degenerate, or rather take so strong a tincture of the climate as to deform and bastardize the species; the form remains, but disfigured in all the lines which are not essential thereto; by mixing, on the contrary, the kinds, and

above all, by crossing their breed with foreign species, their forms seem to become more perfect.

I shall not here enter into the causes of these effects, but indicate the conjectures which readily present themselves. We know from experience that animals or vegetables transplanted from a distant climate frequently degenerate, and sometimes are improved in a short time. It is easy to conceive, that this effect is produced by the difference of the climate and food. The influence of these two causes must at length render these animals exempt from, or susceptible of, certain affections or certain disorders; their temperament must gradually change; consequently their form, which depends partly on the food and the quality of the humours, must also change in their progeny. This change is indeed almost imperceptible in the first generation, because the male and female, supposed to be the stock of this race, being completely grown, had taken their consistence and form before they were brought from their own country; the new climate, and new food may, indeed, change their temperament, but cannot have influence enough on the solid parts, and organs to alter their form, consequently the first generation will be no ways changed, nor will the original stock at the time of birth be degenerated: but the young and tender animal will feel the influence of the climate, and receive a stronger impression than its father and mother had done. The food will also have a greater effect, and act upon the organic parts during the time of its growth, change a little the original form, and produce therein those seeds of defects which manifest themselves in a very conspicuous manner in the second generation, where the progeny will not only have its own defects which arise from its growth, but also the vices of the second stock. In the third generation, the defects, which proceed from the influence of the climate and food, combined with those of influence on the actual growth, will become so visible, that the character of the first stock will be effaced. Thus animals of a foreign race soon lose their particular qualities, and in every respect resemble those of the country. Spanish or Barbary horses, if the breed is not crossed frequently, become in France, French horses, in the second generation, and always in the third. We are, therefore, obliged to cross the breed

instead of preserving it, and renew the race at each generation, by giving the horses of Barbary or Spain, to the mares of the country; and what is more singular, this renewal of the race, which is only done in part, produces much better effects than if the renewal was entire. A Spanish horse and mare in a foreign country do not produce such handsome horses as those which are bred from a Spanish horse and a mare of the country; this is easy to be conceived, if attention is given to the amendment of natural defects, which will be produced when a male and female of different countries are put together. Each climate, by its influence, and by that of its food, gives a certain conformation of parts, which offends either by excess or defects. In a warm climate, there will be in excess what will be deficient in a cold climate, therefore, when we join together animals of those opposite climates, we must expect the produce to be complete; and as the most perfect work in Nature is that which has the fewest defects, and the most perfect forms, those that have the fewest deformities, so the produce of two animals, whose defects exactly counterbalance each other, will be the most perfect production of its species: they counterbalance one another the better, in proportion to the distance between the countries the animals matched together were bred in; the compound that results therefrom is the more perfect, the more opposite the excesses or defects of the constitution of the male are to the defects or excesses of the temperament of the female. Thus the breed is always improved by matching the mares with foreign horses, and they will always be more beautiful in proportion as the climates in which the horse and mare were bred are the more distant, and, on the contrary, the produce will be much debased by suffering horses of the same race to breed together; for they infallibly degenerate in a very little time.

The climate and food have not so much influence on the human species as on animals; and the reason is plain: man can defend himself better than any other animal from the intemperance of the climate; he is lodged and clothed suitably to the seasons; in his food also there is more variety, and consequently it cannot influence all individuals in the same manner. The defects or excesses which arise

from these two causes, and which are so constantly and so sensibly felt in animals, are much less conspicuous in men. Besides, as there have been frequent migrations, as nations are mixed, and great numbers travel and are dispersed every where, it is no wonder that the human race should appear less subject to the influence of climate, and that there should be men strong, well-made, and even ingenious in all countries. Nevertheless, we may believe, from experience much further back than memory can trace, that men formerly knew the misfortunes which resulted from alliances with the same blood; since in the most uncivilized nations, it has rarely been permitted for the brother to marry the sister. This custom, which among Christians is a divine law, and which is practised by other people from political views, is perhaps grounded on this observation. Policy is never extended in so general and absolute a manner, unless supported by physical principles: but if men once discovered by experience that their race degenerated, when intercourse was admitted between children of the same family, they would soon have looked upon alliances with other families as a law of nature, and agreed in not suffering a mixture of blood among their children. In short, from analogy it may be presumed, that in most climates men would degenerate, as well as animals, after a certain number of generations.

Another influence of the climate and food is, the variety of colours in the coats of animals: those which are wild, and live in the same climate, are of the same colour, which becomes a little lighter, or a little darker, in the different seasons of the year; on the contrary, those which live in different climates are of different colours, and domestic animals vary so much, that there are horses, dogs, &c. of all colours, while the stags, hares, &c. are almost uniformly of the same. The injuries of the climate, always the same, and constantly eating the same food, produce, in wild animals, this uniformity. The care of man, the comforts of shelter, the variety of food, efface and vary the colour in domestic animals; as does also the mixture of foreign racers, when no care has been taken to assort the colours of the male and female, which sometimes produces beautiful singularities, as we see in pied horses, where the black and the

white are so whimsically mixed that they sometimes do not seem the work of nature, but rather the fancy of a painter.

In coupling horses the colour and height should be attended to; the shapes should be contrasted, the race should be mixed with opposite climates, and horses and mares bred in the same stud should never be coupled together. All these are necessary cautions, and there are still some others not to be neglected; for example brood-mares ought never to be docked, because, being unable to defend themselves from the flies, they are continually tormented, and the constant agitations which the stings of these insects occasion diminish the quantity of their milk, which has great influence on the temperament and size of the foal, which in every respect will be more vigorous as the mother is more capable of nursing it. It is also preferable to choose brood-mares from such as have always been kept at grass, and have never been hard worked. Mares which have been kept in stables on dry food, and are afterwards put to grass, do not immediately conceive; they must have time to accustom themselves to this new kind of nutriment.

Although the usual season of mares is from the beginning of April to the end of June, yet it frequently happens that some are so before that time; but which it would be better to let pass off, because the foal in such case would be brought forth in winter, and suffer both from the intemperance of the season, and badness of milk; and also, if a mare does not become proud till after the month of June, she should not be suffered to take horse, because the foal being produced in summer, cannot acquire strength enough to resist the injuries of the ensuing winter.

Many people, instead of conducting the stallion to the mare, let him loose in a park, where a number of mares are kept, and leave him at liberty to single out those which are in season: this method is good for the mares, and they will breed with more certainty; but the stallion is more hurt in six weeks than he would be well managed in as many years.

As soon as the mares are with foal, and their bellies begin to grow heavy, they must be separated from those which are not so, lest they should be injured. They usually go with foal eleven months and some days; they bring forth standing upright, while almost all other quadrupeds lie down: in some cases, when the delivery is difficult they require assistance, and when the foal is dead, it is extracted with ropes. The foal generally presents its head first, as do all other animals; it breaks the membranes in the birth, and the waters flow out abundantly; at the same time there is voided several solid pieces of flesh formed by the liquor of the allantoides: these pieces, which the ancients have called the hippomanes, are not, as they say, pieces of flesh fastened to its head; but, on the contrary, separated by the amnios. The mare licks the foal after its birth, but she does not meddle with the hippomanes, notwithstanding the assertion of the ancients, that she devours it immediately.

It is the usual custom to have the mare covered nine days after she has foaled: not to lose time, and to make all they can from the stud; yet it is certain, that the mare having a foal and f[oe]tus to provide for, her strength is divided, and she is not able to give them so much nourishment as if she had only one; it would, therefore, be better, in order to have excellent horses, to let the mares be covered but once in two years; they would last longer, and would not be so liable to drop their foals; for in common studs it is a great thing when, in the same year, half or two thirds produce foals.

The mares, when with foal, can bear to be covered, though there is never any fresh conception: they usually breed till the age of 14 or 15 years, and the most vigorous not longer than 18. Stallions, when they have been taken care of, may engender till they are 20 years old, or upwards. The same remark has been made of these animals as of men, viz. that those who have begun too early are soonest incapacitated; for large horses, which sooner arrive at their growth than delicate ones, are frequently incapable before they are fifteen.

The duration of the life of horses, like that of every other species of animals, is proportioned to the time of their growth. Man, who is above 14 years in growing, lives six or seven times as long, to 90 or

100. The horse, who attains his whole growth in four years, lives six or seven times as long, that is, to 25 or 30. There are so few exceptions to this rule that we cannot draw any precedents from them; and as robust horses are at their entire growth in less time than delicate ones, they also live less time, seldom exceeding 15 years.

It may be easily seen, that in horses, and most other quadrupeds, the growth of the hinder parts is at first greater than those of the anterior, whilst in man the inferior parts grow less at first than the superior; for in a child the thighs and legs are in proportion to the body, much less than those of an adult; on the contrary, the hind legs of a foal are so long that they can touch its head, which they cannot do when full grown. This difference proceeds less from the inequality of the whole growth of the anterior and posterior parts, than from the inequality of the fore and hind feet, which is constantly the case through all Nature, and is most sensible in quadrupeds. In man the feet are larger than the hands, and are also sooner formed; and in the horse the foot forms the greatest part of the hind leg, being composed of bones, corresponding to the tarsus, metatarsus, &c. It is not, therefore, astonishing that this foot should be sooner extended than the fore legs, the inferior part of which resembles the hands, being composed of the bones of the carpus, metacarpus, &c. When a colt is just foaled this difference is readily remarked; the fore legs compared with the hind ones being much shorter in proportion than they are in the sequel; besides, the thickness which the body acquires, though independent of the proportions of the growth in length, occasions more distance between the hind legs and the head, and consequently contributes to hinder the horse from reaching it when arrived at his full growth.

In all animals each species differs according to the difference of climate, and the general result of this variety forms and constitutes the different races. Of these we can only particularize the most remarkable, which differ greatly from each other, passing the intermediate shades, which here, as in every thing else, are infinite. We have even augmented the number and confusion, by favouring the mixture of these breeds; and we may be said to have almost

inverted Nature by bringing into these climates the horses of Africa or Asia, and have so much raised the primitive race of France, by introducing horses of all countries, that they are not now to be known, there only remaining some slight traces, produced by the actual influence of the climate. These traces would be much stronger, and the differences would be much greater, if the race of each climate were preserved without mixture; the small differences would be less shaded, and fewer in number; but there would be a certain number of great varieties, that all mankind might easily distinguish; instead of which, custom, and even a long experience, are at present necessary to know the horses of different countries. On this subject we have only the knowledge drawn from the accounts of different travellers, and the ablest riding-masters, such as Newcastle, Garsault, Guerinere, &c. and from some remarks that Pignerolles, Master of Horse to the King of France, and President of the Academy of Angers, has communicated.

The Arabian horses are the handsomest known in Europe, they are larger and more plump than those of Barbary, and equally well shaped, but as they are not often brought into France, few observations have been made on their perfections or defects.

The horses of Barbary are more common, they have a long fine neck, not too much covered with hair, and well divided from the withers; the head is small and beautiful; the ears handsome and well-placed; the back short and straight; the flanks and sides round without too much belly; the haunches thin, the crupper generally long, and the tail placed rather high; the thighs well formed, and seldom flat; the legs handsome, well made, and almost without hair; the tendon large, the foot well made, but frequently the pastern long; they are of all colours, but most commonly grey. In their paces, they are always very negligent, and must be often reminded: they are swift and strong, very light, and well adapted for hunting. These horses seem the most proper to breed from; and leave it only to be wished they were of larger stature, seldom exceeding four feet eight inches high. It is confirmed by experience, that in France, England, &c. they beget foals larger than themselves. Among the Barbary horses, those of the Kingdom of Morocco are the best; next, those of

the mountains. The horses of Mauritania, are of an inferior quality, as well as those of Turkey, Persia, and Armenia. All the horses of warm countries have the hair shorter and smoother than others. The Turkish horses are not so well proportioned as those of Barbary; they have commonly the neck slender, the body long, and the legs too thin. They will, however, travel a great way, and are long winded; this will not appear surprising if we consider, that in warm countries the bones of animals are harder than in cold climates and it is for this reason that, though they have smaller shank bones, their legs are stronger.

The Spanish horses which hold the second rank after those of Barbary, have a long, thick, and hairy neck; the head rather large, the ears long, but well placed; the eyes full of fire, and have a noble stately air; the shoulders are thick, and the breast large; the loins frequently rather low, the sides round, and often too much belly; the crupper is usually round and large, though some have it rather long; the legs thin, free from air; the pastern is sometimes long like those of Barbary; the foot rather lengthened like that of a mule, and frequently the heels too high. Spanish horses of the best breed are plump, well-coated, and low of stature. They use much motion in their carriage, and have great suppleness, spirit, and pride. Their hair is usually black, or of a dark chesnut colour, though there are some of all colours, and it is but seldom that they have white legs or noses. The Spaniards have an aversion to these marks, and never breed from horses that have them, chusing only a star in the forehead; they however prefer those which have not a single spot, as much as the French do those with particular marks. But these prejudices are perhaps equally ill-founded, since there are exceeding good horses with all kinds of marks, or entirely of one colour. These small differences in the coats of horses do not, in any manner, depend on their qualities, or their interior constitution, but originate from external causes, and even those so superficial, that by a slight scratch on the skin a white spot is produced. Spanish horses are all marked in the thigh with the mark of the stud where they were bred. They are commonly of a small stature, though there are some four feet nine or ten inches in height. Those of Upper Andalusia are

reckoned to be the best, though they are apt to have the head too long; but this defect is excused in favour of their excellent qualities: they are courageous, obedient, graceful, spirited, and more supple than those of Barbary, for which talents they are preferred to all other horses in the world, for war, for shew, and for the menage.

The handsomest English horses have in their conformation great resemblance to those of Arabia and Barbary, from which in fact they originated: they have, notwithstanding, the head larger, but well made, the ears longer, but well placed. By the ears alone an English horse may be known from a Barbary; but the great difference is in their stature, for English horses are much larger and plumper; they are frequently five feet high; are of all colours, and have all kinds of marks; they are generally strong, vigorous, bold, capable of great fatigue, excellent for hunting and coursing; but they want grace and suppleness in their shoulders. The race horses of this country are exceedingly swift, as indeed are the saddle horses in general; of which I cannot give a stronger proof than by giving an extract of a letter I received from a British nobleman, (Earl of Morton) dated London, February 18, 1748, which runs in these words: “Mr. Thornhill, a post-master of Stilton, wagered that he would ride three times the distance from Stilton to London, that is 215 English miles, within 15 hours. In undertaking the performance of which, he set out from Stilton in the morning of the 29th of April, 1745, and arrived in London in three hours and fifty-one minutes, having taken a relay of eight different horses on the road; he immediately set out again from London, and got back to Stilton in three hours and fifty-two minutes, having changed horses but six times; for the third space he set off again, and with seven of the same horses he completed it in three hours and forty-nine minutes, going over the whole space of 215 miles in eleven hours and thirty-two minutes; an example of swiftness that possibly is not to be paralleled in ancient history.”

The horses of Italy were formerly much handsomer than they are at present, because the breed for some time has been neglected; notwithstanding the Neapolitan horses are still handsome, especially for carriages and draught horses; but in general they have large heads end thick necks; they are untractable, and consequently not

easily managed; these defects are compensated by their noble form, their stateliness, and the gracefulness of their motion.

The Danish horses are so superior in make and beauty, that they are preferred to all others for carriages; some of them are perfectly moulded, but their number is small; for the conformation of these horses is seldom regular, most of them have thick necks, large shoulders, their loins long and low, and the buttocks too narrow for the thickness of the fore parts; but they are all graceful in their motions, and in general very good for war, and for state: they are of all colours, and some are spotted like tygers which are found no where but in Denmark.

Germany produces very handsome horses, but they are generally heavy, and short-breathed, though chiefly bred from Turkish and Barbary, Spanish and Italian horses; for this reason they are not swift enough for coursing or hunting, whilst the Hungarian and Transilvanian horses are, on the contrary, light and good coursers. The Hungarians split their nostrils, with a view, they say, of giving them more breath, and also to hinder their neighing in battle. I have never had it in my power to be convinced of this fact, that horses who have their nostrils slit cannot neigh, but it appears to me that their neighing must be weaker. It is remarked, that the Hungarian, Croatian, and Polish horses have the mark in their mouths during life.

The horses of Holland are very good for coach-horses: the best come from the province of Friesland: there are also some very good ones in the provinces of Bergues and Juliers. The Flemish horses are greatly inferior to the Dutch: they have almost all large heads, flat feet, and are subject to humours; and these two last defects are essential ones in coach-horses.

In France there are horses of all kinds, but very few handsome ones. The best saddle-horses come from the Limosin, which resemble much those of Barbary, and like them are excellent for hunting; but they are slow in their growth, require great care while young, and must not be used till they are eight years old. There are

also some excellent foals in Auvergne, Poitou, and in Moroant in Burgundy; but next to the Limosin, Normandy furnishes the finest horses; they are not so good for hunting, but are better for war: they have thicker coats, and sooner attain their full growth. There are many good coach-horses brought from Lower Normandy, which are lighter than those of Holland. Franche-Compte, and the country round Boulogne, furnish very good draught-horses. In general, the French horses have their shoulders too thick, which in the Barbary horses are generally too narrow.

Having described those horses which are best known to us, we shall now mention what travellers report of foreign horses with which we are unacquainted. There are good horses in islands of the Archipelago: those of the island of Crete were in great reputation among the ancients for their agility and swiftness; they are at present but little used even in that country, from its being almost every where unequal, and very mountainous. The best horses in these islands, and even in Barbary, are of the Arabian breed. The native horses of the kingdom of Morocco are much smaller than those of Arabia, but very light and vigorous. Shaw says, that the breed of Egypt and Tingitania are preferable to all those of the neighbouring countries; and yet a century ago there were good horses all over Barbary. The excellence of these Barbary horses consists in their never stumbling, and in their standing still whilst the rider dismounts or lets fall his bridle. They walk fast and gallop with rapidity, but they are never suffered to trot or amble; the inhabitants of the country looking upon those paces as rude and ignoble. He adds, that the horses of Egypt are superior to all others for their height and beauty; but these Egyptian horses, as well as most of those of Barbary, sprung from Arabian horses, which are, without contradiction, the most beautiful horses in the world.

According to Marmol, or rather Leon, the African, (for Marmol has copied him almost word for word) the Arabian horses are descended from the wild horses of the desarts of Arabia, of which, in ancient times, large studs were formed, which have multiplied so much that all Asia and Africa are full of them; they are so swift as to outstrip the very ostrich. The Arabians of the desart, and the people of Lybia,

breed a great number of these horses for hunting, but neither use them in travelling nor in their wars. They send them to pasture whilst there is any grass, and when that fails they feed them with dates and camels' milk, which makes them nervous, light, and lean. They lay snares for the wild horses, and eat the flesh of the young ones, which they affirm is very delicate. These wild horses are small, and are commonly ash-coloured, though there are also some white ones, and the mane and the hair of the tail is short and frizzled. Other travellers have given curious accounts of the Arabian horses, of which we will only mention the principal circumstances.

Let an Arabian be ever so poor he has horses; they usually ride upon the mares, experience having taught them that they bear fatigue, hunger, and thirst, better than horses; they are also less vicious, more gentle, and will remain left to themselves, in great numbers, for days together, without doing the least harm to each other. The Turks, on the contrary, do not like mares, and the Arabians sell them the horses which they do not keep for stallions. The Arabs have long preserved with great care the breed of their horses; they know their generations, alliances, and all their genealogies[B]. They distinguish their breeds into three classes; the first, which are of pure and ancient race on both sides, they call nobles; the second are of ancient race, but have been misallied; and the third kind are their common horses. The latter are sold at a low price; but those of the first class, and even of the second, among which some are as good as those of the first, are extremely dear. They never suffer the mares of the noble class to be covered except by stallions of the same quality. They are acquainted, from long experience, with the whole race of their own horses, and even with those of their neighbours, and know their names, surnames, colours, marks, &c. When they have no noble stallions of their own they borrow one of a neighbour to cover their mares, which is done in the presence of witnesses who give an attestation signed and sealed before the secretary of the Emir, or some other public person, in which the names of the mare and horse are written down, and their whole generation set forth. When the mare has foaled witnesses are again called, and another attestation is drawn up, which contains a

description of the foal, with the day of its birth. These certificates enhance the value of their horses and are given to those who buy them. The price of a mare of the first class is from one to three hundred pounds sterling. As the Arabs have only tents for their houses, those tents serve them also for stables: the mare and her foal, husband, wife, and children, lie promiscuously together; the children will lie on the body and neck of the mare and foal without being incommoded or receiving the least injury; nay, the animals seem afraid to move for fear of hurting them. These mares are so accustomed to live in this familiarity that they will suffer any kind of play. The Arabs never beat their mares, but treat them kindly, talk and reason with them; they take great care of them, always letting them walk, and never use the spur without the greatest necessity; as soon, therefore, as they feel their rider's heel they set out with incredible swiftness, and leap hedges and ditches with as much agility as so many does. If their riders happen to fall, they are so well trained that they will stop short even in the most rapid gallop. All Arabian horses are of a middling size, very easy in their paces, and rather thin than fat. They are dressed morning and evening regularly with so much care that not the smallest spot is left on their skins; their legs, mane and tail are washed; the latter is let to grow long, and seldom combed, to avoid breaking the hairs. They have nothing given them to eat all day, and seldom are allowed to drink above two or three times. At sun-set a bag is fastened round their heads, containing about half a bushel of very clean barley, which is not taken from them till the next morning when all is eat up. In the month of March, when the grass is tolerably high, they are turned out to pasture. At this time the mares are covered, and immediately after cold water is thrown upon them. As soon as the spring is past they are taken again from pasture, and have neither grass nor hay, and seldom straw, all the rest of the year, barley being their only food. They cut the manes of their foals at a year or eighteen months old, in order to make it grow thick and long. They mount them at two years old, or two years and a half at furthest, and till this age they put neither saddle nor bridle on them. Every day, from morning till night, all the Arabian horses stand saddled at the doors of the tents.

[B] Of this we have a striking instance in *Pennant's Zoology*, which contains the following attested paper:

(Taken before Abdorraman, Cadi of Acca.)

"The occasion of this present writing or instrument is hat at Acca, in the house of Bedi, legal established judge, appeared in Court Thomas Usgate, the English Consul, and with him Sheikhs Morad Eben al Hajj Abdollah, Sheikh of the country of Safad: and the said Consul desired, from the aforesaid Sheikhs, proof of the race of the grey horse which he bought of him, and he affirmed to be Monaki Shaduhi[1]; but he was not satisfied with this, but desired the testimony of the Arabs, who bred the horse, and knew how he came to Sheikhs Morad; whereupon there appeared certain Arabs of repute, whose names are undermentioned, who testified and declared that the grey horse which the Consul formerly bought of Sheikh Morad is Monaki Shaduhi of the pure race of horses, purer than milk, and that the beginning of the affair was, that the Sheikh Saleh, Sheikh of Alsabal bought him of the Arabs, of the tribe of al Mahommedat, and Sheikh Saleh sold him to Sheikh Morad Ebn al Hajj Abdollah, Sheikh of Safad, and Sheikh Morad sold him to the Consul aforesaid; when these matters appeared to us, and the contents were known, the said gentleman desired a certificate thereof, and testimony of the witnesses, whereupon we wrote him this certificate for him to keep as a proof thereof. Dated Friday 28 of the latter Rabi, in the year 1135."

WITNESSES.

Sheikh Jumat al Faliban of the Arabs of al Mahommadat.
Ali Ebn Taleb al Kaabi.
Ibrahim, his brother.
Mohammed al Adhra Sheikh Alfarifat.
Kaamis al Kaabi.

[1] *The term for their Noble race.*

The breed of these horses is dispersed throughout Barbary; the chiefs among the Moors, and even among the Negroes along the rivers Gambia and Senegal, have them of uncommon beauty. Instead of barley, or oats, they give them maize reduced to flour, which they mix with milk, when they are inclined to fatten them; and in this hot climate they seldom let them drink. The Arabian horses are also spread over Egypt, Turkey, and perhaps Persia, where there were formerly considerable studs. Mark Paul mentions one in which

were 10,000 white mares; and he says, that in the province of Balascia there was a great number of large nimble horses, with their hoofs so hard that it was unnecessary to shoe them.

The horses of the Levant, as well as those of Persia and Arabia, have the frog of the foot very hard; they shoe them notwithstanding, but with shoes so light and thin that nails may be driven through any part of them. In Turkey, Persia and Arabia, the custom of taking care and feeding them is the same. Their litter is made of their own dung, which is first dried in the sun, to take off the ill smell, then reduced into powder, and a bed made with it in the stable or tent, four or five inches thick. This litter lasts a long time, for when soiled, it is dried in the sun a second time, and again loses its disagreeable odour.

In Turkey there are horses of Arabia, Tartary, and Hungary, beside the native horses of the country, which are very handsome and elegant, have a great deal of fire, swiftness and symmetry, but are soon fatigued. Their skins are so tender that they cannot bear the curry-comb, so that they are obliged to use a brush, and to wash them with water. These horses, although handsome, are much inferior to those of Arabia, and even those of Persia, which are, next to the Arabians, the most beautiful and the best horses of the east. The pasture of the plains of Media, Persepolis, Ardebil, and Derbent, is excellent, and by the order of government, a prodigious number of horses are raised there, most of which are very handsome, and almost all excellent. Pietro della Valle prefers the common horses of Persia to the most excellent of the kingdom of Naples. They are commonly of a middling size; some are very small, but equal in goodness and strength, while there are others bigger than the saddle-horses of England. They have small heads and thin necks; their ears are handsome and well placed; slim legs, handsome cruppers, and hard hoofs; they are docile, lively, light, bold, courageous, and capable of bearing great hardships. They run very swift, without ever stumbling. They are robust, and easily fed, being kept on barley mixed with straw chopped fine, and are only put to grass for about six weeks in the spring. Their tails are long, and the Persians never make geldings. They use coverings to defend their horses from the injuries of the air, and are particularly attentive in

their care of them: they manage them with a bridle only, and without employing spurs. Numbers of them are transported into Turkey, but more to the Indies. Those travellers who are so lavish in their praises of the Persian horses agree in allowing that the Arabians are superior for their agility, courage, strength, and beauty; and that they are more valued, even in Persia, than the horses of that country.

The horses bred in the country are not good. Those used by the grandees of the country are imported from Persia and Arabia. They give them a little hay in the day, and in the evening pease boiled with butter and sugar, instead of oats or barley; this nourishment strengthens and gives them spirits; without it they would soon decay, the climate being contrary to their nature. The native horses of India are very small; some of them are so little that, Tavernier says, the young Prince of the Moguls, who was about eight years of age, rode on a handsome little horse, whose height did not exceed that of a large greyhound. It should seem that extreme hot climates are contrary to the nature of horses. Those of the Gold Coast, Juida, Guinea, &c. are also very bad. They carry their heads and necks very low; their walk is so tottering, that one would imagine they were always ready to fall; they would never stir if they were not to be continually beat, and the greatest part of them are so low that the feet of the riders almost touch the ground; they are most untractable creatures, and only fit to be eaten by the Negroes, who are as fond of their flesh as they are of that of dogs. This taste for horse-flesh is common to the Negroes, Arabians, Tartars, and Chinese. The Chinese horses are no better than those of India, they are weak, spiritless, ill-made, and very small; those of Corea are not more than three feet in height. In China almost all the horses are made geldings; and they are so timid that they cannot be made use of in war; so that it may with propriety be said that the Tartarian horses conquered China. Those horses are very fit for war, though commonly but of a moderate size, they are strong, vigorous, spirited, agile, and very swift. Their hoofs are hard, but the bottom is too narrow; their heads are small, their necks long and confined, and their legs are too long; with all these defects they may be considered as good horses, for they are not easily tired, and gallop extremely

fast. The Tartars live with their horses in the same manner as the Arabians. When about seven or eight months old they are mounted by children, who make them walk or gallop a little way by turns. They thus break them by degrees, and oblige them to undergo long fastings; but they never mount them for travelling or hunting till they are six or seven years old, and then they make them support incredible fatigue, such as travelling two or three days together without stopping; passing four or five days without any other food than a handful of grass every eight hours, and also to go twenty-four without drinking, &c. These horses which are so robust in their own country become enfeebled and useless, when transported to China or the Indies; but they succeed better in Persia and Turkey. The little Tartars have a breed of small horses which they value so much, that they are not allowed to be sold to foreigners. These horses have all the good and bad qualities of those of Great Tartary, which shews how much the same manners and education give the same disposition to these animals. There are also in Circassia, and in Mingrelia, many horses which are even handsomer than those of Tartary. There are also some fine horses in the Ukraine, Wallachia, Poland, and Sweden; but we have no particular account of their qualities or defects.

If we consult the ancients on the nature and qualities of the horses of different countries, we shall find, that the horses of Greece, especially those of Thessaly and Epirus, were held in great esteem, and were very useful in war; that those of Achaia were the largest then known; that the handsomest came from Egypt, where there was a great number, and where Solomon sent to buy them at a great price; that in Ethiopia the horses did not thrive, on account of the great heat of the climate; that Arabia and Africa produced the finest horses, but above all the lightest and best calculated for the chace; that those of Italy were extremely good; that in Sicily, Cappadocia, Syria, Armenia, Medea, and Persia, there were excellent horses, remarkable for their swiftness and agility; that those of Sardinia and Corsica were small, but lively and courageous; that those of Spain resembled those of Parthia, and were excellent for war; that there were in Transylvania and in Walachia swift horses with small heads,

large manes hanging down to the ground, and bushy tails; that the Danish horses were well made and good leapers; that those of Scandinavia were small, but well made and very agile; that the Flanders horses were strong; that the Gauls furnished the Romans with good horses for the saddle, and to carry burthens: that the German horses were ill-made, and so vicious, that no use was made of them; that the Swiss had great numbers fit for war; that the horses of Hungary were also very good; and lastly, that the Indian horses were small and weak.

From the above facts it results, that the Arabian horses have ever been, and are still, the first horses in the world, both for beauty and goodness; that it is from them, immediately, or by the means of Barbs, that the finest horses in Europe, Africa, and Asia are bred, that Arabia is perhaps not only the original climate for horses, but the best suited to their natures, because, instead of mixing the breed by foreign horses, the Arabs take care to preserve their own purity; that if the climate is not of itself the best for horses, the natives have produced the same effects, by the care they have taken, from time immemorial, to ennoble their breed by putting together only the most beautiful individuals, and of the first quality; and that by this attention, pursued forages, they have improved the species beyond what nature alone would have done in the most favourable climate. We may also conclude that warm climates rather than cold, but above all, dry countries agree best with the nature of horses; that in general, small are better than large horses; that care is as necessary for them as food; that familiarity and caresses will do more with them than force and chastisement; that the horses of warm countries have their bones, hoofs, and muscles, more firm than those of our climates; that although heat agrees better than cold with these animals, yet excessive heat does not agree with them; and lastly, that their habit and disposition depend almost entirely on the climate, food, care, and education.

In Persia, Arabia, and many other parts of the east, it is not customary to geld horses, although so general a practice in Europe and China. This operation deprives them of much of their strength, courage, and fire, but renders them gentle, quiet, and docile. The

only seasons for performing this operation are spring or autumn, great heat and cold being equally hurtful. With respect to age, they have different customs in different countries; in some parts of France they geld horses at twelve or fifteen months old; but the general and best custom is, not to geld them till two or three years, because, in not doing it till that age, they preserve more of their masculine qualities. Pliny says, that they never lose the milk-teeth if they are made geldings before they have shed them. But this is not a fact; and it is probable that the ancients grounded this supposition merely on the analogy it bears to the falling of the horns of the stag, goat, &c. which, in reality, never fall off after castration. The gelding it is true, can never engender, but we have sometimes examples of their being able to copulate.

Horses of all colours shed their coats, like most animals covered with hair, once a year, usually in the spring, though sometimes in autumn; as they are then weaker than at other times, they should have more care, and be more plentifully fed. There are also horses which shed their hoofs; this usually happens in humid marshy countries, such as Holland.

Geldings and mares neigh less frequently than horses. Their voices are not so strong, but much more shrill. In all horses we may distinguish five kinds of neighing, relative to different passions; in the neigh of joy the voice begins and ends with sharp tones; the horse kicks up at the same time, but without attempting to strike. In the neigh of desire, whether of love or attachment, the horse does not kick, and the voice is dragged to a great length, and ends with a deep sound. The neigh of anger, during which the horse kicks violently with his foot, is short and sharp; that of fear, during which he kicks also, is scarcely longer than that of anger, the voice is hoarse and grave, and seems as if it came from the nostrils only. This neigh is something like the roaring of a lion. That of pain is more like groaning, or breathing with oppression, than of neighing; it is in a grave tone of voice, and follows the alternatives of respiration. It has also been remarked, that horses which neigh frequently from joy or desire, are the best and most generous. Horses, in general, have the voice stronger than mares and geldings; from the birth the male has

the voice stronger than the female. At two years, or two years and a half, which is the age of puberty, the voice of males and females, as in mankind, and other animals, becomes much more strong and deep.

When the horse is impassioned with love he shews his teeth, and seems to laugh; he shews them also when he is angry, and would bite. He sometimes puts out his tongue to lick, but less frequently than the ox, who, notwithstanding, is less sensible to caresses. The horse remembers ill treatment much longer, and is sooner dispirited, than the ox. His natural spirit and courage induce him to make every effort, but when he finds more is expected from him than he is able to perform, he grows angry, and will not endeavour at all; instead of which, the ox, who is slow and idle, seldom exerts his utmost, and is not therefore easily dejected.

The horse sleeps much less than man, for when he is in health he does not rest more than two or three hours together; he then gets up to eat. When he has been much fatigued he lies down a second time, after having eat; but in the whole he does not sleep more than three or four hours in the twenty-four. There are even some horses who never lie down, but sleep standing, which is sometimes the case even with those who do lie down. It has also been remarked, that geldings sleep oftener and longer than horses.

Quadrupeds do not all drink in the same manner, though they are all equally obliged to seek with the head for the liquor, which they cannot get any other way, except the monkey, macaw, and some others, that have hands, and consequently drink like men, when a vessel is given to them which they can hold; for they carry it to their mouths, inclining the head, throwing down the liquor, and swallowing it by the simple motion of deglutition. Man usually drinks in the same manner, because it is most convenient; but he can drink many other ways by contracting the lips to draw in the liquor, or dipping the nose and mouth deep enough into it for the tongue to be environed therewith, and then perform the motions necessary for swallowing; he can also take in a fluid by the lips alone; and lastly though with more difficulty, stretch out the tongue, and, forming a kind of little

cup, carry a small quantity of water into the mouth. Most quadrupeds could also drink in several different ways, but, like men, they chuse that which is most convenient. The dog, whose mouth is very large, and the tongue long and thin, drinks by lapping, or licking, forming with the tongue a kind of cup or scoop, which fills each time with a tolerable quantity of liquor, and so satisfies his thirst; and this mode he prefers to that of wetting the nose. The horse, on the contrary, whose mouth is small, and whose tongue is too short and thick to form a scoop, and who always drinks with more avidity than he eats, dips the mouth and nose quickly and deeply into the water, which he swallows largely by the simple motion of deglutition; but this forces him to drink without fetching his breath, whereas the dog breathes at his ease while he is drinking. Horses, therefore, should be suffered to take several draughts, especially after running; when respiration is short and quick, they should not be suffered to drink the water too cold, because that, independent of the cholic, which cold water frequently occasions, it sometimes brings on rheums, and often lays the foundation of a disorder called the glanders, the most formidable of all diseases to which this species of animals are subject; for it is known, that the seat of the glanders is in the pituitary membrane, and that it is consequently a real cold, which causes an inflammation in this membrane. Travellers, who give us a detail of the maladies of horses in warm climates, as in Arabia, Persia, and Barbary, do not say that the glanders are so frequent there as in cold climates, and it is for this reason the conjecture arises, that this malady is occasioned by the coldness of the water, because the animals are obliged to keep the nose and nostrils a considerable time under water, which would be prevented by never giving it to them cold, and by always wiping the nostrils after they have drank. Asses, who fear the cold more than horses, and who resemble them so strongly in the interior structure, are not so subject to the glanders, which may possibly be owing to their drinking in a different manner from horses; for instead of dipping in the mouth and nose deeply into the water, they scarcely touch it with their lips.

I shall not speak of the other diseases of horses, it would spin out Natural History too much to join to the history of an animal that of its

disorders; nevertheless, I cannot leave the history of the horse without regretting that the health of this useful animal should have been hitherto abandoned to the care, and too frequently absurd practice, of ignorant people. The branch of physic, which the ancients called Veterinaria Medicina, is at present scarcely known but by name. I am persuaded, that if some physician would turn his views this way, and make this study his principal object, he would soon find it answer his purpose, both with respect to reputation and profit: instead of degrading himself he would render his name illustrious, and this branch of physic would not be so conjectural and difficult as the other. The diet, manners, and influence of sentiment, and all other causes of disorders, being more simple in animals than in man, the diseases must be less complicated, and consequently more easily investigated, and treated with success, without mentioning the advantages that would be derived from the entire liberty of making experiments, trying new remedies, and to be able to arrive, without fear or reproach, to a great extent of knowledge of this kind, from which, by analogy, inferences might be drawn useful to the art of curing mankind.

SUPPLEMENT.

Africa, it has already been observed, appears to be the original climate of the horse, and from the country being so dry and warm, admits many customs that cannot be practised in the northern regions, at least with any effect. In different countries they not only receive different food, but are also differently managed. In Arabia and Barbary they scarcely ever are allowed herbage or grain, but are principally kept upon dates and camel’s milk, which is given them morning and evening; they are seldom made use of till the seventh year, till when they suck the camels whom they constantly follow.

In Persia they are always kept in the open air, being sometimes covered with clothes to preserve them from the inclemency of the weather. The whole troop are tied to a rope, which is fastened at each end to iron rods fixed in the ground; they have also ropes tied to their hind legs, and fastened to pegs in their front, this latter

method is to prevent them from doing any injury to each other; but notwithstanding both fastenings, they stand perfectly at ease, and have sufficient room to lie down. The Persians make use of nothing but sand or dry dust for litter, but the Arabians and Moguls litter their horses with their own dung dried to a powder. It is the custom in these countries not to let the horses eat from the ground, or racks, but to constantly put their barley, and cut straw into bags, which are tied round their necks. In spring they are fed with grass and green barley, but care is taken that they should not have too much, upon a supposition they would soon become fat and useless. They never use bridles or stirrups, but easily manage their horses with a single snaffle; whips and spurs are also seldom employed, and one or two strokes of the former is sufficient at all times to answer every purpose. The horses in Persia are very tall, strong, and sometimes heavy, and from being so plenty, the best of them sell at a low price. These people have a practice of tying a rope to the fore and hind foot on the same side, which teaches them to adopt an easy pace; they also slit their nostrils, for the purpose, they say, of making them respire with more ease.

Horses, however, succeed as well in cold as warm countries, if they are not damp. Denmark, Sweden, and Poland, it is well known, produce fine and beautiful horses; those in Iceland, where the cold is excessive, and where they frequently have nothing but dried fish to subsist upon, though small, are strong and vigorous. In this island the shepherds tend their flocks on horseback, for they are both plenty, and their keep is not attended with any expence. When not wanted they are turned loose into the mountains where they soon become wild; if the owners want them, they are hunted in troops, and caught with ropes, which is thought necessary when the mares have foaled, the owners of which put a mark upon the foals, and then turn them into the mountains again for the space of three years, and it is generally remarked that those left in this manner, are more fleet and better than those brought up at home.

The Norwegian horses possess a peculiarity well adapted to the country, for they travel through the roughest parts of it, and descend the steepest declivities, by putting their hind feet under their bellies

with perfect safety. They are small, generally yellow, with a black stripe along their backs. They are frequently assaulted by the bear, and if a stallion happens to be among the mares and foals, when this destructive animal appears, he advances to meet him, and has the sagacity to attack with his fore feet, in which case he almost always is conqueror, but if he ever trusts to his hind legs he is as constantly subdued, the bear in that case leaping upon his back, which he never quits until he has worried him to death.

The Nordland horses are also small, and it is a pretty general remark, that the nearer we approach the pole the more diminutive are these animals. Those of the West Nordland are short and thick; the upper part of their legs is long, and the under short, and without hair; they are generally very temperate, sure-footed, and climb the highest mountains with the greatest steadiness and perseverance. The pasturage of this country is so rich that the horses are always fat and in good condition, which however, they soon lose if they are taken to Stockholm; and by the same rule if a weakly horse is carried to the Nordland he soon recovers.

The Japanese horses are small, as are also those of China, although in both places some few are of a tolerable size, which are brought from the mountainous parts of those countries. Those of Tonquin, according to M. Rhodes, are strong, of a tolerable size, and very easily managed.

Horses, as before remarked, there is every reason to believe, were unknown in America on its first discovery, but upon being transported thither they multiplied in a most surprising manner, especially in Chili, which, as M. Frezier remarks, is the more surprising, since the Indians killed many to eat, and numbers through fatigue and from want of proper care. In the Phillipine Islands also horses that were taken from Europe increased in an astonishing manner in a very short time.

Horses are suffered to live wild in the Ukraine, among the Cossacks, on the river Don; here they go in troops of four or five hundred together, seldom attended with more than one or two men

on horseback; they have seldom any shelter when the ground is even covered with snow, which they scrape away with their fore feet to get at the pasture; and it is only in very hard winters, and then but for a few days, that they are lodged in the villages. These troops have a chief among them, whom they implicitly obey, and singular as it may appear, he directs their course, makes them proceed or stop at his pleasure. He seems also to have a regular command, and regulates all their movements when attacked by wolves or robbers: in this situation he assumes entirely the business of a commanding officer, and is busily engaged, during the whole time, in traversing round the troops, and if he perceives any out of their places he pushes them in with his shoulder, and actually compels them to resume their station. Without being arranged by men they march in perfect order, and pasture in perfect files or brigades, without ever mixing or separating, notwithstanding they are at perfect liberty, and without the smallest control. It is no less singular, that their chief generally maintains his situation for four or five years, but he no sooner discovers the least symptoms of inactivity than some one will come out of the herd and attack him; if he conquers he continues the command, but if subdued he is forced to fall into the ranks, and the victor becomes chief, and is obeyed by the whole troop.

The horses in Finland, as soon as the snow is off the ground, about the month of May, leave their stables, and assemble together in a particular part of the forests, where they form themselves into different troops, and afterwards no one ever separates from his own party, or intermixes with any other. When thus divided, each troop fixes upon a certain district for their pasturage, within the bounds of which they strictly keep, and never encroach even upon that belonging to another troop, though adjoining; in this manner they continue to graze while there remains any pasture, but on that becoming scarce, they all march off together to another spot, and these marches are conducted with so much order and regularity that the owners know exactly where to find their horses when they have occasion for them; in these cases, when fetched, and having done the service they were wanted for, they return back of themselves, and again join their own troop. In this manner they remain till about

the month of September, when the approach of the inclement season induces them to come home, which they do in troops, and each regularly proceeds to his own stable. At this time they are generally in good case, but the fatigue they undergo in the winter, together with the small allowance of provisions, very soon reduces them. They are small, spirited, and very docile, and roll upon the snow as familiarly as other horses do on grass.

In the Island of St. Helena there are wild horses, which, although originally transported from Europe, are extremely savage and ferocious, and, to avoid being taken, will often leap from very high precipices into the sea. In the neighbourhood of Nippes there are some not bigger than asses, but they are strong, bold, and extremely industrious. The horses in St. Domingo are of a middle size, and though many of them are caught with ropes, they seldom become docile, but generally remain restless, and almost unmanageable. In Virginia there are also horses of domestic origin, yet, from feeding in the woods, are very ferocious, and hard to be taken, and when caught, they remain exceedingly stubborn.

In some parts of Tartary they make use of large birds of prey to hunt their wild horses; they are taught to seize him by the neck or head, upon which he sets off with the greatest speed, and continues running until he is quite exhausted, without being able to extricate himself from his tormentor. The wild horses of the Mongous, and Kakas Tartars, are so swift that they often escape the arrows of the most expert hunters; they generally keep in large numbers together, and if tame ones come near they will surround them, unless they instantly take to flight. There are a great number of wild horses in Congo; they at times are seen at the Cape of Good Hope, but the inhabitants preferring those from Persia they are scarcely ever caught.

In the early part of this work I mentioned, that from the observations of horse-breeders it was the general received opinion, that the male had more influence upon the offspring: than the female; and I then suggested some reasons which it rendered to me very doubtful, but experiments and observations have since

convinced me, that the fact does not only hold good with respect to horses, but also in the human race, and in every species of animals, that the male has infinitely more influence on the exterior form of the young than the female, and that he in fact is the type of the race. Nor does the remark I have made, that the females constitute the unity of the species in the least controvert this position, because that cannot be extended further than her possessing the greater facility in representing the species, but this point is more amply discussed in this work under the article Mule; from which it will appear, that notwithstanding the female may have more influence on the character of the breed, yet from her it never receives any improvement, which faculty is solely possessed by the male.

THE ASS.

If we consider this animal with attention, he appears only to be a horse degenerated. The perfect similitude in conformation of the brain, lungs, stomach, intestinal conduit, heart, liver, and other viscera, and the great resemblance of the body, legs, feet, and the entire skeleton, supports this opinion. We may also attribute the slight differences, which are found between these two animals, to the influence of the climate and food, and to the fortuitous succession of many generations of small wild horses, which, gradually degenerating, have at last produced a new and fixed species; or, rather a succession of individuals alike, all vitiated in the same manner, sufficiently differing from a horse, to be looked upon as another species. What appears to favour this idea is, that horses vary much more than asses in their colour; they have consequently been longer domestic, since all domestic animals vary much more in their colour than wild ones of the same species. The greater number of wild horses, of which travellers speak, are small, and have, like the ass, grey hair, and the tail naked and frizzled at the end: there are also some wild horses, and even domestic ones, which have a black stripe on the back, and other marks, which nearly resemble both wild and domestic asses.

Again, if we consider the difference of the temperament, disposition, and manners; in a word, the organization of these two animals, and, above all, the impossibility of mixing the breed, so as to make one common species, or even an intermediate species, which may be renewed; it appears a better founded opinion to think that these animals are of a species equally ancient, and originally as essentially different as they are at present. The ass differs materially from the horse in the smallness of the size, largeness of the head, length of the ears, hardness of the skin, nakedness of the tail, the form of the rump, and the dimensions of the neighbouring parts, the voice, the appetite, manner of drinking, &c. Can we then suppose that the horse and the ass came originally from the same stock? are they of the same family, or not? and have they not always been different animals?

This question of which philosophers will find the generality, difficulty, and consequences, and which we treat of in this article, because it here offers itself for the first time, appertains to the production of beings nearest to each other, and renders it necessary that we should consider nature under a new point of view. If from the immense variety of animated beings which people the universe, we chuse an animal, or even the body of man, to serve as a foundation to our knowledge, and to find out, by way of comparison, the other organized beings, we shall find that each possesses an independent existence, and that all vary, by different gradations, almost to infinity; there exists also, at the same time, a primitive and general design, which we may trace very far, and of which the gradations are much slower than those of the form, and other apparent relations, for, without mentioning the organs of digestion, circulation and generation, which appertain to all animals, and without which they could neither subsist nor reproduce, there is even in the parts which contribute most to the variety of the exterior form a prodigious resemblance, which necessarily calls to our minds an original design, upon which all seem to have been projected and executed. The body of a horse, for example, which, by a single glance of the eye, appears so different from the body of a man, when it is compared part by part, instead of surprising by the difference, only

astonishes by the singular and almost perfect resemblance, in fact, take the skeleton of a man, bend downwards the bones of the pelvis, shorten those of the thighs, legs, and arms, lengthen those of the feet and hands, join the phalanges, lengthen the jaws, by shortening the frontal bone, and extend the spine of the back, this skeleton would cease to represent the remains of a human figure, and would be the skeleton of a horse; for it is easy to suppose, that in lengthening the spine of the back and jaws we augment, at the same time, the number of the vertebræ, ribs, and teeth; and it is only by the number of those bones, which may be looked upon as accessory, and, by the prolongation, the shortening, or junction, of the others, that the skeleton of a horse differs from that of the human body. We see in the description of the horse these facts too well established to doubt; but, to follow these relations still further, let us consider separately some essential parts of the structure; for example, we find ribs in all quadrupeds, in birds, and in fish; and we find the vestiges even in the shell of the turtle. Let us also consider, that the foot of a horse, so different in appearance from the hand of a man, is, notwithstanding composed of the same bones, and that we have, at the extremity of each of our fingers, the same little bone resembling a horse-shoe, which terminates the foot of that animal. From this we may judge if this hidden resemblance is not more marvellous than the apparent differences; if this constant conformity and design followed from man to quadrupeds, from quadrupeds to cetaceous animals, from cetaceous animals to birds, from birds to reptiles, from reptiles to fish, &c. in which the essential parts, as the heart, intestines, spine, senses, &c. are always found, does not imply, that, in creating animals the Supreme Being has followed but one idea, and varied it, at the same time, in every possible manner, that man may equally admire the magnificence, execution, and simplicity of the design.

In this point of view, not only the ass and horse, but man, monkies, quadrupeds, and all animals, may be looked upon as making but one family; but ought we, therefore, to conclude, that in this great and numerous family, which the Almighty has conceived and created from nothing, there are smaller families projected by

nature and produced by time? some of which are composed only of two individuals, as the horse and the ass; others of several individuals, as the weazle, the pole-cat, the ferret, &c. and also that in vegetables there are families of ten, twenty, thirty plants, &c. If these families existed, in fact, they could only be formed by the mixture, the successive variation, and the degeneration of the original species; and, if we admit, for once, that there are families in plants and animals, that the ass is of the family of the horse, and that he only differs because he has degenerated; we may say, with as much propriety, that the monkey belongs to the family of man, and he is a man degenerated; that man and the monkey had but one common origin, like the horse and ass; that each family, as well in animals as in vegetables, come from the same origin, and even that all animals are come from one species, which, in the succession of time, by improving and degenerating, has produced all the races of animals which now exist.

The naturalists, who have so easily established families and vegetables, do not seem to have considered the whole extent of these consequences, which would reduce the immediate product of the creation, to any number of individuals however small; for, if it was once proved, that animals and vegetables were really divided into families, and that there was a single instance of one species having been produced by the degeneration of another; if it was true, that the ass was only a horse degenerated, there would be no bounds to the power of nature, and, we might, with equal reason suppose, that from one single individual being, in the course of time, she might have produced all the organized bodies which are now spread over the universe.

But it is certain, by revelation, that all creatures have equally participated in the favours of creation; that the two first of each species, were formed by the hands of the Creator, and we ought to believe, that they were then nearly such as they appear at present in their descendants. Besides, since Nature has been observed with attention, from the time of Aristotle to the present, not a single new species has been seen, notwithstanding the rapid motion that drags on, or dissipates the parts of matter, notwithstanding the infinite

number of combinations which must have been in the space of twenty centuries, notwithstanding the fortuitous couplings of different animals, from which nothing has ever resulted but vitiated and sterile individuals, and such as have not been able to become a stock for new generations. Were the exterior and interior resemblance in some animals still greater than they are between the horse and the ass, we ought not to confound these animals, nor give them to one common origin, for if they, in fact, came from the same stock, we might bring them back to their original state by new alliances, and undo by time, what time is already supposed to have done.

We must also consider, that although nature proceeds by gradual, and frequently by imperceptible degrees, the intervals are not always the same. The more exalted the species, the fewer they are in number, and the shades by which they are separated, are more conspicuous; the smaller species, on the contrary, are very numerous, and have more affinity to each other, so that we are the more tempted to confound them together in the same family; but we should not forget that these families are our own works, that we have made them for the ease of our memories, that if we cannot comprehend the real relations of all beings, it is ourselves, not nature that is in fault, who knows not these pretended families; and, in fact, contains only individuals.

An individual is a separate detached being, and has nothing in common with other beings, excepting that it resembles, or rather differs from them. All similar individuals which exist on the earth, are considered as composing the species of those individuals. Notwithstanding, it is neither the number nor collection of similar individuals which form the species, but the constant succession and renewing of these individuals which constitute them; for, a being which existed for ever would not be a species. Species, then, is an abstract and general term, the meaning of which can only be determined on by considering nature in the succession of time, and in the constant destruction and renewal of beings. It is by comparing the present state of nature with that of the past, and actual individuals with former, that has given us a clear idea of what is called species: for a comparison of the number or resemblance of

individuals, is only an accessory idea, and frequently independent of the first; for, the ass resembles the horse more than the barbet the greyhound, notwithstanding the latter are but one species, since they produce fertile individuals, but the horse and ass are certainly of different species, since they produce together vicious and unfruitful individuals.

It is then in the characteristic diversity of the species, that the shades of nature are the most sensible and best marked; we may even say, that these shades between the species are the most equal and least variable, since we may always draw a line of separation between two species: that is, between two successions of individuals, who reproduce and cannot mix, as we may also unite into one species two successions of individuals which would reproduce by mixing. This is the most fixed point that we have in Natural History; all other resemblances, and differences that we can make in the comparison of beings, are neither so constant, real, nor certain. These intervals are the only lines of separation that will be found in this work; we shall not divide beings otherwise than they are in fact: each species, each succession of individuals which reproduce and cannot mix, will be considered apart, and treated separately; and we shall only make use of families, kinds, orders, and classes, which are marked out by Nature herself.

Species, then, being nothing more than a constant succession of individuals alike, and which reproduce, ought only to extend to animals and vegetables, and that it is only an abuse of the term, and confounding ideas when used to point out the different kinds of minerals. We should not then look on iron as one species, and lead as another species, but only as two different metals, and should be distinguished by lines of separation different from those made use of with respect to animals and vegetables.

But to return to the degeneration of beings, and particularly to that of animals. Let us examine more nearly still, the steps of nature, in the variety which she offers to our view; and, as the human species is best known to us, let us observe how far these steps of variation extend. Men differ in colour from black to white, they differ

also one half in their height, bulk, lightness, strength, &c. and above all in their understandings; but this last quality having nothing to do with matter, ought not to be considered here. The others are the usual variations of nature, proceeding from the influence of climate and food; but, these differences of size and colour do not prevent the Negro and the White, the Laplander and Patagonian, the Giant and Dwarf, from mixing together, and producing fertile individuals; and consequently these men, so different in appearance, are all of one species, since this constant reproduction is that which constitutes distinct species. Besides these general variations, there are others more particular, which are also perpetrated; such as the enormous legs of the men who are called of the race of St. Thomas, in the island of Ceylon; the red eyes and white hair of the Dariens and Chacrelas, the six fingers and toes in certain families, &c. These singular varieties are either accidental defaults or excesses, which originating in some individuals, are propagated from race to race, like hereditary defects and diseases; but these differences should not be regarded as forming separate species, since the extraordinary races of these men with large legs, or six fingers, may mix with the ordinary races, and produce fertile individuals. The same thing may be said of all other deformities communicated from parents to their children. Thus far the errors of Nature, and the varieties among men extend, and if there are individuals which degenerate still more, those individuals reproducing nothing, neither alter the constancy nor uniformity of the species. Thus man constitutes but one and the same species, and, though this species is perhaps more numerous, inconstant, and irregular in all its actions, yet the prodigious diversity of nourishment, climate, and so many other combinations as may be supposed, have not produced beings different enough from each other to constitute new species, and at the same time so like ourselves, that we are not able to deny but that we are of the same race.

If the Negro and the White could not procreate together, or if their offspring remained unfruitful, they would be two distinct species; the negro would be to man what the ass is to the horse; or rather, if the white was the man, the negro would be a distinct animal like the

monkey, and we might with reason think, that the white and the negro had not the same common origin. But this supposition is denied by the fact; for since all varieties of men can communicate together and transmit their kind, all men must have come from the same stock, and are of the same family.

When two individuals of the same species cannot produce together, it is possibly occasioned by some slight difference of temperament, or accidental fault in the organs of generation. For two individuals of different species, to produce other individuals which do not resemble the one or the other in no fixed particular, and can consequently produce nothing like themselves, there needs but a certain degree of conformity between the forms of their bodies, and their organs of generation. But what an immense number of combinations are even necessary, even to suppose that two animals, male and female, of a certain species, have so much degenerated as to form a new species, and are no longer able to produce with any of their own kind but themselves! And also to suppose that the production of these two degenerated animals should follow exactly the same laws which are observed in the procreation of perfect animals; for a degenerated animal is itself a vitiated production, and how can a vitiated, depraved origin, become a new stock, and not only produce a constant succession of beings, but even to produce them in the same manner, and by following the same laws which reproduce animals, the origin of which are pure and uncorrupted?

Although we cannot demonstrate that the production of a new species, by degeneration, is a thing impossible in nature, yet the number of probabilities to the contrary render it incredible, for if some species have been produced by the degeneration of others, if that of the ass absolutely originated from the horse, it can only have happened by a succession of imperceptible degrees, and there must necessarily have been a greater number of intermediate animals, the first of which would have differed but slightly in its nature from the horse, and the latter would have approached by degrees to that of the ass. Upon the ground of this supposition we might ask, what is become of these intermediate beings? Why do we not see their

representatives, their descendants? and why do the two extremes alone remain?

The ass is then an ass, and not a horse degenerated; a horse with a naked tail. The ass is neither a stranger, an intruder, nor a bastard; he has like all other animals, his family, his species, and his rank; his blood is pure and untainted, and although his race is less noble, yet it is equally good, equally ancient, with that of the horse. Why then is there so much contempt for an animal so good, so patient, so steady, and so useful? Do men despise, even among animals, those which serve them best and at the smallest expence? We educate the horse, take care of, instruct, and exercise him, whilst the ass is abandoned to the power of the lowest servant, or the tricks of children, so that instead of improving, he must lose by his education, and if he had not a fund of good qualities he would certainly lose them, by the manner in which he is treated. He is the sport of the rustics, who beat him with staffs, abuse, overload, and make him work beyond his strength. We do not consider that the ass would be in himself, and, with respect to us, the most beautiful, best-formed, and most distinguished of animals, if there were no horse in the world; he, however, holds the second instead of the first rank, and it is from that only he appears to be of no value. It is comparison alone degrades him; we look at, and give our opinions, not of himself, but comparatively with the horse. We forget that he is an ass, that he has all the qualities of his nature, all the gifts attached to his species, and only think of the figure and qualities of the horse which are wanting in him, and which he ought not to have.

He is naturally as humble, patient, and quiet, as the horse is proud, ardent, and impetuous; he suffers with constancy, and perhaps with courage, chastisement, and blows; he is moderate both as to the quantity and quality of his food; he is contented with the hardest and most disagreeable herbs, which the horse, and other animals, will leave with disdain; he is very delicate with respect to his water, for he will drink none but the clearest, and from rivulets which he is acquainted with; he drinks as moderately as he eats, and does not put his nose in the water through fear, as some say, of the shadow of his ears: as care is not taken to comb him, he frequently

rolls on the grass, thistles, and in dust. Without regarding his road, he lies down and rolls as often as he can, and seemingly to reproach his master for the little care he takes of him, for he never wallows in the mud or in the water; he even fears to wet his feet, and will turn out of his road to avoid it; his legs are also drier and cleaner than those of the horse; he is susceptible of education, and some have been seen sufficiently disciplined for a public shew.

When young, they are sprightly, handsome, light and even graceful, but they soon lose those qualities either from age or bad treatment, and become slow, stubborn, and headstrong. The ass is ardent in nothing but love, or rather when under the influence of that passion he is so furious that nothing can retain him; he has been known to exhaust himself by excessive indulgence, and die some moments afterwards. As he loves with a kind of madness, he has also the strongest attachment to his progeny. Pliny assures us, that when they separate the mother from her young, she will go through fire to recover it. The ass is also strongly attached to his master, notwithstanding he is usually ill-treated; he will scent him at a distance, and distinguish him from all other men. He also knows the places where he has lived, and the ways which he has frequented. His eyes are good, and smell acute, especially with regard to females; his ears are excellent, which has also contributed to his being numbered among timid animals, who it is pretended have all long ears, and the hearing extremely delicate. When he is overloaded, he shews it by lowering his head and bending down his ears: when greatly abused, he opens his mouth and draws back his lips in a most disagreeable manner, which gives him an air of derision and scorn. If his eyes are covered, he remains motionless; and when he is laid down, and his head so fixed, that one eye rests on the ground and the other being covered with a piece of wood, he will remain in that situation without endeavouring to get up. He walks, trots, and gallops like the horse, but all his motions are smaller and much slower. He can however run with tolerable swiftness, but he can hold it only for a small space, and whatever pace he uses, if he is hard pressed, he is soon fatigued.

The horse neighs, but the ass brays; which he does by a long, disagreeable, and discordant cry, by alternative discords of sharp and flat. He seldom cries but when he is pressed by love or appetite. The she-ass has the voice clearer and more shrill; those that are gelded, bray very low, and though they seem to make the same efforts, and the same motions of the throat, yet their cry cannot be heard very far.

Of all the animals covered with hair, the ass is least subject to vermin, which apparently proceeds from the peculiar hardness and dryness of the skin, and for the same reason he is less sensible than the horse to the whip, and stinging of flies.

At two years and a half old the first middle incisive teeth fall out, and the others on each side soon follow; they are renewed at the same time, and in the same order as those of the horse. The age of the ass is also known by his teeth in the same manner. From the age of two years and a half, the ass is in a state to engender; the female is still more early and quite as lascivious, so that unless she is beaten to allay her ardour, she seldom conceives. The usual time of her being in heat is May or June; when pregnant it soon goes off, and at the tenth month milk is found in her dugs; she brings forth at the twelfth, and frequently there are found solid pieces of flesh in the liquor of the amnios, resembling the hippomanes of a foal. Seven days after delivery she is capable of receiving the male, so that we may say she is constantly rearing and engendering. She only produces one foal, and we have scarcely ever heard of her having two. At the end of five or six months the foal may be weaned, and it is even necessary if the mother is pregnant. The stallion ass should be chosen from the largest and strongest of his species; he must at least be three years old, but should not exceed ten; his legs should be long, body plump, head long and light, eyes brisk, nostrils and chest large, neck long, loins fleshy, ribs broad, rump flat, tail short, hair shining, soft to the touch, and of a deep grey.

The ass, like the horse, is three or four years in growing, and lives also like him 25 or 30 years; it is said the female usually lives longer than the male; but, perhaps, this happens from their being

often pregnant, and at those times having some care taken of them, instead of which the males are constantly worn out with fatigue and blows. They sleep less than the horse, and do not lie down to sleep, except when they are exceedingly tired. The male ass lasts also much longer than the stallion; the older he is the more ardent he appears, and in general the health of this animal is much better than that of the horse; he is less delicate and not near so subject to maladies. The ancients knew of no disease they had but the glanders, and which, as we have already said, they are much less subject to than the horse.

There are among asses different races, as among horses, but they are much less known, because they have not been taken the same care of, or followed with the same attention; but we cannot doubt that they originally came from warm climates. Aristotle assures us, that there were none in his time in Scythia, nor the other northern countries, nor even in Gaul; which, he says, is too cold a climate, and adds, that a cold climate either prevents them from procreating their species, or causes them to degenerate, which is the reason they are small and weak in Illyria, Thrace, and Epirus. They are still the same in France, though they have been for many ages naturalized, and though the coldness of the climate is much lessened within these two thousand years, by the number of forests destroyed, and marshes dried up; but it is more certain, they have been but newly introduced into Sweden and the other northern countries. They appear to have come originally from Arabia; and to have passed from Arabia into Egypt, from Egypt into Greece, from Greece into Italy, from Italy into France, and from thence into Germany, England, Sweden, &c. for they are, in fact, weak and small, in proportion to the coldness of the climate.

This migration seems to be well proved by the account of travellers. Chardin says, "that there are two kinds of asses in Persia, the asses of the country, which are slow and heavy, and which are only made use of to carry burthens, and a race of Arabian asses, which are very beautiful, and certainly the first asses in the world; their skin is glossy, their heads high, and have high light feet, which they raise with grace, walk well, and are solely employed to ride on.

The saddles which they use with them are like a bat, round on one side, flat on the other; they are made of woollen cloth, or tapestry, and have harness and stirrups, and the rider sits on them nearer the crupper than the neck. There are some of these asses which even cost about 18 pounds sterling, and there are none sold under 25 pistoles. They are broke like horses, but are taught no other pace than the amble; the manner of teaching them is by tying their hind and fore-legs of the same side with two ropes of cotton, which are made to the length of the step the ass is to pace, and are suspended by a cord fastened to the girth. A groom mounts and exercises them in this pace morning and evening. Their nostrils are slit in order to enable them to breathe more freely, and they go so fast, that a horse must gallop to keep up with them."

It is to be regretted that the Arabians, who have so long taken care to preserve the breed of their horses, had not paid the same attention to the ass, since from the above it appears that Arabia is not only the first, but also the best climate in the world for both. From Arabia they have passed into Barbary and Egypt, where they are handsome and high in stature. In the Indies, and in Guinea, they are larger, stronger, and better than the horses of those countries: there are a great number of them at Madura, where one of the most considerable and noble tribes of the Indians pay particular homage to them, because they believe that the souls of all their nobles pass into the bodies of asses; in short, asses are found in great numbers in all parts of the east, from Senegal to China, and wild asses are more commonly found than wild horses.

The Latins, after the Greeks, have called the wild ass *onager*, which animal must not be confounded, as some naturalists and travellers have done, with the zebra, because the zebra is of a different species from the ass. The onager, or wild ass, is not striped like the zebra, and is not near so elegant in figure. Wild asses are found in some of the islands of the Archipelago, and particularly in that of Cerigo; there are also many in the deserts of Lybia and Numidia. They are grey, and run so fast that the horses of Barbary only can beat them in hunting. When they see a man they give a loud cry, turn themselves about, and throw up their legs, then stop,

and do not attempt to fly till he comes very near them: they are taken in snares made with ropes, go in troops to pasture, and their flesh is also eaten. There were, in the time of Marmol, wild asses in Sardinia, but they were less than those of Africa; Pietro della Valle says he saw a wild ass at Bassora, whose figure differed in no respect from a domestic one, only of a lighter colour, and had from the head to tail a stripe of white; he was also much livelier and swifter than the asses usually are. Olearius mentions, that one day the King of Persia made him go up with him to the top of a little building, in form of a theatre, to eat fruit and sweetmeats; that after the repast, 32 wild asses were brought in, when the king amused himself for some time by firing at them, both with bullets and arrows, and having wounded some, he afterwards permitted the ambassadors, and other lords, to do the same; that it was no small diversion to see these asses with a number of arrows sticking in them, and, from the pain they felt, biting and rolling over each other; that when they were all killed and laid before the king they were sent to the royal kitchen at Ispahan; the Persians setting so great a value on the flesh of these wild asses that they have a proverb expressive of it. But it does not appear that these 32 wild asses were all taken in the forests, and therefore it is probable they were asses brought up in large parks, for the pleasure of hunting and eating them.

Neither asses nor horses were found in America, although the climate of South America is perfectly consonant with their natures. Those which the Spaniards have transported from Europe, and left in large islands, and on the Continent, have greatly multiplied. In some parts they are found in troops, and are taken in snares like wild horses.

The he-ass with the mare produce large mules, and the horse with the she-ass produce small mules, differing from the first in many respects; but as we shall treat of mules in a particular chapter, we shall finish the history of the ass with that of its properties, and the uses to which the animal may be put.

As wild asses are unknown in these climates we cannot in reality say whether their flesh is or is not good to eat; but it is certain, that

the flesh of the domestic ass is extremely bad, and harder than that of the horse. Galen says, that it is a pernicious aliment, and occasions diseases. The milk of the ass, on the contrary, is an approved and specific remedy for certain complaints and its use has been transmitted to us from the Greek. To have it good we should chuse a young healthy she-ass, full of flesh, that has lately foaled, and has not since been with the male: the young one should be taken from her, and care must be taken to feed her well with hay, oats, barley, and grass, whose qualities may have an influence on the disease, with particular care not to let the milk cool, nor even to expose it to the air, which will spoil it in a little time. The ancients also attributed great virtue to the blood, &c. of the ass, but which experience has not confirmed.

As the skin of the ass is extremely hard, and very elastic, it is used for different purposes, such as to make drums, shoes, and thick parchment for pocket-books, which is slightly varnished over: it is also with asses' skin that the Orientals make their sagri, which we call *shagreen*. It is also probable that the bones of asses are harder than those of other animals, since the ancients made their best-sounding flutes of them.

The ass in proportion to his size, can carry the greatest weight of any animal; and as it costs but little to feed him, and he scarcely requires any care, he is of great use in country business; he also serves to ride on, as all his paces are gentle, and he stumbles less than the horse; he is frequently put to the plough in countries where the earth is light, and his dung is an excellent manure.

THE OX.

The surface of the earth, adorned with its verdure, is the inexhaustible and common food from which man and animals draw their subsistence. Every thing in nature that has life, is nourished by that which vegetates; and vegetables, in turn, exist on the spoil of every thing that has lived or vegetated. To live, it is necessary to destroy; and it is only by the destruction of beings, that animals can

live themselves and multiply. God, in creating the first individuals of each species of animals and vegetables, has not only given form to the dust of the earth, but also gave it animation, by inclosing in each individual a greater or less quantity of active principles, organs, living molecules, incapable of being destroyed, and common to all organized beings. The molecules pass from body to body, and are equally the causes of life, and the continuation of it, to the nourishment and growth of each individual. After the dissolution of the body, after its reduction to ashes, these organic molecules, on which death has no power, survive, circulate in the universe, pass into other beings and produce life and nourishment. Every production, every renovation, or increase by generation, by nutrition, or by growth, implies a preceding destruction, a conversion of substance, a translation of these organic molecules which never multiply, but always subsisting in an equal number, render nature always equally alive, the earth equally peopled, and ever equally resplendent with the primitive glory of Him who created it.

To take beings in general, the total quantity of life is always then the same; and death, which seems to destroy all, destroys nothing of that primitive life which is common to all organized beings. Like all other subordinate powers, death attacks only individuals, strikes only the surface, and destroys the form; but can have no power over matter, and can do no harm to Nature, which only appears to more advantage. She does not permit him to destroy the species, but leaves individuals to his power, to shew herself independent both of Death and Time; to exercise every instant, her power, which is always active; to manifest her plenitude by her fertility, and to make the universe, in reproducing and renewing its beings, a theatre always filled, and a spectacle always new.

That there may be a constant succession of beings, it is necessary there should be a mutual destruction; that animals may subsist and be nourished, vegetables, or other animals must be destroyed; and as, before and after the destruction, the quantity of life remains always the same, it should, as if it was indifferent to nature which species were more or less consumed; like an economical mother, however, in the midst of abundance, she has

fixed bounds to her expences, and prevents unnecessary waste, in giving but to a few animals the instinct of feeding on flesh, while she has abundantly multiplied both the species and individuals which feed on plants and vegetables. She seems to have been prodigal to the vegetable kingdom, and to have bestowed on each great profusion and fecundity; greatly perhaps to second her views, in maintaining and even establishing this order on the earth; for in the sea, we find almost all the species are voracious; they live on their own kind, or on others, and devour perpetually, without ever destroying any particular species, because the fecundity is as great as the depredation, and because all the consumption turns to the profit of reproduction.

Man knows how to exercise his power on animals; he has chosen those whose flesh pleases his taste, has made them his domestic slaves, and multiplied them more than nature would have done; and by the pains he takes for their increase, seems to have acquired a right to slaughter them; but he extends this right much farther than his wants require; for he also makes war with savage animals, birds, and fishes, and does not even confine himself to those of the climate which he inhabits, but seeks at a distance, and even in the midst of the ocean, for new food. All nature seems insufficient to satisfy the intemperance, and the inconstant variety of his appetites. Man alone consumes more flesh than all the other animals together devour; he is, then, the greatest destroyer; and this more from custom than necessity. Instead of using with moderation the blessings which are offered him, instead of disposing of them with equity, instead of increasing them in proportion as he destroys, the rich man places all his glory in consuming, in one day, at his table, as much as would be necessary to support many families; he equally abuses both animals and his fellow-creatures, some of whom remain starving and languishing in misery, and labour only to satisfy his immoderate appetite, and more insatiable vanity, and who, by destroying others through wantonness, destroys himself by excess.

Nevertheless, man, like some other animals, might live on vegetables; and flesh, which seems so analogous to flesh, is not a better nourishment than corn or bread; that which contributes to the

nutrition, development, growth, and maintenance of the body, is not that visible matter which seems to be the texture of flesh or herbs, but of those organic particles which they both contain, since the ox, by eating grass, acquires as much flesh as either man or beast, that live on flesh and blood. The only real difference between these aliments is, that, in an equal quantity, flesh, corn and seeds, contain more organic particles than grass, leaves, roots, and other parts of plants; of which fact we may be certain by observing infusions of these different matters, insomuch that man, and other carnivorous animals, whose stomachs and intestines are not sufficiently capacious to admit a great quantity of aliment at once, cannot eat herbs enough to receive a quantify of organic particles sufficient for their nutrition; and it is for this reason that man, and those animals which have but one stomach, can only live on flesh and corn, which, in a small bulk, contains a great quantity of these organic and nutritive particles, while the ox[C], and other animals, that chew the cud, who have many stomachs, one of which is very capacious, and consequently can contain a large mass of herbage, can extract therefrom a sufficient quantity of these organic particles for their nourishment, growth, and multiplication; the quantity here compensates for the quality of the food, but the foundation is the same; it is the same matter, the same organic particles, which nourishes man, the ox, and all other animals.

[C] The term ox is generally applied to cattle in general, but when used in its confined sense, we shall mark it with *Italics*.

Some may observe that the horse has but one stomach, and even that very small; that the ass, the hare, and other animals, which live on herbage, have also but one stomach, and, consequently, this explanation, though it seems probable, is not well grounded. But these exceptions, so far from controverting, appear to confirm this opinion, for although the horse has one stomach he has pouches in the intestines, so very capacious that they may be compared to the paunch of ruminant animals; and hares have a blind gut of so great a length and diameter, that it is at least equal to a second stomach; thus it is not astonishing that these animals can live on herbage alone. We find in general it is wholly on the size of the stomach and intestines that their manner of feeding depends; for ruminating quadrupeds, as the ox, sheep, goats, camels, &c. have four stomachs, and the intestines of a prodigious length; these live on herbage, and that alone suffices them. Horses, asses, hares, rabbits, guinea pigs, &c. have but one stomach, but they have a gut equivalent to a second, and live on herbs and corn. Wild boars, hedgehogs, &c. whose stomachs and bowels are less capacious, eat but little grass, and live on corn, fruits, and roots. Those, such as the wolf, fox, tyger, &c. which have the stomach smaller than other animals, in proportion to the size of their bodies, are obliged to chuse the most succulent aliments; and those which abound most with organic particles, and to eat flesh and blood, corn, and fruits.

It is on this necessary and physical relation, then, much more than on the varieties of taste, that is founded the diversity which we see in the appetites of animals, for if necessity did not determine them oftener than taste how could they devour corrupted flesh with as much avidity as that which is fresh and juicy? Why do they eat equally of all kinds of flesh? We see that domestic dogs, which have it in their power to chuse, constantly reject certain meats, such as the woodcock, thrush, pork, &c. whilst wild dogs, wolves, foxes, &c. eat equally the flesh of the hog, woodcock, birds of all species, and even frogs, of which I once found two in the stomach of a wolf. When

they can neither get flesh nor fish, they will eat fruit, corn, grapes, &c. but they always prefer that food, which, in a small portion, contains a large quantity of nutritive or organic particles, proper for the nourishment and subsistence of the body.

If these are not sufficient proofs let us consider the method made use of to fatten cattle. They begin by castration, thus stopping the passage through which the organic molecules escape in most abundance; then, instead of leaving the *ox* to his usual pasture, of herbage alone, they give him bran, corn, and turnips; in a word, more substantial aliments than grass. In a little time the flesh, juices, and fat of the animal augments, the fat abounds, and, from a flesh hard and dry, forms a viand so succulent and good, that it is the chief of our best repasts.

It also results from what has been said, that man, whose stomach and intestines are not so capacious with respect to the size of his body, could not live on herbage alone; yet it is proved by facts, that he can live on vegetables, corn, and seeds of plants, since there are whole nations, and particular orders of men, who are forbid by their religion to eat of any thing that has had life; but these examples, though supported by the authority of Pythagoras, and recommended by some physicians, do not appear sufficient to convince us, that it would benefit the health of mankind, or that the human species would multiply in a greater proportion, if they lived on vegetables and bread; the rather as peasants, whom the luxuries, and the sumptuousness of the great, reduce to this mode of living, languish and die much sooner than persons in a middle station of life, to whom wants and excesses are equally unknown.

Next to man, animals which live on flesh only are the greatest destroyers: they are both the enemies of nature, and the rivals of man. It is only by a careful attention that our flocks and fowls can be sheltered from birds of prey, the wolf, fox, weazle, &c. and it is only by a continual war that we can preserve our grain, fruits, and even clothing from the voracity of rats, moths, mites, &c. for insects are among those creatures which do more harm than good.

The ox, sheep, and those other animals which feed on grass, are not only the best, most useful, and most precious to man, but consume and cost him least. The ox, above all the rest, is the most excellent in this respect, for he gives as much to the earth as he takes from it, and even enriches the ground on which he lives; while the horse and the greatest part of other animals, in a few years impoverish the best pasture-lands.

But these are not the only advantages that this animal procures to man; without the ox, the poor and the rich would have much difficulty to live; the earth would remain uncultivated, the fields, and even the gardens would be dry and sterile; it is on him that all the work of the country falls, he is the most useful domestic of the farmer, and does all the labour of agriculture[D]. Formerly he formed the only riches of mankind, and still he is the basis of the riches of states, which only flourish, and are supported by the cultivation of the lands, and the number of their cattle; since these are the only real wealth we possess, all others, even gold and silver, being only arbitrary representations, and are of no worth but what the produce of the earth can give them.

[D] Modern practice, at least in England, proves that with all the superior qualities of the ox, he is not entitled to this particular encomium, since in many parts it is found the horse can be much more advantageously employed in the culture of lands, and even in some countries the service of the ox in that respect is quite exploded.

That the ox is not so proper as the horse, ass, camel, &c. for carrying burthens, the form of his back and loins clearly demonstrate; but the thickness of his neck, and the broadness of his shoulders, sufficiently indicate his qualification for the yoke. Although it is in this manner that he draws with the most advantage, yet in some provinces of France they oblige him to draw with his horns; for which they give as a reason, that when harnessed in this manner he is managed with more ease. His head is very strong, and he may draw very well when so yoked, but certainly with much less advantage than when he draws by the shoulders. He seems to be made on purpose for the plough; the size of his body, the slowness of his motions, the shortness of his legs, and even his tranquillity and

patience when he labours, concur in making him proper for the cultivation of the ground, and more capable than any other animal of overcoming the constant resistance that the earth opposes to his efforts. The horse, although perhaps as strong as the ox, is, however, less proper for this work, his legs are too long, his motions too great and sudden, and he is also more impatient, and more easily fatigued; we take from him his lightness, all the suppleness of his motion, and all the grace of his attitude, when he is put to this laborious work, which requires more constancy than ardour, and more strength and weight than swiftness.

In those species of animals which man has formed into flocks, and whose multiplication is his principal object, the females are more useful than the males. The produce of the cow, is a benefit almost perpetually renewed; the flesh of the calf is healthy and delicate, the milk; is excellent food at least for children; butter relishes the greatest part of our victuals, and cheese is the common food of the country people. How many poor families are reduced to live entirely on their cow! These same men who toil from morning to night, groan with anguish, exhausted with continual labour of cultivating the ground, obtain nothing from the earth but black bread, and are obliged to give to others the flour and substance of their grain. It is through them that the harvests are abundant, though they partake not thereof. These men who breed and multiply our cattle, who take care of, and are constantly occupied with them, dare not enjoy the fruits of their labour; they are debarred from the use of flesh, and reduced by the necessity of their condition, or rather by the brutality of the great, to live like horses, on barley and oats, common herbs, &c.

Engraved for Barr's Buffon

Fig. 20 *Bull*
Fig. 21 *Cow*

The cow (*fig. 21.*) may also be used for the plough; and though she is not so strong as the ox, yet she is often made use of to supply

his place; but, if employed for this use, care should be taken to match her with an ox of the same size and strength; or with another cow, in order to preserve the equality of the draught, and to keep the plough in an equilibrium between the two powers attending to facilitate the labour, and preserving the tillage more regular. From six to eight *oxen* are frequently made use of for stiff land, but more especially in fallow grounds which break up in large clots, whilst two cows are sufficient to plough light, and sandy soils. The ancients confined the *ox* to 120 paces, as the extent of the furrow, he was capable of tracing without stopping; after which they suffered him to take breath a few moments before he went on with the same furrow, or began a fresh one. The ancients took delight in the study of agriculture and gloried in ploughing themselves, or at least in encouraging the labourer, and sparing him and the *ox* as much trouble as possible; but among us, those who enjoy the greatest share of the blessings of the earth are those who know least how to esteem, and to encourage the art of cultivation.

The bull (*fig. 20.*) serves chiefly for the propagation of his species, and though we can make him submit to work, yet we are less sure of his obedience, and must be on our guard against the improper use he may make of his strength. Nature has made him indocile and haughty; in rutting time he is unmanageable, and frequently furious; but by castration these impetuous motions cease, whilst it robs him of none of his strength; it rather renders him larger, weightier, and more proper for the work for which he is intended; it has also an effect upon his disposition, and makes him more tame and patient, more docile and less troublesome to the rest; a number of bulls would prove an unruly herd, which man could neither tame nor guide.

The country people adopt different modes for castration, but they in general consider the best time when the animal is between eighteen months and two years of age, as they seldom live when it is performed more early, yet those who do survive the operation, if performed while young calves, always become the largest and fattest oxen. If left to a late period they retain all the impetuous ferocity of the male sex, and are scarcely governable. The females

are commonly in season from about the 15th of April to the 15th of July; they go nine months with young, and bring forth at the beginning of the tenth; therefore calves are always plenty during the spring and summer.

The bull, like the stallion, should be chosen from the handsomest of his species; he should be large, well made, and full of flesh; his eyes black, his looks haughty and fierce, forehead open, head short, horns thick, short, and black, ears short and soft, muzzle large, nose short and straight, neck fleshy and thick, shoulders and breast large, loins firm, back straight, legs thick and muscular, tail long and well covered with hair, step firm and sure, and his coat of a reddish colour. The cows frequently retain the first, second, or third time, and as soon as they are with calf the bull takes no more notice of them, although they have still some appearance of ardour; but this usually goes off as soon as they have conceived, and they also refuse the approaches of the bull.

Cows are also subject to abortion if put to the plough, and not properly managed; and care should be taken to prevent their leaping over hedges, ditches, &c. they should also be put into the richest pastures, which, without being too humid or marshy, afford plenty of herbage. For six weeks before they calve they should be more fed than usual, giving them grass in their stalls, if summer, and, during the winter bran, lucerne, saintfoine, &c. They should not be milked from that time; the milk being necessary for the nourishment of the f[oe]tus. There are some cows in which the milk ceases a month or six weeks before they calve, but those which have milk to the last are the best mothers, and the best nurses. The milk, towards the time of calving, is generally bad, and in small quantities. More care is necessary to be taken of the cow at and after her delivery than of the mare, being apparently more weakened and fatigued. She should be put into a stable and kept warm, giving her good litter, and feeding her well, during ten or twelve days, with bean-flower, corn, oats, &c. mixed with salt water, and plenty of lucerne, saintfoine, or good grass. This time is sufficient to re-establish her strength, after which she may be brought by degrees to her usual manner of living and pasturing. Not any of her milk should be taken for the two first

months, but left solely to the calf; besides, the milk at this time is not of the best quality.

The calf should be left with his mother for five or six days, that it may be kept warm, and suck as often as it has occasion; it may then be removed, for it would weaken the cow too much if it was always kept with her. It is sufficient to let calves suck two or three times in a day; and to fatten them quickly, they should every day have raw eggs, and boiled milk and bread. At the end of four or five weeks calves thus taken care of will be excellent eating. It is sufficient to let a calf suck, designed for the butcher, thirty or forty days; but those which are intended to grow up should be suffered to suck for two months at least; the longer they are allowed to suck the stronger and larger cattle they become. Those brought forth in April, May, and June, are the fittest to be raised; for calves which come later never acquire strength enough to resist the injuries of the following winter, and almost all languish and perish with the cold. Before the milk is entirely taken from them, they should have a little good grass, or saintfoine, cut fine to accustom them by degrees to their future food; after which they should be entirely separated from the mother, and not suffered to go near her, either in the stable, or field. To the latter they should be taken every day, and suffered to remain from morning to night during the summer; but as soon as the cold begins in autumn, they should be taken out late in the morning and carried home soon in the evening; and during winter, as cold is extremely hurtful to them, they should be kept warm in a close well littered stable; and with their usual food, they should have saintfoine, lucerne, &c. and not suffered to go out, except in mild weather. Great care must be taken of them for the first winter, as it is the most dangerous time in their lives; for they get strength enough during the following summer not to fear the cold of a second winter.[E]

[E] It is evident here that our author did not draw his conclusions from a general view of the subject, but possibly rather from the practice followed in France, which, in many cases, with regard to cows and calves, is diametrically opposite to that pursued in England, both in respect to food and management.

At 18 months old, the cow arrives at puberty, and the bull when he is two years; but though they can engender at this age, it is better to keep them asunder till they are three years old. These animals are in their greatest vigour from three weeks old till nine; after this, neither cows nor bulls are fit for any thing but to fatten for the slaughter. As at two years of age they are almost at their full growth, the length of their lives is also, like that of most other animals, seven times that, or about fourteen years; they seldom live beyond fifteen.

In all quadrupeds the voice of the male is stronger and deeper than that of the female; and I believe there is no exception to this rule; though the ancients say, that the cow, the ox, and even the calf, have deeper voices than the bull; but the contrary is certain, since he can be heard much the farthest. What has afforded grounds to think that his voice is less deep, is, that his bellowing not being a simple sound, but composed of two or three octaves, the highest of which strikes the ear most forcibly, and the others are not perceived, yet if we give attention thereto, we hear a grave sound, much deeper than the voice of the cow, *ox* or calf, whose lowings are also much shorter. The bull only bellows when he is enamoured; the cow more frequently lows through fear and dread, than from any other cause; and the calf bellows from pain, want of food, or a desire of being with its mother.

The dullest and most idle animals are not those which sleep the soundest, or the longest. The sleep of the ox is short, and not very sound; for he awakes on the least noise. He usually lies on his left side, and the left kidney is always larger and fatter than the right.

Oxen, like other domestic animals, differ in colour; but the red appears the most common colour, and the redder they are, the more they are esteemed; some prefer the black, while others assert that those of a bay colour last longest; that the brown are sooner fatigued and shorter lived; that the grey, brindled, and white, are not proper for work, and are only fit to be fattened for slaughter. But whatsoever be the colour, the coat of the *ox* should be shining, thick, and soft to the touch; for if it is rough and uneven, it indicates the animal is not well, or at least of a weak constitution. An ox for the plough should

be neither too fat nor too lean; his head should be short and thick, his ears large, with a soft even coat, his horns strong, shining, and of a middling size, his forehead high, his eyes large and black, his muzzle large and flat, his nostrils wide, his teeth white and even, his lips black, his neck short, his shoulders thick and strong, his breast large, his dewlap, that is, the fore part of the neck, long, and hanging down to his knees; his loins very large, his belly spacious and prominent, his flanks thick, his haunches long, his rump round, his legs and thighs big and nervous, his back straight and full, his tail hanging down to the ground, and covered with a fine tuft of curling hair, his feet firm, his skin thick and pliable, and his muscles large and elevated; he should also be sensible of the goad, obedient to the call, and well trained: but it is only by degrees, and beginning early, that we can make him submit willingly to the yoke. At the age of two years and a half, or three years at most, we should begin to use him to subjection; if it is deferred later, he frequently becomes unmanageable. Patience, gentleness, and caresses, are the only methods to be used; violence and ill-usage only serve to make him sullen and untractable for ever: he should be stroked and caressed, and frequently fed with boiled barley, bruised beans, and other nourishing food of the same kind, mixed with a little salt, all of which he is very fond; he should be frequently tied by the horns some days before he is put to the yoke; and he should at first be yoked to the plough with another ox of the same size which is already trained. They should be tied together at the rack, and led to the same pasturage, that they may become acquainted, and habituate themselves to the same common motions. The goad should never be used at the beginning, as it would only serve to make him ungovernable. He should only work a little at a time, for he is soon fatigued when not perfectly broke; and for the same reason, he should then have more food than at another time.

The *ox* should only be worked from three years old to ten; and he should then be taken from the plough to fatten, as the flesh will be better than if he be kept longer. The age of this animal is known by his teeth and horns. The first front teeth fall out when he is ten months old, and are replaced by others which are larger and not so

white; at 16 months those on each side of the middle teeth drop out, and are replaced by others; and at three years old, all the incisive teeth are renewed; they are then all long, white, and even; and, in proportion as the *ox* advances in years, they decay, and become unequal and black. It is the same with the bull and cow; so that neither sex nor castration makes any alteration in the growth or fall of the teeth, nor does either make any difference in the casting of the horns, for they fall off at three years equally from the ox, bull, and cow; these are replaced by other horns, which, like the second teeth, fall off no more, only those of the *ox* and cow grow longer than those of the bull. The growth of these second horns is not uniform. The first year, that is to say, the fourth of the animal's age, two little pointed horns sprout, which are even, and terminate at the head by a kind of knob; the following year this knob grows from the head, pushed out by a cylinder of horn, which forms and terminates also by another knob, and so on; for as long as the animal lives, the horns continue to grow; these knobs are easily distinguished, and by which his age may be easily known, by adding three years to the number of intervals between the other knobs.

The horse eats slowly, but almost continually, the *ox* on the contrary, eats quick, and takes in a short time all the food which he requires; after which he lies down to ruminate. This difference arises from the different conformation of their stomachs. The *ox*, whose two first stomachs form but one vast bag, can, without inconvenience, receive a large quantity of grass, which afterwards, by chewing, digests at leisure. But the horse, whose stomach is single and small, can receive but a small quantity of grass, he therefore fills it in proportion as it digests, and passes into the intestines, where is performed the principal decomposition of the food. Having observed in the *ox* and the horse the successive product of digestion, but, above all, the decomposition of hay, I remarked in the ox, that at the entrance of that part of the paunch which forms the second stomach, it is reduced to a kind of green paste; that in this form it is retained in the plaits of the third stomach; that the decomposition is entire in the fourth stomach; and that scarcely any thing but the dregs passes into the intestines. In the horse on the contrary, the food is not

decomposed at all, either in the stomach or in the first intestines, where it only becomes more flexible and supple, macerated with the liquor with which it is surrounded, it arrives at the cæcum and colon, without much alteration; it is principally in these two intestines, of which the enormous capacity answers to that of the paunch of ruminant cattle, that in the horse is performed the decomposition of the food; but this decomposition is never so entire as that which is made in the fourth stomach of the ox.

For these reasons, and from the inspection of the parts, it seems easy to conceive how chewing the cud is effected, and why the horse neither ruminates nor vomits. Chewing the cud is but a vomiting without straining, occasioned by the re-action of the first stomach upon what it contains. The ox fills his two first stomachs, or portions of the paunch. This membrane acts with force on the food it contains; it is chewed but a little, and its quantity is greatly increased by fermentation. Were the food liquid, this force of contraction would occasion it to pass into the third stomach, which communicates with the other by a narrow conveyance, the orifice of which is situated in the posterior part of the first, and almost as high as the [oe]sophagus; thus this conduit cannot admit the food, until it has become somewhat fluid. The dry parts, must, therefore, rise up again into the [oe]sophagus, the orifice of which is larger than that of the conduit; in fact, they go up again into the mouth, and the animal again chews and macerates them, imbibes them afresh with its saliva, and thus by degrees liquefies them sufficient to pass into the third stomach, where it is again macerated before it goes into the fourth; and it is in this last stomach that the decomposition of the hay is finished, which is there reduced to a perfect mucilage.

What chiefly confirms the truth of this explanation is, that as long as the animals suck, or are fed with milk and other liquid aliments, they do not chew the cud; and that they chew the cud much more in winter, when they are fed with dry food, than in summer, when they eat tender grass. In the horse, on the contrary, the stomach is small, the orifice of the [oe]sophagus is narrow; and that of the pylorus very large. This alone would render chewing the cud impossible, for the food contained in this little stomach, though perhaps more strongly

compressed than in the stomach of the ox, does not mount upwards, since it can easily descend through the pylorus, which is very large; and it is not necessary that the hay should be reduced to a soft running paste, because the force of the contraction of the stomach pushes the aliment through when almost dry.

It is by this difference, then, that the ox chews the cud, and that the horse cannot perform this operation. But there is still another difference in the horse, which hinders him from chewing the cud, and is the reason why he cannot vomit; the passage of the [oe]sophagus being placed obliquely in the stomach, the membranes of which are very thick, makes a kind of gutter in them so oblique that it must close still more instead of opening by the convulsive motions of the stomach. Although this difference, as well as many others we observe in the conformation of the bodies of these animals, depend on their constant nature, nevertheless, there are in the development, more particularly in the soft parts, differences constantly in appearance, but which may, and actually do, vary from circumstances. The vast capaciousness of the ox's paunch, for example, is not entirely owing to Nature; it is not of that size in its primitive conformation, but attains it by degrees, from the large quantity of aliment it receives; for, in the calf, which is not very young, but has eat no grass, the paunch is much smaller in proportion than in the ox. This capaciousness of the paunch proceeds, then, from the extension which is occasioned by the large quantity of aliments, of which I was well convinced by an experiment that appeared to me decisive. I brought up two lambs of the same age, one on bread, the other on grass, and when they were a year old, on opening them, I found the paunch of the lamb which had lived on grass was much larger than that which had lived on bread.

It is said that *oxen* which eat slowly are more capable of working than those which eat quick; that *oxen* fed on high and dry lands are more lively, vigorous, and healthy, than those which live on low and humid grounds; that they are all stronger when fed on dry hay than when fed with grass; that they meet with more difficulty on the change of climate than horses, and that, for this reason, *oxen* for the plough should never be purchased but in their own neighbourhood.

In winter, as *oxen* do nothing[F], it is sufficient to feed them on straw, with a little hay; but at the season they work they should have more hay than straw, likewise a little bran, or a few oats. If hay is scarce they should have fresh-cut grass, leaves of ash, elm, oak, &c. but this food should be given in a small quantity, because the excess of it, being what they are very fond of, occasion them to avoid bloody urine; but lucerne, saintfoine, lupins, turnips, boiled barley, &c. are very good for them, and as they never eat more than is necessary, they should always be supplied with as much as they will take. They should not be put to pasture till about the middle of May; they should be kept at pasture all the summer; and, about the middle of October they should be brought back to fodder, only observing not to change them too suddenly from green to dry food, or from dry to green, but to bring them to it by degrees.

[F] This is not the case in England, as in many counties the farmer, excepting in hard weather, finds it the best time to keep them in full employ.

Great heat incommodes this animal more perhaps than great cold. During summer they should be brought to work at day-break, taken to the stable, or left to feed in the woods, during the heat of the day, and not yoked again till three or four in the afternoon. In spring, winter, and autumn, they may be worked from eight or nine in the morning, till five or six in the evening. They do not require so much care as horses, yet to keep them healthy and vigorous they should be curried every day, and their hoofs carefully greased and washed; they should be taken to drink at least twice a day; they are fond of water that is fresh and cool, while the horse loves it muddy and luke-warm.

Nearly the same food and care are requisite for the cow as the *ox*; but the cow that suckles requires more particular attention, as well in the chusing as in the management. It is said, that black cows give the best milk, and that white cows give the most: but of whatever colour, she should be fleshy, have a brisk eye, and be light in her walk; she should be young, her milk plentiful, and of a good kind; she should be milked twice a day in summer, and once in

winter; and, if we would increase the quantity, she must be fed with more succulent food than herbage.

Good milk is neither too thick, nor too thin; its consistence should be such, that a drop should preserve its roundness without running. In colour it should be of a beautiful white: that which is inclinable to blue or yellow is worth nothing; its taste should be sweet, without any bitterness or sourness. It is better in the month of May, and during the summer, than in winter; and it is never perfectly good but when the cow is of a proper age, and in good health. The milk of young heifers is too thick, that of old cows is too dry, and during the winter it is too thick. The milk of the cow is not good when she is in season, near her time, or has lately calved. In the third and fourth stomachs of the calves which suck, there are clots of curdled milk, which, dried in the air, serve to make runnet, and the longer it is kept the better it is, and it requires but a small quantity to make a great deal of cheese.

Both cows and *oxen* love wine, vinegar, and salt, and they will devour with avidity a seasoned salad. In Spain, and some other countries, they place near the young calf one of those stones, called salegres, which are found in salt mines; they lick this salt stone all the time the mother is at pasture, which excites the appetite, or creates thirst so much, that the moment the cow returns, the young calf sucks with great eagerness; and this makes them grow fatter and faster than those to whom no salt is given. For the same reason, when *oxen* loath their food, they give them grass soaked in vinegar, or strewed with salt; salt may also be given to them, as it excites their appetites in order to fatten them in a short time. It is usual to put them to fatten when ten years old; if we stay longer, there is less certainty of success, and their flesh is not so good. They may be fattened in all seasons, but summer is generally preferred, because it is attended with less expence; and by beginning in May or June, we are almost certain of having them fat before the end of October. When we begin to fatten them they must not be suffered to work any longer. They should drink much oftener, and have succulent food in abundance, sometimes mixed with a little salt, and be left to chew the cud at leisure, and to sleep in the cow-house during the heat of

the day. In four or five months, if thus attended to, they will become so fat that it will be difficult for them to walk, or be conducted to any distance but by small journeys. Cows and bulls, whose testicles are twisted, may also be fattened; but the flesh of the cow is drier, and that of the bull is redder and harder than that of the ox, and the latter has always a strong disagreeable taste.

Bulls, cows, and *oxen*, are very apt to lick themselves, especially when quiet and at rest; and as this is supposed to prevent their fattening, it is usual to rub all parts of their bodies which they can reach with their own dung. When this precaution is not taken, they raise up the hair of their coats with their tongue, and swallow it in large quantities. As this substance cannot digest, it remains in the stomach, and forms round smooth balls, of so considerable a size, as to incommode and prevent digestion. These balls in time get covered with a brown crust, which, though nothing but a thick mucilage, becomes hard and shining; they are only found in the paunch, and if any of the hairs get into the other stomachs, they do not remain, but seem to pass off with the aliments.

Animals which have incisive teeth, such as the horse and the ass, in both jaws, bite short grass more easily than those which want these teeth in the superior jaw; and if the sheep and goat bite the closest, it is because they are small, and their lips are thin. But *oxen*, whose lips are thick, can only bite long grass; and it is for this reason that they do no harm to the pasture on which they live; as they only bite off the tops of the young herbage, they do not stir the roots, and the growth is scarcely checked; instead of which, the sheep and the goat bite so close, that they destroy the stalk and spoil the root. Besides, the horse chuses the shortest and most delicate grass, leaving the largest to grow for seed; but the *ox* eats these thick stalks, and by little and little destroys the coarser grass; so that in a few years, the field in which the horse has lived becomes poor, and that on which the ox has broused, becomes an improved pasture.

Our oxen, which we must not confound with the buffalo, bison, &c. seem to be originally of this temperate climate, great heat, or excessive cold, being equally injurious to them. Besides this species,

which is so abundant in Europe, is not found in the southern countries, and is not extended beyond Armenia and Persia; nor beyond Egypt and Barbary in Africa. For in India, the rest of Africa, and even in America, the cattle have a bunch on the back, or are animals of a different species, which travellers have called oxen. Those found at the Cape of Good Hope, and in many parts of America, were carried from Europe by the Dutch and Spaniards. In general, countries which are rather cold agree better with our oxen than hot climates; they are larger and fatter in proportion as the climate is humid, and as it abounds in goodness of pasture. The oxen of Denmark, Padolia, Ukraine, and Calmuck Tartary, are the largest; those of England, Ireland, Holland, and Hungary, are larger than those of Persia, Turkey, Greece, Italy, France, and Spain; and those of Barbary are the smallest. The Dutch every year bring from Denmark a vast number of large thin cows, which give more milk than those of France; and it is possible they are of the breed of cows which has been carried into Poitou, Aunis, and Charente, for those cows are larger and much thinner than common cows, and produce double the quantity of milk and butter. They have milk at all times, and may be milked all the year, excepting four or five days before they calve. Though they eat no more than common cows, their pasture, however, must be excellent; and as they are always lean it is certain that all the superabundance of their food turns into milk; instead of which, common cows become fat, and cease to give milk when they have lived some time in rich pastures. With a bull of this breed, and common cows, a bastard kind is produced, which is more fruitful, and abounds more in milk than the common race. These bastard cows have frequently two calves at a time, and they give milk all the year. These milch cows form a part of the riches of Holland, from which place they export butter and cheese to a considerable amount; they give as much milk again as French cows, and six times as much as those of Barbary.

In England, Ireland, Holland, Switzerland, and other northern countries, they salt and smoke the flesh of the ox in large quantities, both for the use of the navy and for the advantage of commerce. They export also from those countries large quantities of leather; the

hide of the ox, and that of the calf, serving for an infinite number of uses. The fat is also very useful. The dung of the ox is the best manure for light dry soils. The horn of this animal was the first instrument ever made use of for drinking or augmenting sounds; the first transparent matter ever used for windows and lanthorns. It is now softened to make boxes, combs, and a thousand other things. But I must conclude, for, as I said before, Natural History finishes where the History of the Arts begin.

SUPPLEMENT.

Oxen are very numerous in Tartary and Siberia; and at Tobolski black cattle abounds. In Ireland I formerly remarked that both *oxen* and cows were without horns; but this I find applies only to the southern part, where there is either scarcely any grass, or it is very bad which gives strength to my position, that horns arise from a superabundance of nourishment. Adjacent to the sea the Irish boil their fish down extremely soft, with which they feed their cows, and of which they are very fond; and it is said the milk has not the smallest disagreeable smell or taste therefrom.

In Norway both cows and *oxen* are very diminutive; but on the Norwegian coast they are bigger probably owing to their having better pasture, and being allowed to range at perfect freedom; for they are left entirely to themselves without any guides, unless the rams may be so called who accompany them in winter and who scrape the snow from the ground both for themselves and companions, to get at the grass. Living in this wild state they sometimes grow very fierce, and are only to be caught by means of ropes.

Engraved for Barr's Buffon

Fig. 22 *Ram*
Fig. 23 *Ewe*

European cattle have multiplied in a most astonishing manner in South America. In the vicinity of Buenos-Ayres, they hunt them merely for their grease and hides, and frequently kill large quantities. The coast of Brazil produces very indifferent cattle; they are small, and their flesh has a bad savour, most probably owing to the bad quality of their pasturage. There are great numbers of *oxen* in some parts of Africa. The mountains are covered with wild cows from Cape Blanc to Sierra Leona; their colour is generally brown with black horns, and they are so exceedingly prolific, that both Europeans and Negroes find it necessary to be perpetually destroying them by hunting. There are also wild cows of a dark chesnut colour in many parts of Barbary, and in the deserts of Numidia; they are small, run fast, and frequently keep in flocks of one or two hundred together.

THE SHEEP.

It does not admit of a doubt, but that all animals which are now actually domestic were formerly wild. Those whose history has already been given, afford a sufficient proof of it; for there are still wild horses, asses, and bulls. Can man, who has conquered so many millions of individuals, boast of having subdued an entire species? As they were all created without his participation, is it not reasonable to believe that Nature enabled them to exist and multiply without his aid? If we consider, nevertheless, the weakness and stupidity of the sheep, and reflect, that this animal, without defence, cannot find safety in flight; that he has for his enemies all devouring animals, which seem to seek him in preference, and to devour him by choice; that formerly this species produced but few; and that the life of each individual is but short; we shall be tempted to think, that from the beginning sheep were confided to the care of man; that they had occasion for his protection to subsist, and of his care to multiply; especially as there never were any wild sheep found in the deserts. In all places where man does not rule, the lion, tiger, and wolf reign by force and cruelty; and these animals of blood and carnage, live longer, and multiply faster than sheep. In short, if we were to abandon the flocks, which we have rendered so numerous, they

would soon be destroyed and their species entirely annihilated by the voracity of its numberless enemies.

It appears, therefore, that it is only by the help and care of man sheep have been preserved and that they could not have continued to subsist for themselves. The female is absolutely without resource, and without defence. The ram has but feeble arms; his courage is nothing but a petulance useless to himself, inconvenient to others, and which is destroyed by castration. The wedder is still more fearful than ewes. It is through fear that sheep gather so often in troops; the smallest noise to which they are unaccustomed, makes them get close together; and this fear is attended with the greatest stupidity, for they know not how to fly the danger, nor do they even seem to feel the hazard and inconvenience of their situation. They continue obstinately fixed wherever they are, and for neither rain nor snow will they stir. To oblige them to change their route, or situation, they must have a chief who is instructed to walk first, and whom they will follow step by step. This chief, however, would remain without motion if he were not driven off by the shepherd, or the dog which guards them, who, in fact, watches over their safety, defends, directs, separates, assembles, and in short, communicates to them every motion that is necessary for their safety.

Of all quadrupeds then sheep are the most insensible, and have the least resources from instinct. Goats, which in many things resemble them, have much more sagacity. They know how to conduct themselves, and to avoid danger, and are easily familiarized to new objects; the sheep neither knows how to fly from danger, nor to face it: let their wants be ever so great, they never come to man for assistance so willingly as the goat, and which in animals appears to be the last degree of timidity or insensibility, the female will suffer her lamb to be taken away without shewing any signs of anger, or trying to defend it, nor by the smallest difference in her bleating, expresses the smallest degree of sorrow[G].

[G] The veracity of this charge of indifference, will be doubted by all who have passed over the fertile plains of England, while these fleecy flocks were grazing in

the spring, since, insensible indeed must be that breast, which has not felt the tender responses of the bleating ewe, and her distant lamb.

But this animal, so contemptible in itself, so wanting in sentiment and interior qualities, is to man the most useful of all animals. Of itself it at the same time furnishes us with food and clothing; without reckoning the particular advantages we have from the milk, the fat, the skin, the bowels, the bones, and even the dung. This animal seems to evince that nature has given it nothing but what is for the advantage and convenience of man.

Love, which in all animals is the most general and lively sensation, seems to be the only one which gives any vivacity to the ram. When he feels any such emotions, he becomes petulant, fights, and will sometimes attack even his own shepherd. The ewe, however, even at those times, does not appear more animated; and has only instinct sufficient not to refuse the approaches of the male, to chuse her food and to know her own lamb. Instinct is more certain as it is more mechanical. The young lamb, among a numerous flock, will search and find out its mother, and will seize its teat, without ever being mistaken. It is also said, that sheep are sensible to the pleasures of musick; that they brouze with more assiduity, are better in health, and fatten sooner when they hear the shepherd's pipe; but it appears more probable that music serves to amuse the shepherd, and that it is to this solitary, idle life, that we owe the origin of the art.

These animals, whose understandings are so simple, are also of a very weak constitution. They cannot walk long; travelling weakens and exhausts them; and when they run, they pant and are soon out of breath. The great heat of the sun, is as disagreeable to them, as too much moisture, cold, or snow. They are subject to many disorders, the greatest part of which are contagious. Superabundance of fat sometimes kills them, and always prevents the ewes from having young. They suffer a great deal in breeding, have frequent abortions and require more care than any other domestic animal.[H]

[H] There appears in the text a degree of unusual asperity against this harmless animal, and all its imperfections seem pictured in glaring colours, but in this, as well as in several other particulars, some exaggeration is adopted, since scarce any domestic animal, at the time of bringing forth, requires less assistance than the ewe does in general.

When the ewe is near her time, she should be taken from the rest of the flock, and watched in order to be near to help her in delivery. The lamb frequently presents itself cross-ways, or by the feet; and, in this case, the mother's life is in danger if she is not assisted. As soon as she is delivered, the lamb should be lifted on its feet, and the milk drawn out of the mother's teats; this first milk being bad would do much hurt to the lamb, and therefore it is necessary to stay till the teats are filled again, before it is suffered to suck. The lamb is kept warm, and shut up for two or three days with the mother, that it may learn to know her. For a few days, in order to re-establish the strength of the ewe, she should be fed with hay, barley wetted, or bran mixed with a little salt. The water she drinks should be luke-warm, with some wheat or bean flour, or millet put into it. In four or five days she may again be used, by degrees, to her common manner of living, and may be put amongst the others, only observing not to take her too far, lest it should overheat her milk. Some time after, when the lamb begins to have strength, and to skip about, it may, with safety, be suffered to follow its mother into the fields.

It is usual to send those lambs which appear weak to the butcher, and to preserve those which are the largest, are most vigorous, and have the thickest fleece; the first lambs are scarcely ever so good as those of the following litters. If those lambs are wanted to be reared which are brought forth in October, November December, January, or February, they are kept in the stable, and only let out to suck mornings and evenings, until the beginning of April. Some time before letting them out they should daily have a little grass, for the purpose of accustoming them by degrees to their new nourishment. They may be weaned as early as a month old, but it is better to let them suck for six weeks or two months. Lambs which are all white, and without spots, are always preferred because white wool always produces the best price. Lambs should not be castrated before they

are five or six months old at the earliest, and then the operation should be performed when the weather is moderate, either in spring or autumn: it is done two ways, either by incision, or by destroying the vessels, which terminate in them, by a tight ligature. Castration makes lambs sick and melancholy, and to prevent the disgust which generally succeeds, they should have bran given them mixed with a little salt for two or three days.

At a year old, rams, ewes, and wedders, lose the two fore teeth of the under jaw; they have no incisive ones in the upper; six months after the two neighbouring teeth fall out also; at three years of age they are all replaced, are then tolerably even and pretty white, but as the animal increases in years they become uneven and black. The age of the ram is also known by his horns; they appear the first year, and sometimes at his birth, and a ring is added to them every year after as long as he lives. In general the ewes have no horns, but in their places two bony prominences; nor withstanding there are some which have two and even four horns. These ewes are like the others; their horns are five or six inches long, but less twisted than those of the ram, and when they have four, the two anterior are shorter than the other two. The ram is capable of generating at eighteen months, and the ewe to produce at a year old; but it is better not to couple them before the ram is three and the ewe two; as before that period the young will be feeble and weak, which indeed is generally the case with their first productions. One ram is sufficient to attend 25 or 30 ewes; he should be chosen from the strongest and handsomest of his species; he should have horns, for there are some rams in our climate which are without, but they are less vigorous, and less proper for propagation[l]. A good and handsome ram should have a large thick head, a wide forehead, large black eyes, broad nose, big ears, thick neck, long high body, large loins and crupper, and a long tail. The best rams are the white ones, well covered with wool on the belly, the tail, the head, the ears, and quite up to the eyes. Ewes which have wool in the greatest abundance, most bushy, whitest, and most silky, are the best for propagation; especially if they are large, have thick necks, and walk nimbly. It has also been remarked,

that those which are rather lean than fat are the most successful breeders.

[l] This does not always hold good, since the Lincoln sheep are without horns, and are at the same time as fine and as large as any in England.

The ewes are commonly in season from the beginning of November to the end of April; but they conceive at any time if supplied with stimulating food, such as salted water, and bread made of hemp-seed. The ewes are allowed to go with the ram two or three times, after which they are separated from him; he invariably attaches himself to the oldest ewes, and despises the young ones. During the coupling season great care must be taken not to expose the ewes to rains or storms, for moisture prevents conception, and a clap of thunder often produces an abortion. A day or two after copulation they may return to their usual mode of living, for if the salted water, hempen bread, and other hot foods are continued, it will prevent their produce. They carry their young five months, and drop them at the beginning of the sixth. They commonly bring forth but one lamb, though they sometimes have two: in warm climates they produce twice a year, but in France, and those which are colder, never more than once. The ram is admitted to the ewes about the end of July, or beginning of August, for the purpose of having lambs in January; in September, October, and November, he is given to a greater number, from which we have plenty of lambs in February, March, and April; there are also quantities in May, June, July, August, and September; and it is only in October, November, and December, that they are scarce. The ewes have milk for six or seven months; it is tolerable nourishment for children and country people, and makes very good cheese, especially when mixed with cows' milk. The time for milking the ewes is just before they go into the fields, or immediately after their return. In summer they may be milked twice a day, and once in winter.

Ewes fatten when they are with young, because they then eat more than at any other time. As they often hurt themselves they have frequent abortions, sometimes become barren, and often bring forth monsters; nevertheless, if they are well taken care of, they will

produce through life; that is for ten or twelve years, though they commonly begin to grow old and useless by the time they are seven or eight. The ram lives till he is twelve or fourteen years old, but is unfit for propagation, after he is eight. He should then be castrated, and fattened with the old ewes. The flesh of the ram is always ill-tasted, that of the ewe insipid, while that of the wedder is the most succulent and best of our common meat.

Those who wish to form a flock with a view to profit, buy ewes and wedders from the age of eighteen months to two years, an hundred of which may be put under the care of one shepherd, and if he is careful and assisted by a good dog, he will lose but few. When he conducts them to the field he should always go first, accustom them to the sound of his voice, to follow him without going aside among the corn, vines, and cultivated lands, where they do considerable damage. Hills, or plains above hills, afford them the best and most agreeable pasture, and they should never be suffered to brouze in low and marshy grounds. In winter they should be fed in the stable on bran, turnips, hay, straw, lucerne, saintfoine, leaves of ash, elm, &c. and unless the weather is very bad they should be allowed to go out every day for the sake of exercise. In the cold season they should not be taken to the fields before ten o'clock in the morning, and remain for four or five hours; they should then be made to drink, and about three o'clock in the afternoon be reconducted home. In spring and autumn, on the contrary, they should be taken out as soon as the sun has dissipated the moisture and hoar frost, and not taken back again till near sun-set. It is sufficient in these two seasons if they drink once a day, and that just before they return to the stable, where there must always be forage for them, though in a smaller quantity than during winter. It is in summer alone that they ought to find all their food in the fields, where they should then be conducted twice a day, and taken twice to drink; they should be led out in the morning while the dew is on the ground, allowed to feed four or five hours, and after drinking led back to the fold, or some shady place. About three or four o'clock in the afternoon, when the excessive heat begins to diminish, they may be again taken into the fields and allowed to stay until the night comes

on; and were it not for the danger of the wolf, it would be better to leave them out all night as they do in England, which would make them more vigorous and healthy. As violent heat greatly incommodes them, and the rays of the sun will give them the vertigo, they should always be kept, when brouzing, with their heads from the sun, so that their bodies may form a kind of shade. And it is also very necessary, to preserve their wool, that they should not be suffered to feed among thorns, briars, or bristles.

In dry and high grounds, where wild thyme and other odoriferous plants abound, the flesh of the sheep is of a much better quality than when fed on low plains and humid valleys; unless near the sea coast, where all the herbage having imbibed a degree of saltness, it renders the mutton superior to that fed on any other pasture; it gives also a pleasing flavour to the milk, and adds to its quantity. Nothing is more pleasing to the taste of these animals than salt, nor is there any thing more salutary for them when given in moderation; in some places they put a bag of salt, or salt-stone, into the sheep-fold, the which they will all lick by turns.

Every year those grown of a proper age to fatten should be picked out of the flock, as they require a different treatment. If in summer, they should be taken to the field before sun-rise that they may feed on the grass while the dew remains upon it. Nothing contributes more to fatten sheep than water taken in great quantities, and nothing retards it more than the heat of the sun; for which reason they should be taken into the shade by nine o’clock in the morning before the violent heat comes on, and a little salt should be given them to excite their appetite for water. About four o’clock in the afternoon they should be led out again to fresh and moist pastures. This care pursued for two or three months is sufficient to make them fleshy and fat; but this fat, which originates from the great quantities of water drank by the animal, is only a kind of pursy swelling, and would soon occasion the rot; it is therefore necessary to kill them immediately when they acquire this false fat: even their flesh, instead of having become firm and juicy, is frequently the more flat and insipid. If we would have good mutton, besides feeding them in the dew and giving them plenty of water, it is necessary they should

have more succulent food than grass. In winter, nay in all seasons, they may be fattened by keeping them in stables and feeding them with the flour of barley, oats, wheat, beans, &c. mixed with salt to make them drink more frequently. But whatever mode is followed, it should be done quickly, and the sheep should be killed immediately, for they cannot be fattened twice, and almost all die with diseases of the liver.

We frequently find worms in the livers of animals; a description of those found in sheep and oxen is contained in the Journal des Savans of 1668, and in the German Ephimerides. It was thought that these worms were peculiar to animals who chew the cud, but M. Dauberton discovered some in the liver of an ass, and it is probable they might be found in those of many other animals. It has also been said that butterflies are sometimes found in the livers of sheep; and in confirmation of this M. Rouillé favoured me with a letter of M. Gachet de Beaufort, containing the following observations: “It has long been remarked, that our Alpine wedders frequently lose their flesh on a sudden; that their eyes turn white and gummy, that their blood becomes serous, having scarcely any red globules, their tongues parched, and their noses stuffed with a yellow purulent mucus. It is true this does not affect the appetite of the animal, but makes him extremely weak and terminates in his death. From repeated dissections it has been discovered, that animals so affected have always butterflies in their livers, which butterflies are white, and furnished with wings; their heads are nearly oval, hairy, and about the size of those of the silk-worm fly. Above seventy which I squeezed out of the two holes convinced me of the truth of this fact.” From this description of M. Beaufort I cannot admit myself as positively convinced of their being butterflies, because they have so near a resemblance to the common worms found in the livers of sheep, which are flat, broad, and of so singular a figure, as to appear at first rather leaves than worms.

It is customary for sheep to be shorn every year; and in warm countries where they apprehend no danger from leaving the animal quite bare, they do not shear the wool, but tear it off, and those frequently find a sufficiency to have two crops in a year. In France,

and in colder climates, the fleece is shorn only once a year, and then a part of the wool is permitted to remain by way of preserving the animal from the intemperance of the weather. This operation is performed in the month of May, after the sheep have been well washed to render the wool as clean as possible. The month of April is too cold, and if delayed to July, there would not be sufficient time for the wool to grow to preserve them from the cold of the following winter. The wool of the wedder is generally better, and in greater abundance than that of the ewe or ram; that on the neck and top of the back, is much superior to that on the thighs, belly, tail, &c. and that taken from the bodies of the dead, or diseased animals, is by much the worst. White wool is preferable to grey, brown, or black, because in dying it will take any colour, and that which is smooth and sleek is better than the curled; it is even said, that sheep whose wool is curled are not so good as the others. Folding sheep is of great advantage to the land, and when it is wished to improve any by this means, the ground must be inclosed, and the flock shut in every night during the summer; the dung, urine, and heat of the animals, will soon enrich the most exhausted, cold, and infertile grounds. An hundred sheep in one summer will fertilize eight acres of land for six years.

The ancients have remarked that all animals which chew the cud have suet, but this is only true with the sheep and goat, and that of the sheep is more abundant, whiter, drier, and better than that of any other. Suet differs materially from fat or grease, as the latter remains soft, but the former hardens in cooling. The suet amasses in the greatest quantities about the kidneys, and there is always more about the left than the right; there is also a great deal in the epiploon, and about the intestines, but that is not near so firm and good as that of the kidneys, tail, and other parts of the body. Sheep have no other fat than suet, and this matter is so predominant in their bodies, that their flesh is covered with it; even their blood contains a considerable quantity, and their semen is so loaded with it, as to have a different appearance from that of any other animal. That of man, the dog, horse, ass, and probably of all animals which have not suet, liquefies by cold, and becomes more and more fluid from the moment it

comes out of the body; but that of the ram, goat, and perhaps of all animals which have suet, hardens, and loses all its fluidity with its heat. I discovered these differences when examining their different liquors with the microscope. That of the ram fixes a few moments after it is out of the body, and in order to discover the living organic molecules, of which it contains great numbers, heat must be applied to keep it in a state of fluidity.

The flavour of the flesh, the fineness of the wool, the quantity of the suet, and even the size of the sheep, differ greatly in different countries. At Berri, in France, they abound; those of the environs of Beauvoise, and some other parts of Normandy, are the fattest, and have the greatest quantity of suet. They are very good in Burgundy; but the best are those which are fed upon the downs in our maritime provinces. The wool of Italy, Spain, and England is finer than the wool of France. In Poitou, Provence, in the environs of Bayonne, and several other parts of France, there is some sheep which appear to be of a foreign race; they are larger, stronger, and have a greater quantity of wool than those of the common breed. They are also more prolific, generally producing two lambs at a time. The rams of this breed engender with the common ewes and produce an intermediate race. In Italy and Spain there is a great variety in their races of sheep, but they should all be regarded as forming one species with our common sheep, which though so numerous does not extend beyond Europe. Those animals with large broad tails, so common in Asia and Africa, and which travellers have given the name of Barbary sheep, appear to be of different species from our common sheep, as well as from the pacos and lama of America.

Engraved for Barr's Buffon.

Fig. 24. *Wallachian Ram.*
Fig. 25. *Wallachian Ram.*

White wool being most esteemed, those lambs which are black or spotted are commonly led to slaughter. There are some places however where almost all the sheep are black; and white rams and

ewes will frequently produce spotted lambs. In France there are only white, black, and spotted; in Spain there is a reddish kind, and in Scotland there are some of a yellow colour; but these varieties in colour are more accidental than the difference and variety of the breed, which notwithstanding only happens from the influence of climate and the difference of nourishment.

SUPPLEMENT.

I was favoured with the drawings of two Wallachian Sheep[J] (*fig. 24, 25.*) by Mr. Colinson a Fellow of the Royal Society of London, whose horns are very different from ours, but I was never able to discover whether they were of the ordinary kind in Walachia or some accidental variety.

[J] The annexed representations were taken from two of these living animals, the property of Mr. Clark; and as the likeness was strongly attended to, will be found more correct than the drawings copied in the works of our author.

In Denmark, Norway, and in the northern part of Europe, the sheep are very indifferent; and it is customary there to improve the breed, to have rams frequently imported from England. In the islands near Norway the sheep are constantly left in the fields, and they are much larger and produce better wool than those who are attended by men. Pontopiddan asserts that those sheep which live in perfect liberty always sleep on that side of the island from whence the wind will blow the next day, and this is constantly attended to by the mariners.

The Iceland sheep have larger and thicker horns than the common sheep of these climates; some of them have four or five horns, but this is not common, and when they find any so ornamented, they are sent to Copenhagen and sold at a high price as great rarities.

THE GOAT.

Though the species of animals are all separated by an interval which Nature cannot overleap, yet some resemble others in so many respects that there seems only a necessary space to draw a line of separation. When we compare these neighbouring species, and consider them relatively to ourselves, some appear to be of the greatest utility, and others seem to be only auxiliary species, which might in many respects serve in the place of the former. Thus the ass might nearly supply the place of the horse, and the goat that of the sheep. The goat, like the sheep, furnishes both milk and suet in great abundance. Their hair, though coarser than wool, can serve the purpose of making very good cloth; their skins are more valuable than those of the sheep; and the flesh of a young kid nearly resembles that of lamb. These auxiliary species are wilder and more robust than the principals. The ass and the goat do not require near so much care as the horse and the sheep, for they every where find means of support, and browze equally on the most coarse as on the most delicate plants; they are less affected by the influence of the climate, and can do better without the aid of man; the less dependence they have on us, the more they seem to belong to Nature; and instead of considering these subordinate species as degenerations of the principal species; instead of looking on the ass as a degenerated horse; it might with more reason be said, the horse is an ass brought to perfection, and that the sheep is a more delicate kind of goat, which we have taken care of, brought to perfection, and propagated for our own use; and, in general, that the most perfect species, especially among domestic animals, take their origin from those wild and less perfect kinds which resemble them the most, as the powers of Nature are greatly augmented when united to those of man.

Although the goat is a distinct species, and possibly further removed from the sheep than the ass is from the horse, yet the buck will as willingly couple with the ewe as the he-ass with the mare; the ram with the she-goat in the same manner as the horse with the she-ass. But though these couplings happen very frequently, and are sometimes prolific, yet no intermediate species has been formed between the goat and the sheep. The two species are distinct,

remaining at the same distance from each other; no change has been effected by the intermixture, no new or middle race has arisen therefrom; at most they have only produced individual differences, which have no influence on the unity of each primitive species, but, on the contrary, confirm the reality of their different characteristics.

There are, however, many cases in which we cannot distinguish these characters, nor pronounce on their differences with certainty: there are others in which we are obliged to suspend our opinions, and in a great number of others we have not the smallest ray of light for our guide; for, independent of the uncertainty arising from the contrariety of assertions respecting recorded facts, independent of the doubts resulting from the inaccuracy of those who have endeavoured to observe Nature, the greatest obstacle to the advancement of knowledge, is our ignorance of a great number of effects which time has not disclosed to us, and which can only be revealed to posterity by experience, and the most accurate observations; in the mean time we stray in darkness, perplexed between prejudices and probabilities, ignorant even of possibilities, and every moment confounding the opinions of men with the acts of Nature. Examples are in abundance; but, without quitting our subject, we know that the goat and the sheep couple together; though we are still to learn whether the mule from this commixture is sterile or fruitful. We are apt to conclude that mules in general, are barren, because those produced from the he-ass and mare, or the horse and she-ass, are sterile. But this opinion may have no foundation, since the ancients positively assert, that the mule produces at seven years old and that it can produce with the mare; they say also that the she-mule is capable of conception, but that she cannot bring her fruit to perfection. It is necessary therefore, to destroy or confirm the truth of these facts, since they obscure the real distinction of animals and the theory of their generation; and though we know distinctly the species of all the animals which surround us, yet we are ignorant what might be produced by an intermixture among themselves, or with foreign animals. We are but ill informed of the jumar, an animal said to be the produce of a cow and an ass, or a mare and a bull. We are also ignorant whether the

zebra would not produce with the horse or the ass, or the broad-tailed Barbary ram with a common ewe; whether the chamois goat be any thing more than a common goat in a wild state, or whether an intermixture would not form an intermediate race; whether the monkeys are of different species, or, like that of the dog, it is one and the same, but varied by a great number of different breeds; whether the dog can produce with the fox and the wolf, the stag with the cow, &c. Our ignorance in most of these cases is almost invincible, and the experiments which would decide them require more time, care, and expence, than the life and fortune of most men can permit.

On the determination of these facts, however, depends our knowledge of animals, the exact distinction of their species, the intelligence of their genuine history and manner of treating them. But since we are deprived of knowledge so necessary, since it is not possible to proceed upon positive facts, we cannot do better than go step by step, to consider each animal individually, to look on those as different species who do not procreate together, and to write their history in separate articles, reserving for ourselves a power to unite or separate, as we shall acquire a more perfect knowledge from our own experience, or from that of others.

It is for this reason that though there are many animals which resemble the sheep and goat, we have taken notice of only the domestic kinds. We are ignorant whether foreign kinds would intermix and form new races with our common species; we are therefore authorized to consider them as distinct species, till it can be proved that these foreign kinds can procreate with the common and produce fertile individuals: this degree alone constituting the reality of what should be denominated species both in the animal and vegetable kingdoms.

The goat has naturally more sagacity than the sheep and can shift better for itself. He comes to man of himself and is easily familiarized; he is sensible of caresses, and capable of much attachment; he is more strong, light, agile, and less timid than the sheep; he is lively, capricious and lascivious, and it requires much trouble to conduct them into flocks. They are fond of straying into

solitude, of climbing steep and rugged places, to stand and even to sleep on the tops of rocks or brinks of precipices. The female seeks the male with eagerness and ardour; she is robust and easily supported, eating almost all kinds of herbs and very few disagreeing with her. The bodily temperament, which in all animals has great influence on the dispositions, does not seem to differ essentially in the goat from that of the sheep. The interior organization of these two species of animals is almost entirely the same; they are fed, grow, and multiply in the same manner, and have the same diseases, except a few to which the goat is not subject. The goat is not, like the sheep, affected with too great a degree of heat, but voluntarily exposes himself to the liveliest rays of the sun, and sleeps therein without suffering a vertigo, or any other inconvenience. He is not alarmed by rains or storms, but appears sensible of the rigours of cold. The exterior movements, as already remarked, depend less on the conformation of the body than on the strength and variety of their sensations, for which reason they are more lively and less regular in the goat than in the sheep. The inconstancy of his disposition is strongly marked by the irregularity of his actions; he walks, stops short, runs, skips, jumps, advances, retreats, shews and conceals himself, or flies off, and all this from mere caprice, and without any other cause than what arises from the whimsicality of his temper; the suppleness of his organs and strength, and nervousness of his frame, are scarcely sufficient to support the petulance and rapidity of his natural motions.

That these animals are naturally fond of men, and that even in uninhabited countries they betray no savage dispositions, the following anecdote is a strong confirmation. In 1698, an English vessel having put into harbour at the island of Bonavista, two negroes went on board, and offered the captain as many goats as he chose to carry away. He expressing a surprise at this offer, the negroes informed him there were only twelve persons on the island, and that the goats multiplied so fast as to become exceedingly troublesome, for instead of being hard to be caught, they followed them about with a degree of obstinacy, like other domestic animals.

The male (*fig. 26*) goat is capable of engendering at a year, and the female at seven months old; but the fruits of this early coupling are generally weak and defective, and therefore they are commonly restrained until they are eighteen months or two years. The he-goat is handsome, vigorous, and ardent; and one is sufficient to accompany 150 females for two or three months; but this ardour, which soon consumes him, does not last more than three or four years, and by the age of five or six, he becomes aged and enervated. Therefore, in choosing a male for propagation, he should be large, handsome, and about two years old; his neck should be short and thick, his head light, his ears hanging down, his thighs thick, his legs firm, his hair black, thick and soft, his beard long and bushy. The choice of the female (*fig. 27*) is of less importance, only observing that those with large bodies, thick thighs, who walk light, have large udders, and soft bushy hair, are the most preferable. They are usually in season in September, October, and November, though they will couple and bring forth at all times. They retain, however, much surer in autumn; and the months of October and November are preferred, because the grass will be young and tender when the kids begin to eat. They go about five months with young and bring forth at the beginning of the sixth; they suckle their young a month or five weeks; so that about six and twenty weeks may be reckoned from the time of their coupling to the kids first beginning to feed on pasture.

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Fig. 27 *She Goat*
Fig. 26 *He Goat*

When kept among sheep they do not mix with them, but always precede the flock. They prefer feeding separately, are fond of getting upon the tops of hills, and even upon the most steep and craggy parts of the mountains. They find a sufficiency of food on heaths, barren and uncultivated grounds. Great attention is necessary to keep them from corn, vines, and young plantations as they are great destroyers, and eat with avidity the tender barks, and young shoots

of trees, and thus prove fatal to their growth. They avoid humid and marshy fields, or rich pastures: they are seldom kept on flat lands, because it does not agree with them, and it makes their flesh ill-tasted. In most warm climates goats are raised in great numbers and never put into the stables. In France they would perish if not preserved from the inclemency of the winter. It is not necessary to give them litter in the summer, though absolutely so in winter; and as all moisture is very hurtful to them they should never be suffered to lie upon their own dung. They should be taken out into the fields very early in the morning, while the dew is on the grass, which, though hurtful to sheep, is very salutary for goats. As they are untractable and wandering animals, the most active and robust man cannot manage more than fifty of them. They should never be suffered to go out during snow or hoar frost, but be kept in the stable, and fed with herbage, small branches of trees gathered in autumn, or on cabbages, turnips, and other roots. The more they eat, the greater is their quantity of milk; to increase and preserve their milk still more, they are made to drink a great deal, and they mix sometimes a little nitre or salt in their water. They may be milked in fifteen days after they have brought forth, and will continue to give a considerable quantity twice a day for four or five months.

The female produces one kid, sometimes two, very rarely three, and never more than four; she continues to breed from one year or eighteen months, until she is seven years of age. The he-goat will propagate as long, and perhaps longer if proper care is taken of him; but he commonly becomes useless at about five. He is then sent to fatten among the old goats, and castrated kids which have been emasculated at six months old, to render their flesh more juicy and tender. They are fattened with great care, in the same manner as wethers, but they are never so good, excepting in very warm climates, where mutton is always ill-tasted. The strong smell of the goat does not proceed from his flesh but his skin. These animals are not permitted to grow old, or perhaps they might live to ten or twelve years; but it is usual to kill them as soon as they cease to multiply, because the older they are the worse is their flesh. Both male and female goats have horns, with a very few exceptions; they vary very

much in the colour of their hair: it is said that those which are white, and have no horns, give the most milk, and that the black ones are the strongest. Though they cost very little for their food they produce a considerable profit; their flesh, tallow, hair, and skin, are all valuable commodities. Their milk is more wholesome and better than that of the sheep; it is used in medicine, curdles easily, and makes very good cheese. The females will allow themselves to be suckled by young children, for whom their milk is excellent nourishment. Like cows and sheep, they are sucked by the viper, and also by a bird, called in France, the goat-sucker, which fastens to their teats during the night, and, as some say, makes them lose their milk for ever after.

Goats have no incisive teeth in the upper jaw; those in the under fall out, and are replaced in the same time and manner as those of the sheep. Their age may be ascertained by the knobs in their horns, and their teeth. The number of teeth in the female goats is not always the same, but they usually have fewer than the male, whose hair is also more rough, and who has the beard and horns longer. These animals, like the ox and sheep, have four stomachs, and chew the cud. Their species is more generally diffused than that of sheep, and goats similar to ours are found in many parts of the world; only in Guinea, and other warm climates they are smaller, and in Muscovy and the more northern regions, they are larger. The goats of Angora and Syria, with ears hanging down, are of the same species with ours, as they intermix together, and will produce in these climates: the males have horns almost as long as the common kind, but their directions are very different, they are extended horizontally from each side of the head, and form spirals somewhat like a screw. The horns of the female are short, they bend backwards, then turn down, and their points come forward so as nearly to approach their eyes; but the directions of these sometimes vary. These descriptions are from a male and female goat which I have seen. Like most Syrian animals, their hair was very long and thick, and so fine that stuffs have been made of it almost as handsome and glossy as our silks.

SUPPLEMENT.

Pontoppidan says, that goats abound in Norway, and that more than 80,000 raw hides are annually exported from Bergen alone, besides those which are dressed. But they seem peculiarly calculated for this country, as they search for their food upon high and rugged mountains, are very courageous, and so far from fearing the wolf, will even assist the dogs in repelling their attacks upon the flock.

THE SWINE, THE HOG OF SIAM, AND THE WILD BOAR.

I shall treat of these three at the same time, because they form but one species. The one is wild, and the other two the same animal only domestic; and though they are different in some external marks, and perhaps in some of their habits, yet these differences are not very essential, but relate merely to their condition: they are not much changed by their domestic state; they will intermix and produce fertile individuals; which is the only character that constitutes a distinct and permanent species.

It is singular in these animals that their species seem to be entirely distinct by itself, and not connected with any other, which may be considered as principal or accessory, like that of the horse with the ass, or the goat with the sheep; nor is it subject to a variety of races like the dog; it participates of many species, yet essentially differs from all. Let those who would circumscribe the immensity of nature into narrow systems, attend to this animal, and they will find it surmounts their methodical arrangements. In its extremities it has no resemblance to whole-hoofed animals, being rather cloven-hoofed, and yet it does not resemble them fairly, because though it appears to have but two toes, yet it has four concealed within; nor does the hog resemble those which have the toes separated, since he walks only on two toes, and the other two are neither so placed, nor extended sufficiently, to be made use of in that respect. Shall we consider this as an error in nature, and that these two toes so

concealed ought not to be reckoned? If so, it should be remembered that this error is constant: that besides, the other bones of the feet do not resemble cloven-footed animals, and that there are striking differences in many other respects, for the latter have horns and no incisive teeth in the upper jaw, they have four stomachs, chew the cud, &c. while the hog, on the contrary, has no horns, but one stomach, does not chew the cud, and has cutting teeth both above and below; thus it is evident, he neither belongs to the species of hoofed or cloven-footed animals, and with as little propriety can he be ranked among the web-footed animals since he differs from them not only in the extremities of the feet, but in the teeth, stomach, intestines, and internal parts of generation. All that can be said is, that in some respects he forms the shade between the whole and cloven-footed animals, and in others between the cloven-footed and digitated animals; for he differs less from the whole-hoofed quadrupeds in the form and number of his teeth than from others; he also resembles them in the length of his jaw, and, like them, has but one stomach; but by an appendage annexed to it, as well as by the position of the intestines, he seems nearly to approach the cloven-footed animals, or those who chew the cud. He likewise resembles them in the external parts of generation, and at the same time in the make of his legs, habits of body, number of young, he approaches very near to the digitated quadrupeds.

Aristotle was the first who divided quadrupeds into whole-hoofed, cloven-footed, and digitated, and he allows, that the hog is of an ambiguous species; but the only reason he gives is, that in Illyria, Pæonia, and some other places there are hogs with whole hoofs. This animal is also a kind of exception to the two general rules of nature, namely, that the larger the animals the less young they produce, and that digitated animals are the most prolific. The hog, though far above the middling size, produces more than any other quadruped. By this fertility, as well as by the formation of the ovary of the female, it even seems to form the extremity of the viviparous species, and to approach the oviparous. In short, the hog seems to be of an equivocal nature, or rather appears so to those who suppose the hypothetical order of their ideas to be the same as the

common order of Nature, and who only perceive, in the infinite chain of beings, some apparent points to which they would refer every natural occurrence.

It is not by circumscribing the sphere of Nature that we can become perfectly acquainted with her: we cannot judge of her by making her act with our particular views; nor is it by ascribing our ideas to her Author that we can penetrate into His designs. Instead of confining and limiting the powers of Nature, we should extend them to immensity; we ought to look on nothing as impossible, but that every thing which may be, really has existence. Ambiguous species, and irregular productions, would then cease to surprise, and appear equally as necessary as others in the infinite order of things; they fill up the intervals, form the immediate points, and mark the extremities of the chain. These beings present to the human understanding curious examples, where Nature, appearing to act less conformably to herself, makes a greater display of her powers, and enables us to trace singular characters, which indicate that her designs are more general than our confined views, and that if she does nothing in vain, neither is she regulated by the designs we attribute to her.

Should we not reflect on this singular conformation of the hog? He appears not to have been formed on an original and perfect plan, since he is composed of parts peculiar to other animals, and has evidently parts of which he makes no use, particularly the toes above described, notwithstanding the bones are perfectly formed. Nature is therefore far from being influenced by final causes in the conformation of beings; why may she not sometimes give redundant parts, since she so often withholds those which are essential? How many animals are deficient both in senses and members? Why should we suppose, that in each individual every part is useful to others, and necessary to the whole? Is it not sufficient that they are found together, that they are not hurtful, can grow without hindrance, and unfold without obliterating each other? All things which are not hostile enough to destroy each other certainly can subsist together; and perhaps there are, in most beings, fewer relative, useful, or necessary parts, than those which are indifferent, useless, or

superabundant; but as we would always refer things to a certain end, when parts have no apparent uses, we either suppose they have hidden ones, or invent relations which have no foundation, and only serve to lead us into errors. We do not consider that we alter the philosophy, and change the sense of the object, when instead of inquiring how Nature acts, we endeavour to divine the end and cause of her acting. This general prejudice, which is too frequently adopted, serves only to cover our ignorance, and is both useless and opposite to the inquiry after, and discovery of, the effects of Nature. Without quitting our subject we can give other examples, where the intentions we so vainly ascribe to Nature are evidently contradicted. It is said the phalanges are formed merely to produce fingers or toes, yet in the hog they are useless, since they do not form toes which the animal can make any advantage of; and in cloven-footed animals there are small bones which do not form phalanges.[K] If then it was the design of Nature to produce toes, it is evident that in the hog she has not more than half executed her purpose, and in the others she has scarcely began it.

[K] M. Daubenton was the first who made this discovery.

The allantois is a membrane which is found in the f[oe]tus of the sow, mare, cow, and many other animals. This membrane adheres to the bladder of the f[oe]tus, and is said to be placed there for the purpose of receiving its urine while it is in the belly of the mother; and at the instant of birth, indeed, an inconsiderable quantity of liquor is found in the allantois; in the cow, where perhaps it is most abundant, it never amounts to more than a few pints; and the extent of the membrane is so great, there is not any proportion between that and the liquor. This membrane, when filled with air, forms a kind of double packet, in the shape of a crescent, thirteen or fourteen inches long, and from nine to twelve inches broad. Can it require a vessel capable of containing several cubic feet to receive three or four pints of water? The bladder of the f[oe]tus itself, if not pierced at the bottom, would suffice to contain this liquor, as it does in mankind, and those animals where the allantois has not been discovered; it is, therefore, plain this membrane is not designed to receive the urine of the f[oe]tus, nor for any purpose we are capable of imagining, for if it

was to be filled it would form a bulk as large as the body in which it was contained; besides, as it bursts at the moment of birth, and is thrown away with the other membranes which envelop the f[oe]tus, it is certainly as useless then as it was before.

The number of teats, it has been said, in every species of animals, corresponds with the number of young which the female can produce and suckle. Why then has the male, which never produces, usually the same number of teats as the female? and why should the sow, which sometimes produces eighteen or twenty pigs, never have more than twelve teats, and sometimes less? Does not this prove that it is not by final causes that we can judge of the works of Nature, and that we ought not to determine but by examining how she acts, and by employing the physical reasons which present themselves in the immense variety of her productions? Allowing that this method, which is the only one that can conduct us to real knowledge, is more difficult than the other, and that there are an infinity of facts in Nature, which, like the preceding, cannot be applied with success, instead of searching for the use of this great capacity in the allantois, we ought to inquire into those physical relations which may indicate the origin of its production; by observing, for example, that in animals, whose stomachs and intestines are not very large, the allantois is either very small or does not exist, and that consequently the production of this membrane has some connection with the size of the intestines, &c. By considering, in the same manner, that the number of teats is not equal to those of the young, admitting only that the most prolific animals have the greatest number of teats, we may conceive that this numerous production depends on the conformation of the interior parts of generation, and the teats being also the external dependencies of the same parts, there is between the number and arrangement of those parts and that of the paps a physical relation, which we should endeavour to investigate.

But I here only endeavour to point out the right path, without entering into a discussion; yet I must observe, that numerous productions depend more upon the internal construction of the parts of generation than any other cause. It certainly does not depend

upon the quantity of semen emitted, otherwise the horse, stag, ram, and goat, would be more prolific than the dog, cat, and other animals, who produce a great number of young, though they have but very little in proportion to their size; neither does the number of young depend upon the frequency of coition, for once coupling of the hog and the dog is sufficient to produce a great many young; the length of time occupied in the emission has no effect in this respect, for the dog remains long only because he is retained by an obstacle in the conformation of the parts; and though the boar has not this obstacle yet he remains longer coupled than most animals, but no conclusion can be drawn from that in favour of the numerous productions of the sow, since a cock requires not more than an instant to fecundate all the eggs an hen will produce in a month. I shall have occasion to unfold the ideas I have accumulated, with a view to prove that a simple probability, or doubt, when founded on physical relations, produces more light and advantages than all the final causes put together.

To the singularities already related we shall add some others. The fat of the hog differs from that of almost every other quadruped, not only in its consistence and quality, but its position in the body of the animal. The fat of man, and those animals which have no suet, such as the dog, horse, &c. is pretty equally mixed with the flesh; the suet of the sheep, goat, deer, &c. is found only at the extremities of the flesh; but the fat of the hog is neither mixed with the flesh nor collected at its extremities, but covers the animal all over, and forms a thick, distinct, and continued layer between the flesh and the skin. This peculiarity also attends the whale, and other cetaceous animals. A still greater singularity is, that the hog never sheds any of his cutting teeth, like man, the horse, ox, sheep, &c. but they continue to grow during life. He has six cutting teeth in the under jaw, and a corresponding number in the upper, but, by an irregularity, of which there is not another example in Nature, the bottom ones are of a very different form from the upper, for instead of being incisive and sharp, the latter are long, cylindrical, blunt at the points, and form an angle almost even with the upper jaw, so that their extremities apply to each other very obliquely. It is only the hog, and two or three other

species of animals, which have the canine teeth very long; they differ from other teeth by coming out of the mouth, and growing during their whole lives. In the elephant, and sea-cow, they are cylindrical, and some feet in length; in the wild boar, and male hog, they are partly bent in the form of a circle, and I have seen them from nine to ten inches long; they are deep in the socket, and, like those of the elephant, have a cavity at the superior extremity; but the elephant and sea-cow have these tusks only in the upper jaw, and are without canine teeth in the under; while the male hog, and wild boar, have them in both jaws, and those of the under are the most useful to the animal; they are also the most dangerous, as it is with the lower tusks the wild boar wounds those he attacks.

The sow, wild sow, and the hog which is cut, have these canine teeth in the under jaw, but they do not grow like those of the boar, and scarcely appear out of the mouth. Beside these sixteen teeth, that is twelve incisive and four canine, they have twenty-eight grinders, which make forty-four in the whole. The wild boar, (*fig. 29.*) has the tusks larger, the snout stronger, and the head longer than the domestic hog, (*fig. 28.*) his feet are always larger, his toes more separated, and his bristles always black.

Of all quadrupeds the hog appears the most rough and brutal, and the imperfections of his make seem to influence his nature; all his ways are uncouth, all his appetites unclean, all his sensations are confined to a furious lust and brutal gluttony; he devours, without distinction, every thing that comes in his way, even his own young soon after their birth. His voraciousness seems to proceed from the continual wants of his stomach, which is immoderately large; and the coarseness of his appetite is probably owing to the dullness of his senses, both as to taste and feeling. The roughness of the hair, hardness of the skin, and thickness of the fat, render these animals insensible to blows. Mice have been known to lodge on their backs, and to eat their skin and fat without their seeming sensible of it. Their other senses are good, and it is well known to huntsmen, that wild boars see, hear, and smell at a great distance, since in order to surprise them they are obliged to watch in silence during the night, and to place themselves opposite to the wind, to prevent them

having notice of them by the smell, which invariably makes them change their road.

Engraved for Barr's Buffon.

Fig. 29 *Wild Boar*
Fig. 28 *Boar*

The imperfections in the senses of taste and feeling is still more augmented by a leprous disease which renders him almost absolutely insensible. This disorder proceeds perhaps less from the texture of the skin and flesh of this animal than from his natural filth, and the corruption which must result from the putrid food which he frequently devours; for the wild boar who usually lives upon corn, fruits, acorns, and roots, is not subject to this distemper, nor is the pig while it continues to suck. The disorder is only to be prevented in the domestic hog by keeping him in a clean stable and feeding him with wholesome food: his flesh will become excellent and his fat firm and brittle, if he is kept for a fortnight or three weeks before he is killed in a clean paved stable, without litter, giving him no other food than dry wheat, and letting him drink but little; for this purpose a hog of about a year old and nearly fat should be selected.

The usual method of fattening hogs, is to give them plenty of barley, acorns, cabbages, boiled peas, roots, and water mixed with bran. In two months they are fat; their lard is thick but neither firm nor white; and their flesh, though good, is rather insipid. They may be fattened at less expence in woody countries, by conducting them into forests during autumn, when acorns, chesnuts, beech-mast, must quit their husks and fall from the trees. They eat indiscriminately all wild fruits, and fatten in a short time, especially if a little warm water mixed with bran and pease-meal is given to them every night on their return home; this drink makes them sleep and augments their fat to such a degree that they are sometime unable to walk or scarcely move. They fatten much the quickest in autumn, both on account of the plenty of food and because they lose much less by perspiration than in the summer months.

It is not necessary in fattening the hog, to wait, as with other cattle, until he is full grown, for the older he is the more difficult it is to fatten him, and his flesh decreases in goodness with age. Castration, which should always precede fattening, is usually performed when they are six months old, and either in spring or autumn, as both heat

and cold are injurious to the healing of the wound. When this operation is performed in the spring, they are generally fit for fattening the following autumn. They continue growing for four or five years, and even to that period it is not limited, as boars kept for propagation sometimes increase in size during the sixth, and the wild boar is always larger in proportion to the number of his years: the life of which sometimes extends to 25 or 30. According to Aristotle hogs live twenty years, and both males and females are fertile till the fifteenth. They can couple by the age of nine or twelve months, but it is better to keep them separate until they are eighteen months or two years. The sows have but few young at the first litter, and those are generally weak, even when a year old; she is at all times in season and solicits the male; she goes four months after copulation, and litters at the beginning of the fifth; she will receive the male almost immediately after and consequently bring forth twice in the year. The wild sow has but one litter in the year, and as she perfectly resembles the domestic one in every other respect, this difference may arise both from her not having the same kind of nourishment, and being obliged to suckle her young much longer. In fifteen days pigs are fit to kill; as many females are unnecessary, and as castrated hogs bring most profit, it is customary not to leave with the mother, after that period, more than one or two females, and seven or eight males.

The boars kept for propagation should have a thick body, rather short than long, a large head, short snout, long ears, small fiery eyes, a thick neck, flat belly, broad thighs, short thick legs, and strong black bristles. Black hogs are always stronger than white ones. The sow should have a large body, spacious belly, and large dugs, and some attention should be paid to her being of a mild disposition. After conception she should be taken from the male, as he will sometimes do her an injury: she should be plentifully fed when she litters, and watched lest she destroys her young; and the male must then be carefully kept away, or he will devour the whole of them. It is common to let the females go with the males in the spring, that they may litter in the summer, and that the pigs may acquire strength before winter; unless when two litters are required in the

year, then she is put to the male in November, and again at the beginning of May: some of them will regularly produce every five months. The wild sow generally goes with the male in January, and brings forth in June; she suckles her young three or four months, and they never separate from her before they are two or three years old; and it is not uncommon to see her accompanied with two or three different litters at a time. The domestic sow is not permitted to suckle her young more than two months; as early as three weeks even, they go with the mother to the fields, by way of being habituated to her mode of living, and five weeks afterwards they are weaned, when, for some short time they have a little milk, mixed with bran, given them morning and evening. Hogs are particularly fond of earthworms and roots, for the purpose of procuring which it is that they tear up the ground with their snouts. The wild boar, who has a stronger snout than the domestic one, digs deeper, and nearly in a straight line, while the latter does it very irregularly.

The wild boars do not separate from their mothers until the third year, and to which age they are called by hunters flock-beasts, from that circumstance. They never go alone until they are strong enough to encounter the wolf. At that time they form themselves into flocks, and if attacked, the largest and strongest front the enemy, and by pressing against the weak ones keep them in the middle; the domestic hogs follow the same method, and therefore require not to be guarded with dogs. They are very untractable, and one man cannot manage more than fifty of them at a time. They procure a number of wild fruits in autumn and winter by being taken to the woods, as they do worms and roots in moist lands in summer, both of which are good for them; and they may be allowed to go into waste and fallow lands during the spring. From March to October they are taken out as soon as the dew is off the ground, and kept to feed till ten o’clock; about two they are suffered to go out again, and continue till the evening. In the winter they are only let out when the weather is fine, as dew, snow, and rain, are very injurious to them. When a heavy rain or storm comes on, it is not uncommon to see them desert the flock one after another, and run and cry until they arrive at the stable-door; and it is the youngest which cry the loudest;

this cry is different from their usual grunting, and resembles that which they make when tied up for slaughter. The male cries less than the female; and the wild boar seldom cries but when he is wounded in fighting with another; the wild sow cries more often, and when suddenly surprised will breathe with such violence as to be heard at a great distance.

Although these animals are great gluttons, yet they do not attack or devour other animals; sometimes, however, they eat corrupted flesh. Wild boars have been seen to eat horse-flesh, and the skin of the deer, and the claws of birds have been found in their stomach; but this is, perhaps, more from necessity than instinct. It cannot, nevertheless, be denied that they are very fond of blood, and of fresh and bloody flesh, since they will eat their own young, and even children in the cradle. Whenever they find any thing succulent or humid, fat or unctuous, they first lick and then swallow it. It is common for a whole herd of these animals to stop round a heap of new-dug clay, and though it is but very little unctuous, they will all lick it, and some of them swallow great quantities. Their gluttony is as gross as their nature is brutal: they have scarcely any distinct sentiments; the young ones hardly know their mothers, for they are very apt to mistake her, and to suck the first sow that will permit them. Fear and necessity seem to give more instinct and sentiment to wild hogs, for the young are more attached to their mother, who also appears more attentive to them than does the domestic sow. In the rutting season the male follows the female, and generally stays about a month with her in the thickest and most solitary parts of the forest: he is then more fierce than ever, and becomes perfectly furious if another male endeavours to occupy his place, in that case they fight, wound, and sometimes kill each other. The wild sow is never furious but when her young is in danger; and it may be remarked in general, that in almost all wild animals the males are more ferocious in the rutting season, and the females when they have young.

The wild boar is hunted by dogs, or taken by surprise in the night, by the light of the moon. As he flies slowly, leaves a strong odour behind him, defends himself against the dogs, and wounds them

dangerously, he should not be hunted by dogs designed for the stag, &c. as it will spoil their scent, and give them the habit of moving slowly. Mastiffs will serve the purpose, and are easily trained to it. The oldest only should be attacked, and they are easily known by the tracks of their feet; a young boar of three years old is difficult to take, because he runs a great way without stopping; but the old boar does not run far, suffers himself to be close hunted, and has no great fear of the dogs. In the day he usually hides himself in the most unfrequented parts of the wood, and comes out in the night in quest of food. In summer it is very easy so surprise him, especially in the cultivated fields, where the grain is ripe, which he will frequent every night. As soon as he is killed the hunters cut off his testicles, for their odour is so strong that in five or six hours the whole of his flesh would be infected. Of an old wild boar the head only is good to eat, while every part of the young one, of not more than one year old, is extremely delicate. The flesh of the domestic boar is still worse than that of the wild one, and it is only by castration and fattening that they are rendered fit to eat. The ancients castrated the young wild boars, which they could get from their mothers, and then returned them again into the woods, where they soon grew fat, and their flesh was much better than that of domestics hogs.[L]

[L] See Aristotle's Hist. Animal. lib. vi. cap. xxviii.

No one who lives in the country is ignorant of the profits arising from the hog; his flesh sells for more than that of the ox, and his lard for nearly double; the blood, intestines, feet, and tongue, are all prepared and used as food. The dung of the hog is colder than that of other animals, and should not be used for any but hot and dry lands. The fat of the intestines and web, which differs from the common lard, is employed for greasing wheels, and many other purposes. Sieves are made of the skin, and brushes and pencil-brushes are made of the hair and bristles. The flesh of this animal takes salt better, and will keep longer than that of any other.

This species, though very abundant, and greatly spread over Europe, Asia, and Africa, were not found on the New Continent till they were transported thither by the Spaniards, and who also took

large black hogs to almost all the islands of America. They have become wild, and multiplied greatly in many places: they resemble our wild boars, and their bodies are shorter, their heads larger, and their skins thicker than the domestic hogs, which in warm climates are all black, like the wild boar.

By one of those prejudices which superstition alone could produce and support, the Mahometans are deprived of this animal; having been told hogs are unclean, they do not either touch or feed on them. The Chinese, on the contrary, are very fond of their flesh; they raise numerous herds of them, and pork is their principal food; and this circumstance is said to have prevented them from receiving the law of Mahomet. The hogs of China, Siam, and India, differ a little from those of Europe; they are smaller, have shorter legs, and their flesh is much more white and delicate. Some of them have been reared in France, and they will intermix and produce with the common hogs. The negroes raise great numbers of hogs, and though there are but few among the Moors, or in the countries inhabited by the Mahometans, yet wild boars are as plenty in Africa and in Asia as in Europe.

Thus these animals are not confined to any particular climates; it is only observable, that the boar, by becoming domestic, degenerates more in cold than in warm climates. A degree of temperature is sufficient to change their colour. Hogs are commonly white in the northern parts of France, as they are in Vivarais, while in Dauphiny, which is not far distant, they are all black; those of Languedoc, Provence, Spain, Italy, India, China, and America, are also of the same colour. The hog of Siam has a greater resemblance than the hog of France to the wild boar. One of the most evident marks of degeneration is furnished by the ears, which become more supple and pendant as the animal changes into a domestic state; in short the ears of the domestic hog are not so stiff, are much longer, and more pendant than those of the wild boar, which ought to be regarded as the model of the species.

THE DOG.

It is not the largeness of make, elegance of form, strength of body, freedom of motions, or all the exterior qualities, which constitute the noblest properties in an animated being; in mankind genius is preferred to figure, courage to strength, and sentiment to beauty; so we consider the interior qualities in an animal as the most estimable; for it is by those he differs from the automaton, rises above the vegetable species, and approaches nearer to man. It is sentiment which ennobles, regulates, and enlivens his being, which gives activity to all his organs, and birth to desire and motion. The perfection of an animal depends, then, upon sentiment alone, and the more this is extended the more are his faculties and resources augmented, and the greater are his relations with the rest of the universe. When this sentiment is delicate, exquisite, and capable of improvement, the animal then becomes worthy to associate with man; he knows how to concur with his designs, to watch for his safety, to defend and to flatter him with caresses; by a repetition of these services he conciliates the affection of his master, and from his tyrant makes him his protector.

The dog, independent of his beauty, strength, vivacity, and nimbleness, has all the interior qualities which can attract the regard of man. A passionate and ferocious temper, makes the wild dog dreaded by most animals, as much as the pacific disposition of the domestic dog renders him agreeable; to his master he flies with alacrity, and submissively lays at his feet all his courage, strength, and talents; he seems to consult, interrogate, and supplicate for orders, which he is solicitous to execute; a glance of the eye is sufficient, for he understands the smallest signs of his will. Without having like man, the faculty of thought, he has all the ardour of sentiment, with fidelity and constancy in his affections; neither ambition, interest, nor desire of revenge, can corrupt him, and he has no fear but that of displeasing; he is all zeal, warmth, and obedience; more inclined to remember benefits than injuries; he soon forgets ill-usage, or at least only recollects it to make his attachment the stronger. Instead of becoming furious or running away, he exposes himself to the severity of his master, and licks the

hand which causes his pain: he only opposes by his cries, and in the end subdues by patience and submission.

More docile than man, more tractable than any other animal, the dog is not only instructed in a very short time, but he even conforms himself to the manners, motions, and habits, of those who command him. He assumes all the modes of the family in which he lives; like other servants he is haughty with the great and rustic with the peasant. Always attentive to his master, and desirous of pleasing his friends, he is totally indifferent to strangers, and opposes beggars, whom he knows by their dress, voice, and gestures, and prevents their approach. When the care of a house is committed to him during the night he becomes more bold, and sometimes perfectly ferocious; he watches, goes his rounds, scents strangers at a distance, and if they stop, or attempt to break in, he flies to oppose them, and by reiterated barkings, and other efforts of passion, he gives the alarm to the family. He is equally furious against thieves as rapacious animals; he attacks, wounds, and forces from them what they were endeavouring to take away; but contented with having conquered, he will lie down upon the spoil, nor even touch it to satisfy his appetite; giving at once an example of courage, temperance, and fidelity.

To determine the importance of this species in the order of nature, let us suppose it had never existed. Without the assistance of the dog how could man have been able to tame and reduce other animals to slavery? How could he discover, hunt, and destroy noxious and savage beasts? To preserve his own safety, and to render himself master of the animated world, it was necessary to make friends among those animals whom he found capable of attachment to oppose them to others; and therefore the training of dogs seems to have been the first art invented by man, and the fruit of that art was the conquest and peaceable possession of the earth.

Almost all animals have more agility, swiftness, strength, and even courage than man. Nature has furnished them better; their senses, but above all that of smelling, is more perfect. To have gained over a tractable and courageous species like the dog, was acquiring new senses and faculties. The machines and instruments

which we have invented to improve or extend our other senses, do not equal, in utility, those nature has presented to us; which by supplying the defects of our smelling, have furnished us with the great and permanent means of conquest and dominion. The dog, faithful to man, will always preserve a portion of his empire, and a degree of superiority over other animals; he reigns at the head of a flock, and makes himself better understood than the voice of the shepherd; safety, order, and discipline are the fruits of his vigilance and activity; they are a people submitted to his management, whom he conducts and protects, and against whom he never employs force, but for the preservation of peace and good order. But in war against his enemies, or wild animals, his courage shines forth, his understanding is displayed, and his natural and acquired talents are united. As soon as he hears the noise of arms, as soon as the horn, or the huntsman's voice gives the alarm, filled with a new ardour, the dog expresses his joy by the most lively transports, and shews by his emotions and cries, his impatience for combat and his desire to conquer. Sometimes he moves along with cautious silence to discover and surprise his enemy; at others he traces the animal step by step, and by different tones indicates the distance, species, and even age of what he is in pursuit of. Pushed, intimidated, and despairing of safety in flight alone, animals make use of all their faculties and oppose craft to sagacity. In no instance are the resources of instinct more admirable: in order to make it difficult for the dog to trace him, the animal doubles, goes over its own steps again, by a single spring will clear a hedge or highway, and swims over brooks and rivers; but being still pursued and unable to annihilate himself, he endeavours to put another in his place; for this he seeks an unexperienced neighbour, with whom he keeps close until he supposes their steps are sufficiently intermixed to confound the scent of his, when he suddenly leaves him to become a victim to his deceived enemy. But the dog, by the superiority which exercise and education have given him, and by the excellence of his sensations, does not lose the object of his pursuit; by his scent he finds out all the windings of the labyrinth, all the false means adopted to make him go astray; and far from abandoning the one he was in pursuit of for another, he redoubles his ardour, at length overtakes,

attacks, and puts him to death; thus drenching in his blood both his hatred and revenge.

The inclination for hunting or war is common to us with animals. Man, in a savage state, knows only how to fight and to hunt. All carnivorous animals which have strength and weapons hunt naturally. The lion and the tiger, whose strength is so great that they are sure to conquer, hunt alone, and without art. Wolves, foxes, and wild dogs, hunt in packs, assist each other and divide the prey, and when education in the domestic dog has improved this natural talent, when he is taught to repress his ardour and to regulate his motions, he hunts with art and knowledge, and always with success. In deserts and depopulated countries, there are wild dogs, which differ in their manners from wolves, in no case but in the facility with which they are tamed. They unite in large troops to hunt, and will attack wild boars, bulls, and even lions and tigers. In America the wild dogs spring from a domestic race and were transported thither from Europe; some of them having been forgotten or abandoned in those deserts, have multiplied in such a degree that they go in troops to inhabited places, where they attack the cattle, and will sometimes even approach the inhabitants, who are obliged to drive them away by force and kill them like other ferocious animals. Dogs however continue in this state only while they remain unacquainted with man, for if we approach wild ones with gentleness, they soon grow tame, become familiar, and remain faithfully attached to their masters; but the wolf though taken young and brought up in the house, is only gentle in his youth, never loses his taste for prey, and sooner or later gives himself up to his fondness for rapine and destruction.

The dog may be said to be the only animal whose fidelity will stand the proof; who always knows his master, and even his master’s friends; who points out a stranger as soon as he arrives; who understands his own name, and knows the voices of the domestics; who has not confidence in himself alone; who, when he has lost his master, will call upon him by his cries and lamentations; who in long journeys, and which he may have travelled but once, will remember his way, and find out the roads; in fine, the dog is the only animal whose talents are evident, and whose education is always

successful. Of all animals he is also the most susceptible of impressions, most easily modified by moral causes, and most subject to alterations caused by physical influences. The temperament, faculties, and habits of his body vary prodigiously, and even his form is not uniform. In the same country one dog is very different from another, and the species seems quite changed in different climates; from thence spring the mixture and variety of races which are so great that it is impossible to enumerate or describe them. From the same causes arise that great variety so visible in the height, figure, length of the snout, form of the head, length and direction of the ears and tail, colour, quality and quantity of hair, &c. so that there seems to remain nothing constant in these animals but the conformity of their internal organization, and the faculty of procreating together. And as those which differ most from each other can intermix and produce fertile individuals, it is evident that dogs, however greatly they may vary, nevertheless constitute but one species. But what is most difficult to ascertain in this numerous variety of races, is the character of the primitive stock. How are we to distinguish the effects produced by the influence of the climate, food, &c.? How discover the changes which have resulted from an intermixture among themselves, either in a wild or domestic state? All these causes will, in time, alter the most permanent forms, and the image of nature does not preserve its purity in those objects of which mankind have had the management. Those animals which are independent and can chuse for themselves both their food and climate, are those which best preserve their original impressions, and we may believe the most ancient of their species are the most faithfully represented by their descendants. But those which mankind have subdued, transported from climate to climate, whose food, customs, and manners of living he has changed, may also be those which have changed most in their forms; and it is a fact that there are more varieties among domestic than wild animals; and as among domestic animals the dog is most attached to man, lives also the most regularly, and who possesses sentiments to render him docile, obedient, susceptible of all impressions, and submissive to all restraints, it is not astonishing

that he should be that in which we find the greatest variety not only in figure, height, and colour, but in every other quality.

There are also other circumstances which contribute to this change. The life of the dog is short, his produce is frequent, and in pretty large numbers; he is perpetually beneath the eye of man, and whenever by an accident, which is very common in nature, there may have appeared an individual possessing singular characters, or apparent varieties, they have been perpetuated by uniting together those individuals, and not permitting them to intermix with any others; as is done in the present time, when we want to procure a new breed of dogs, or other animals. Besides, though all the species were equally ancient, yet the number of generations being necessarily the greatest in those whose lives are short, their varieties, changes, and even degenerations, must have become more sensible, since they must be further removed from their original stock than those whose lives are longer. Man is at present eight times nearer to Adam than is the dog to the first of his race, because man lives to fourscore years, and the dog to not more than ten. If, therefore, from any cause these two species equally degenerate, the alteration would be eight times more conspicuous in the dog than in man. Those whose lives are so short that they are succeeded every year by a new generation, are infinitely more subject to variations of every kind than those which have longer lives. It is the same with annual plants (some of which may be said to be artificial or factitious), when compared with other vegetables. Wheat, for example, has been so greatly changed by man that it is not at present to be any where found in a state of nature, it certainly has some resemblance to darnel, dog-grass, and several other herbs of the field, but we are ignorant to which its origin ought to be referred; and as it is renewed every year, and serves for the common food of man, so it has experienced more cultivation than any other plant, and consequently undergone a greater variety of changes. Man can, therefore, not only make every individual in the universe useful to his wants, but, with the aid of time, he can change, modify, and improve their species; and this is the greatest power he has over Nature. To have transformed a barren herb into wheat is a kind of creation, on

which, however, he has no reason to pride himself, since it is only by the sweat of his brow, and reiterated culture, that he is enabled to obtain from the bosom of the earth this, often bitter, subsistence. Thus those species, as well among vegetables as animals, which have been the most cultivated by man, are those which have undergone the greatest changes; and as we are sometimes, as in the example of wheat, unable to know their primitive form, it is not impossible that among the numerous varieties of dogs which exist at present there may not be one like the first animal of his species, although the whole of these breeds must have proceeded virtually from him. Nature, notwithstanding, never fails to resume her rights, when left at liberty to act. Wheat, if sown in uncultivated land, degenerates the first year; if that is likewise sown it will be more degenerated in the second generation, and if continued for a succession of ages the original plant of the wheat would appear; and, by an experiment of this kind, it might be discovered how much time Nature requires to reinstate herself and destroy the effect of art, which restrained her. This experiment might easily be made on corn and plants, but it would be in vain to attempt it on animals, because they would not only be difficult to couple and unite but even to manage, and to surmount that invincible repugnance they have to every thing which is contrary to their dispositions or habits. We need not, therefore, expect to find out, by this method, which is the primitive race of dogs, or any other animals, which are subject to permanent varieties. But in default of the knowledge of these facts, which cannot be acquired, we may assimilate particular indications, and from those draw probable conjectures.

Those domestic dogs which were abandoned in the deserts of America, and have lived wild for 150 or 200 years, though then changed from their original breed, must notwithstanding, in this long space of time, have approached, at least in part, to their primitive form. Travellers say that they resemble our greyhounds; and they say the same of the wild dogs at Congo, which like those in America, assemble in packs to make war with lions, tigers, &c. But others, without comparing the wild dogs of St. Domingo to greyhounds, only say that they have long flat heads, thin muzzles, a ferocious air, and

thin meagre bodies; that they are exceedingly swift in the chace, hunt in perfection, and are easily taken and tamed when young; thus these wild dogs are extremely thin and light; and as the common greyhound differs but little from the mastiff, or what we call the shepherd's dog, it is not improbable that these wild dogs are rather of those species than real greyhounds; because on the other hand more ancient travellers have said that the dogs of Canada have ears erect like foxes, and resemble our middle-sized shepherd-dogs; that those of the Antille Isles had very long heads and ears, and had very much the appearance of foxes; that the Indians of Peru had only two kinds, a large and a small one, which they called Alco; that those of the isthmus of America, were very ugly, and that their hair was rough and coarse, which likewise implies they had ears erect. We cannot, therefore, have any doubt that the original dogs of America, before they had any communication with those of Europe, were all of the same race, and that they approached nearest to those dogs which have thin muzzles, erect ears, and coarse hair, like the shepherd's dogs; and what leads me further to believe that the wild dogs of St. Domingo are not real greyhounds is the latter being so scarce in France, that they are brought for the king from Constantinople, and other parts of the Levant, and because I never knew of any being brought from St. Domingo, or any of our American colonies. Besides, in searching what travellers have said of dogs of different colonies, we find that the dogs of cold climates have long muzzles and erect ears; that those of Lapland are small, have erect ears, and pointed muzzles; that the Siberian, or wolf dogs, are bigger than those of Lapland, but they also have erect ears, coarse hair, and sharp muzzles; and that those of Iceland have a strong resemblance to the Siberian dogs; and, in the same manner, the native dogs of the Cape of Good Hope and other warm countries, have sharp muzzles, erect ears, long trailing tails, longhair, but shining and rough: that these dogs are excellent for guarding of flocks, and consequently not only resemble in figure but even in instinct our shepherd's dogs. In climates still warmer, such as Madagascar, Madura, Calicut, and Malabar, the native dogs have all sharp muzzles, erect ears, and in almost every respect resemble our shepherd's dogs; nay, that even when mastiffs, spaniels, water-dogs, bull-dogs, beagles, blood-

hounds, &c. have been transported thither they degenerated at the second or third generation. In countries extremely hot, like Guinea, the degeneration is still more quick, since by the end of three or four years they lose their voice, can no longer bark, but only make an howling noise, and their immediate offspring have erect ears like foxes. The native dogs of these regions are very ugly; they have sharp muzzles, long erect ears, and long pointed tails; they have no hair on their bodies, their skin is usually spotted, though sometimes it is of an uniform colour; in short they are disagreeable to the eye and still more to the touch.

We may presume, therefore, and with some degree of probability, that the shepherd's dog is that which approaches nearest to the primitive race, since in all countries inhabited by savages, or men half civilized, the dogs resemble this breed more than any other. On the whole continent of the New World, they had but these and no variety; nor is there any other to be found on the south and north extremities of our own continent; and even in France and other temperate climates, they are still very numerous, though greater attention has been paid to multiplying and rearing the more beautiful, than the preservation of those which are most useful, and which have been totally abandoned to the peasants who have the care of our flocks. If we also consider that this dog notwithstanding his ugliness, and his wild and melancholy look, is still superior in instinct to all others, that he has a decided character in which education has no share, that he is the only thing born perfectly trained, that guided by natural powers alone, he applies himself to the care of our flocks, which he executes with singular assiduity, vigilance, and fidelity, that he conducts them with an admirable intelligence which has not been communicated to him; that his talents astonish at the same time they give repose to his master, whilst it requires much time and trouble to instruct other dogs for the purposes to which they are destined; if we reflect on these facts, we shall be confirmed in the opinion that the shepherd's dog is the true dog of nature; the dog that has been bestowed upon us for the extent of his utility; that he has a superior relation to the general order of animated beings who have mutual

occasion for the assistance of each other; and, in short, the one we ought to look upon as the stock and model of the whole species.

The human species appear clownish, deformed and diminutive in the frozen climates of the north. In Lapland, Greenland, and in all countries where the cold is excessive, we find none but small and ugly men; but in the neighbouring countries where the cold is less intense, we all at once meet with the Finlanders, Danes, &c. who for figure, complexion and stature, are perhaps the handsomest of all mankind. It is the same with the species of dogs: the Lapland dogs are very ugly, and so small that they scarcely ever exceed a foot in length. Those of Siberia, though less ugly have ears erect, with a wild and savage look, while in the neighbouring climates, where we find those handsome men just mentioned, are also the largest and most beautiful dogs. The dogs of Tartary, Albania, the northern parts of Greece, Denmark and Ireland, are the largest and most powerful, and are made use of for drawing carriages. The Irish greyhounds (*fig. 30.*) are of very ancient race and still exist, though in small numbers in their original climate. They were called by the ancients, dogs of Epirus, and Albanian dogs; Pliny has recorded in terms as energetic as elegant, a combat of one of these dogs, first with a lion and afterwards with an elephant. These dogs are much larger than the mastiff; they are so rare in France that I never saw but one of them, and he appeared as he sat to be about five feet high, and in form resembled the large Danish dog; but exceeded him very much in his size. He was quite white, and his manner was perfectly gentle and peaceable. In all temperate climates, as in England, France, Spain, Germany and Italy, we find men and dogs of all kinds. This variety proceeds partly from the influence of the climate, and partly from the concourse and intermixture of foreigners. On the former we shall not enlarge here, but with respect to the dogs, we shall observe, with as much attention as possible, the resemblances and differences which care, food, and climate have produced among these animals.

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Fig. 30 *Irish Hound*
Fig. 31 *Dane*
Fig. 32 *Greyhound*
Fig. 33 *Shepherd's Dog*
Fig. 34 *Wolf Dog*
Fig. 35 *Siberian Dog*

The large Dane, (*fig. 31.*) the mastiff, and the common greyhound (*fig. 32.*) though they appear different at the first sight, are nevertheless the same dog; the large Dane is no more than a plump mastiff; and the common greyhound is only the mastiff, rendered more thin and delicate by care; for there is no more difference between these three dogs than between a Dutchman, a Frenchman, and an Italian. In supposing the Irish greyhound to have been a native of France, he would have produced the Danish dog in a colder climate, and the greyhound in a warmer; and this supposition seems to be proved by the fact of the Danish dog's coming to us from the north, and the greyhound from Constantinople and the Levant. The shepherd's dog (*fig. 33.*), the wolf dog (*fig. 34.*) and the Siberian dog (*fig. 35.*) are but the same dog, and to which indeed might be added the Lapland, the Canadian, the Hottentot, and all those dogs which have erect ears; in short they only differ from the shepherd's dog in their height, in being more or less covered with hair, and in that being more or less long, coarse or bushy. The hound (*fig. 36.*) the harrier (*fig. 37.*) the turnspit (*fig. 38.*) the water dog (*fig. 39.*) and even the spaniel (*fig. 40.*) may likewise be regarded as the same dog; the greatest difference between them being the length of their legs, and the size of their ears, which in them all are long, soft, and pendent. These dogs are natives of France; and I do not think we should separate them from what is called the harrier of Bengal (*fig. 41.*) as it only differs from our harrier in its colour. I am fully satisfied that this dog is not originally from Bengal, or any other part of India, and that he is not, as some have pretended, the Indian dog spoken of by the ancients, which they say was the produce of a dog and a tiger, for he

has been known in Italy above 150 years, and never considered as a dog come from India but as a common harrier.[M]

[M] Canis sagax (vulgò brachus) says Aldrovande, an unius vel varii coloris sit parum refert; in Italiâ eligitur varius et maculosæ lynci persimilis, cum tamen niger color vel albus, aut fulvus non sit spernendus. *Ulyssis Aldrovandi de quadruped. digitat. vivip. lib. iii. p. 552.*

Engraved for Barr's Buffon.

Fig. 37. *Harrier.*
Fig. 36. *Hound.*
Fig. 38 *Turnpit*
Fig. 39 *Water Dog*
Fig. 40. *Spaniel.*
Fig. 41. *Harrier of Bengal.*
Fig. 42 *Iceland Dog*
Fig. 43 *Turkish Dog*

England, France, Germany, &c. appear to have produced the hound, the harrier, and the turnspit, for these dogs almost immediately begin to degenerate on being carried into Persia, Turkey, and such warm climates. But the spaniels and water dogs are natives of Spain and Barbary, where the temperature of the air occasions the hair to be longer and finer than in any other country. The bull-dog which is improperly called the little Dane, since he has no resemblance whatever to the large Dane except in having the hair short; the Turkish dog and the Iceland dog (*fig. 42.*) are but the same race, which being transported into a very cold climate has taken a strong covering, and in the warmer climates of Africa and India has lost its hair. The dog without hair known by the name of the Turkish dog (*fig. 43.*) is improperly so called, since it is not in the temperate climates of Turkey that dogs lose their hair, but in Guinea, and in the hottest climates of the Indies that this change happens; and the Turkish dog is no other than the small Dane, which had been

transported into some very warm climate, and having lost its hair was afterwards brought into Turkey, where, from its singularity, care has been taken to multiply the breed. The first of them that was seen in Europe, according to Aldrovandus, were taken in his time into Italy, where they could not multiply upon account of the climate being too cold for them. But as he gives not any description of these naked dogs, we cannot determine whether they were like those which are now called Turkish dogs, or whether we should compare them to the small Dane, since dogs of every breed lose their hair in very warm climates; and as already observed, their voices also. In some countries they become quite mute: in others they only lose the power of barking, and howl like wolves, or yelp like foxes; and by this alteration they seem to approach their natural state, for they change also in their form and instincts; they become ugly and invariably have their ears assume an erect and pointed form.

It is only in temperate climates that dogs preserve their ardour, courage, sagacity, and other natural talents, the whole of which they lose when taken into very warm climates. But, as if Nature never made any thing perfectly useless, in those countries where they cannot serve the purposes for which we employ them, they are in great estimation for food, and the Negroes prefer their flesh to that of any other animal. Dogs are sold in their markets at as dear a rate as mutton, venison, or game of any sort; a roasted dog being the most delicious feast among the negroes. It is possible that their fondness for the flesh of this animal may be occasioned by an alteration in its quality by the heat of their country, and that although extremely bad in our temperate climates it may receive a superior flavour by the warmth of theirs. But I rather think this appetite dependent more on the nature of man than on the change in the flesh of the dog, for the savages of Canada have the same partiality for dog's flesh as the Negroes; and even our missionaries sometimes eat of them without disgust. "Dogs," says Father P. Sabard Theodat, "serve in the room of mutton at feasts. I have been several times at these dog-feasts, and I own that at first they excited in me a degree of horror, but after tasting them twice, I found the flavour to be good, and not unlike pork."

In our climates the fox and the wolf are the wild animals which approach nearest the dog, particularly the shepherd's dog, which I look upon as the stock and type of the species; and as their internal conformation is wholly the same, and their external differences very trifling, I had an inclination to try whether they would breed together: I hoped at least to make them couple, and that if they did not produce fertile individuals, they would bring forth a species of mules which might participate of the nature of both. For this purpose I procured a she-wolf, of about three months old, from the woods, and reared her with a shepherd's dog of nearly the same age. They were shut up together in a pretty large yard, where no other beast could get access, and where they were provided with a shed for their retirement; they neither of them knew any individual of their own species, nor even any man but him who constantly supplied them with their victuals. In this manner they were kept together for the space of three years, without the smallest restraint. During the first year they played perpetually together, and seemed to be very fond of each other; in the second year they began to quarrel about their food, though they were always supplied with more than they could eat. The wolf always began the dispute. They had meat and bones carried to them on a wooden trencher, when the wolf, instead of seizing the meat, would drive off the dog, then take the trencher so dexterously between her teeth as to let nothing fall off, and carry away the whole; and I have frequently seen her run five or six times round the wall of the yard with it in her mouth, and only stop to take breath, devour the meat, or attack the dog if he came near. The dog was stronger than the wolf, but as he was less ferocious, we began to have some fear for his life, and therefore put him on a collar. After the second year their quarrels were sharper, and their combats more frequent, when a collar was also put upon the wolf, whom the dog began to treat more roughly. During these two years there was not the least appearance of desire in either of them; towards the end of the third they began to discover some marks of it, but it was without any signs of love, and instead of rendering them more gentle when they approached each other, they became ferocious and ungovernable. Nothing was now heard but dismal howlings mixed with cries of anger; in about three weeks they both grew very thin,

and never came near each other without indications of mutual destruction. At length they grew so enraged and fought so dreadfully that the dog killed the wolf; and I was obliged to have the dog killed a few days after, because as soon as he was set at liberty, he sprung with fury on the poultry, dogs, and even men.

At the same time I had three young foxes, two males and a female, which had been taken with snares and kept in separate places. I had one of these fastened with a long light chain, and had an hut built to shelter him. I kept him in this manner several months, and though he seemed pensive and had his eyes constantly fixed on the country, which he could see from his hut, yet he had constantly good health and appetite. A bitch in season was put to him, but as she would not remain near the fox, she was chained in the same place and plenty of food was given them. The fox neither bit nor used her ill, and during the ten days they remained together, there was not the smallest quarrel between them, neither night or day, nor when they fed; he even approached her familiarly, but as soon as he scented his companion, the signs of desire disappeared, he returned in a melancholy manner to his hut, and no intercourse took place. When the ardour of this bitch was gone, another and even a third and fourth were put to him in the same manner; he treated them all with the same gentleness and with the same indifference; to ascertain whether it was natural repugnance, or the state of restraint he was kept in, prevented his coupling, I had a female of his own species brought to him, which he covered more than once the same day, and upon dissecting her a few weeks afterwards we found she was impregnated, and would have produced four young ones. The other male fox was successively presented with several bitches in season; who were shut up with him in a close courtyard, but he discovered neither hatred nor love to them; they had neither combats nor caresses, and he died a few months after either of disgust or melancholy.

These experiments prove at least that the wolf and fox are very different in their natures from the dog; and that their species are so distinct as to prevent their intermixture, at least in our climates; that consequently the dog does not derive his origin from the wolf or fox,

and that the nomenclators who look on these two animals as nothing more than wild dogs, or who imagine the dog to be a wolf, or a fox, become tame, and give to all three in common the name of Dog, have deceived themselves by not having sufficiently consulted nature.

In climates which are warmer than ours, there is a ferocious animal which is less different from the dog than either the fox or wolf: this animal, which is called the jackall, has been taken notice of and tolerably well described by many travellers. They are found, we are told, in great numbers in Africa and Asia; about Trebisond and Mount Caucasus; in Mingrelia, Natolia, Hyrcania, Persia, India, Goa, Guzarat, Bengal, Congo, Guinea, and many other places; and though this animal is considered by the natives, where he is found, as a wild dog, yet as it is very doubtful whether they intermix, we shall treat of him as a separate species, as well as the fox and wolf, and keep their histories apart from each other as well as from the dog. Not that I pretend absolutely to affirm, that the jackall, or even the wolf and fox, have never in any age or country coupled with dogs. The ancients have so positively asserted the contrary, that there still remain some doubts, notwithstanding the proofs I have adduced. Aristotle says that although it is very rare for animals of different species to intermingle, yet it certainly happens among foxes, dogs, and wolves; and that the Indian dogs proceed from another wild beast like themselves and a dog; and we may suppose that this wild beast, to which he gives no name, is the jackall. But he says in another place that the Indian dogs come from the tiger and the bitch which appears to me more improbable, because the tiger is of a disposition and form more different from the dog than either the fox, wolf, or jackall. It must be allowed that Aristotle himself seems to invalidate his own argument, for after having said that the Indian dogs proceeded from a wild beast resembling the wolf or the fox, he afterwards says they come from the tiger. If they are from a tiger and a bitch, or from a dog and a tigress, he only adds, that it does not succeed until the third trial; that the first litter is solely tigers; that if dogs be tied up in deserts, unless the tigers are in season, they are often devoured; that the frequent production of monsters and

prodigies in Africa is occasioned by the great heat and scarcity of water making a number of different animals assemble together to drink where they grow familiar, and often couple together. All this seems too conjectural, uncertain, and suspicious to deserve any credit; for the more we observe the nature of animals, the more we perceive that the indication of instinct is the more certain way to judge of them. By the most attentive examination of the interior parts we only discover slight differences. The horse and ass, though they have a most perfect resemblance in the internal parts, are, nevertheless, animals of very different natures. The bull, ram, and goat, differ but little in their internal formation, though they form three species more distant than the horse and the ass; and the same observation holds with respect to the dog, the fox, and the wolf. The inspection of the external form shews this more clearly; but as in many species, especially in those the least distant, there is even in the exterior much more resemblance than difference, this inspection is not sufficient to determine whether they are of the same or different species; and when the shades are still less we can only combine them with the agreements they have with instinct. It is from the disposition of animals that we should judge of their natures; if we suppose two animals quite the same in their forms, yet different in their dispositions, they would not copulate nor breed together, and however much alike they would therefore be two distinct species.

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Fig. 44 *Shock Dog*
Fig. 45 *Lion Dog.*

The same means to which we are obliged to have recourse to judge of the difference of neighbouring species, is what we ought still more to employ when we would distinguish the numerous varieties which take place in the same species. We know of thirty varieties in the dog, and yet it is certain that we are not acquainted with them all. Of these thirty there are seventeen which may be said to be owing to the influence of climate, namely, the shepherd's dog, the wolf dog, the Siberian dog, the Iceland dog, the Lapland dog, the mastiff, the common greyhound, the great Dane, the Irish hound, the hound, the harrier, the terrier, the spaniel, the water-dog, the small Dane, the Turkish dog, and the bull-dog. The thirteen others, which are the mongrel Turkish dog, the greyhound with hair like a wolf, the shock dog, (*fig. 44.*) or lap dog, the pug dog, the bastard pug dog, the Calabrian, Burgos, and Alicant dogs, the lion dog, (*fig. 45.*) the small water dog, the Artois dog, and the King Charles's dog, (*fig. 46.*) are nothing but mongrels which proceed from the first seventeen races; and by tracing these mongrels back to the two races from which they issue their natures will be easily known but with respect to the first seventeen races, if we would know what relation there is among them we must attend to their instincts, forms, and many other circumstances. I have put together the shepherd's dog, the wolf dog, the Siberian, the Lapland, and the Iceland dogs, because there is a more striking resemblance between them than any others, in their forms and coats, and because they have all pointed noses somewhat like the fox, erect ears, and their instincts lead them to watch and follow the flocks. The mastiff, the greyhound, the large Dane, and the Irish hound, have, besides the resemblance of form and long snout, the same dispositions; they love to course and to follow horses; they have but indifferent noses, and hunt rather from their sight than their scent. The real hunting dogs are the hounds, harriers, terriers, spaniels, and water-dogs, and notwithstanding they differ in figure yet they have all thick muzzles, the same instincts, and therefore ought to be classed together; the only difference between the water-dog and the spaniel is, that those with long bushy

hair take to the water with more facility than those whose hair is short and straight. The small Dane and Turkish dog must be ranked together, since they are in fact the same; the latter having only lost his hair by the effects of heat. Lastly, the bull dog, (*fig. 47.*) seems to form a particular variety, and even to belong to a particular climate; he is a native of England, and it is difficult to preserve the breed even in France. The pug-dog, (*fig. 48.*) and mastiff, (*fig. 49.*) are mongrels from him and they succeed much better; they all have short muzzles and but little scent. The acuteness of the scent, however, seems in general to depend more on the largeness than the length of the muzzle, for the greyhound, large Dane, and the Irish greyhound, have their scent very inferior to the hound, hairier, terrier, spaniel, and water-dog, although their muzzles are more than proportionally longer.

Engraved for Barr's Buffon.

Fig. 46 *K. Charles's Dog*
Fig. 47 *Bull Dog*
Fig. 48 *Pug*
Fig. 49 *Mastiff*

These animals have all a greater or less perfection of the senses, and these differences, which in man occasion not any eminent or remarkable quality, give to animals all their merit, and produce as a cause all the talents of which their natures are susceptible. I shall not here take upon myself to enumerate all the qualities of the sporting dogs; it is well known how much the excellence of their sense of smelling, together with their education, gives them the superiority over other animals; but these details belong only to a distant part of Natural History. Besides the tricks and dexterity, though proceeding from nature alone, made use of by wild animals to elude the researches, or to avoid the pursuit of the dogs, are perhaps more wonderful than the most refined methods practised in the art of hunting.

The dog, as well as all animals which produce more than one or two at a time, is not perfectly formed at the time of its birth. Dogs are commonly whelped with their eyes shut; the two eyelids are not only closed together, but adhere by a membrane which breaks away as soon as the muscles of the upper eye-lid acquire sufficient strength to raise it and overcome this obstacle, which commonly happens about the tenth or twelfth day. At this time the bones of the skull are not finished, the body and snout swelled, and the whole form incomplete; but in less than two months they learn to make use of all their senses, begin to have strength, and their growth is very rapid. In the fourth month they lose some of their teeth, which, as in other animals, are soon replaced by others that do not fall out. They have in all 42 teeth, namely six incisive, and two canine at top and at bottom, fourteen grinders in the upper, and twelve in the under-jaw; but these latter are not always the same, as some dogs have more grinders than others. When very young, males and females bend down to void their water; about the ninth or tenth month, the males and some females begin to lift up their legs for that purpose, and at which time they begin to be capable of engendering. The male can couple at all times, but the females only at stated seasons, which are usually twice a year, and more frequently in winter than in summer; this inclination lasts ten, twelve, and sometimes fifteen days and shews itself by exterior signs; the male is apprized of her situation by his smell, although she seldom consents to his approaching her for the first six or seven days. Once coupling is sometimes sufficient for her to produce a great number of young, but if left at liberty she will admit many times a day almost every dog that presents himself. It has been observed that when allowed to choose for herself, she generally prefers the largest, without attending either to his form or beauty; and it frequently happens that small bitches who have received large mastiffs die in bringing forth their young. It is well known that these animals, from a singular conformation, cannot separate after consummation, but are obliged to remain united as long as the swelling subsists. The dog, like several other animals, has not only a bone in its member, but also a hollow ring, which is very apparent, and swells considerably during the time of copulation. The females have perhaps the largest clitoris of any animal, and

while compressed, a swelling arises which probably lasts longer than that of the male, and forces him to remain; for when the act is finished he changes his position, to rest on his four legs; he has also a melancholy air, and the efforts for separation are never made on the female side. Bitches go nine weeks with young, that is 63 days, but never less than 60. Those of the largest and strongest make are the most prolific, and those will sometimes produce ten or twelve puppies at a litter; while those of a small kind do not bring forth more than four or five, and frequently but one or two; especially the first time, which is always the least numerous in all animals.

Though dogs are very ardent in their amours, it does not prevent their duration, for they continue to propagate during life, which is usually limited to fourteen or fifteen years, though some have been known to live till twenty. Length of life in dogs is, like that of other animals, proportioned to the time of his growth: for as they are about two years in coming to maturity, so they live to twice seven. The dog's age may be known by his teeth, which, when he is young, are white, sharp, and pointed; and which, in proportion as he advances in age, become black, blunt, and unequal; it is also to be known by the hair, for it turns grey about the nose, forehead, and round the eyes. These animals, though naturally vigilant, active, and formed for exercise, become, by being over-fed in our houses, so heavy and idle, that they pass their lives in sleeping and eating. This sleep, which is almost continual, is accompanied by dreams, which is perhaps a mild manner of existing; and notwithstanding they are naturally voracious, yet they can subsist without eating a considerable time. In the Memoirs of the Academy of Sciences, there is an account of a bitch, who having been accidentally left in a country-house, subsisted 40 days without any other nourishment than the stuff on the wool of a mattress, which she had torn to pieces. Water seems to be more necessary for them than food, for they drink frequently and very abundantly; and it is even a vulgar opinion that if they want water for a length of time they become mad. It is a circumstance peculiar to them that they seem to make great efforts, and suffer pain in voiding their excrements. This is not occasioned, as Aristotle alleges, from their intestines becoming

narrower in approaching the anus; for, on the contrary, it is certain, that in the dog, as in other animals, the great intestines grow bigger as they proceed downwards, and that the rectum is larger than the colon: the dryness of the temperament of this animal is sufficient of itself to produce this effect.

To give a clearer idea of the different kinds of dogs, of their propagation in different climates, and of the mixture of their breeds, I subjoin a kind of genealogical tree, in which all the different varieties may easily be distinguished. The shepherd's dog is the stock or body of the tree. This dog, when transported into the rigorous climates of the north, such as to Lapland, becomes ugly and small, but in Russia, Iceland, and Siberia, where the climate is rather less rigorous, and the people more civilized, he is not only preserved, but even brought to greater perfection. These changes are occasioned solely by the influence of those climates, which produces no great alteration in his form, for in each of them he has erect ears, long and thick hair, and a wild look; he barks also less frequently, and in a different manner from those that in more favourable regions have been brought to greater perfection. The Iceland dog is the only one that has not his ears entirely erect, but which bend or fold a little at their extremities; and Iceland is, of all the northern countries, that which has been most anciently inhabited by half-civilized men.

The same shepherd's dog, transported into temperate climates, and among people perfectly civilized, as those of England, France, or Germany, loses its savage air, erect ears, its long, thick, and rough hair, and takes the form of the hound, bull-dog, and mastiff. Of the two latter the ears are still partly erect, or only half-pendent; and in their manners and sanguinary dispositions very much resemble the dog, from which they draw their origin. The hound is the most distant of the three; his ears are long and pendent, and the gentleness, docility, and, we may say, the timidity of this dog, are so many proofs of the great degeneration, or, more properly, the great perfection he has acquired by a long state of domesticity, and a careful education bestowed on him by man.

The hound, the harrier, and the terrier, are only one race, for it has been remarked that in the same litter there have been harriers, terriers, and hounds, though the female hound had been only covered by one of the three dogs. I have coupled the Bengal harrier with a common harrier, because they differ only by the number of spots upon their coats. I have also coupled the turnspit, or terrier with crooked legs, with the common terrier, because the defects in the legs of this dog only proceed from a disease somewhat like the rickets, with which some individuals have been attacked, and transmitted the effects to their descendants.

The hound, if transported into Spain and Barbary, where all animals have the hair fine, long, and thick, would become the spaniel and water-dog. The great and small spaniel, which differ only in size, when brought into England change their colour from white to black, and, by the influence of the climate, have become the large and small King Charles's dog, and the beagle, which is, in fact, the same as the others, but with liver-coloured marks on the fore feet, over the eyes, and on the nose.

The mastiff, transported to the north, is become the large Dane, and to the south changes into a common greyhound. The large greyhounds come from the Levant, those of a middling size from Italy, and the latter being taken into England have become still smaller. The large Dane, transported into Ireland, the Ukraine, Tartary, Epirus, and Albania, have become the large Irish dogs, which in size surpass all the rest of the species. The bull-dog, transported from England into Denmark, is become the small Dane, and this small Dane taken into warm climates changed into the Turkish dog. All these races, with their varieties, have been produced solely by the influence of climate, joined to the effects of food and education; the other dogs are not pure races, but proceed from a mixture of those above.

The greyhound and mastiff have produced the mongrel greyhound, which is called the *greyhound with wolf's hair*. The nose of this mongrel is not so thin as that of the Turkish greyhound, which is very rare in France. The large Dane and the large spaniel have

produced the dog of Calabria, which is a handsome dog, with long thick hair, and higher in stature than the largest mastiff. The spaniel and terrier produce what is called the Burgundy spaniel; and from the spaniel and small Dane has come the lion-dog, which is now very scarce. The dogs with long fine curled hair, which are called the Bouffe dogs, and which are bigger than the water dogs, come from the water dog and large spaniel. The little water dog comes from the small spaniel and the water dog. The bull-dog and the mastiff produce a mongrel, which is larger than the bull-dog, yet approaches him more than the other; and the pug comes from the bull-dog and the small Dane.

All these races are simple mongrels, and come from the mixture of two pure races; but there are other dogs which may be called double mongrels, because they proceed from a pure race and one already mixed. The bastard pug is a double mongrel, and comes from a mixture of the pug with the small Dane. The Alicant dog is also a double mongrel; he proceeds from the pug and the small spaniel. The Maltese, or lap-dog, is a double mongrel, and comes from the small spaniel and little water-dog. In fine, there are dogs which may be called triple mongrels, because they proceed from the mixture of two races which have already been mixed; as the Artois dogs and what is called the *street dogs*, which resemble all dogs in general, but no one in particular, since they proceed from races which have several times been mixed.

SUPPLEMENT.

The following curious fact I had from M. de Mailly, of the Academy of Dijon: "The curate of Norges, near Dijon, has a bitch, which has had all the symptoms of pregnancy, and having puppies without having been in either state. She was proud, but was not suffered to go with a dog, yet at the end of her usual term her paps were filled with milk, and she brought up some young puppies that were taken to her, with as much care and tenderness as if they had really been her own; and what is more singular, this same bitch, about three years since, suckled two young kittens, one of which has

imbibed so much of the nature of her nurse, that her cries infinitely more resemble the tones of a dog than those of a cat." This is certainly a rare phenomenon, and were this production of milk without impregnation more frequent, it would render female animals more analogous to female birds who produce eggs without connection with the male.

The Russians have brought several dogs to Paris, as Siberians, a very different race from those which we have described; one in particular, both male and female, were about the size of a common greyhound, with pointed noses, ears half erect, and long tails; they were entirely black, excepting a spot of white which the female had upon the top of the head, and one which the male had upon his tail; they were very fond, but exceedingly dirty and voracious, and it was almost impossible to satisfy them with food; upon the whole, they were evidently of the same race as we have treated of under the denomination of Iceland dogs.

Mr. Collinson, who had made various researches concerning the Siberian dogs, informed me that their noses were pointed, and their ears long, that some of them carried their tails like the wolf, others in the same manner as the fox, and that they certainly engendered with both those animals; that he had himself seen dogs and wolves couple in England, and although he knew of no one who could say the same with regard to dogs and foxes, from the kind well known there by the name of the fox-dogs, he did not think there could be any doubt of the fact.

The Greenland dogs are mostly white, though some few are black, and have very thick coats; they employ them for drawing their sledges, by putting four or six of them together; they also eat their flesh, and make clothes of their skins. The Kamtschatka dogs are also either black or white, and are used for drawing sledges; they are suffered to run at large during the summer, and in winter they are fed with a sort of paste made with fish. These dogs of Greenland and Kamtschatka, as well as the Russian dogs just mentioned, have a strong resemblance to the Iceland dogs, and are most probably of the same race.

Notwithstanding the varieties I have described, there are still others remaining, which I have not been able to procure; I have myself seen two individuals of a wild race, but could not get a sufficient opportunity even to describe them. M. Aubry, curate of St. Louis, informed us that a few years since he saw a dog about the size of a spaniel, with long hair and a very large beard on his chin. Louis XIV. had some of these dogs sent to him by M. le Comte de Toulouse; and Comte de Lassai had some of the same breed, but there is not any of them to be found at present.

I have little to add with respect to the wild dogs, of which there are different races, to what is contained in my original work; and the following account of the wild dog found near the Cape of Good Hope, I had from M. le Vicomte de Querhoënt; he says, there are a great number of packs of wild dogs at the Cape; their skins are spotted with various colours, and some of them are very large; their ears are erect, they run extremely fast, and have no constant place of abode. They kill the deer in great numbers, are seldom destroyed themselves, and are very difficult to be caught in snares, from carefully avoiding every thing that has been touched by man. Several of their young have been taken in the woods, and some of those it has been attempted to render domestic, but they grow up so large and so ferocious that the attempt has been given up as in vain.

END OF THE FIFTH VOLUME.

T. Gillet, Printer, Wild-Court.

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