

T H E O X*.

THE surface of the earth, adorned with its verdure, is the common and inexhaustible source, from which man and other animals derive their subsistence. Every animated being in nature is nourished by vegetables; and these, in their turn, are supported by the spoils of all that has lived or vegetated. Destruction is necessary to life: It is only by the destruction of beings, that animals can live and multiply. God, when

* The generic characters are: The horns bend out laterally; there are eight cutting teeth in the lower jaw, and none in the upper; the skin along the lower side of the neck is pendulous. The specific marks of the common bull and cow are, rounded horns, with a large space between their bases; *Pennant's Synops.* p. 4.

Bos, Gessner. quad. 25. *Rall* Syn. quad. p. 70.

Ovis, Klein. quad. 9.

Bos cornibus levibus, teretibus, sursum reflexis; Brisson, quad. 52.

Bos taurus, cornibus teretibus extrorsum curvatis, palcaribus laxis; Linn. Syst. 98.

N. B. The word *Ox*, in its common acceptation, denotes black cattle in general, without regard to sex. In a more restricted sense, it signifies a castrated bull. To prevent confusion, when *ex* is used in the last sense, it is printed in Italic characters.

he created the first individuals of each species of animal and vegetable, not only bestowed form on the dust of the earth, but gave it animation, by infusing into these individuals a greater or smaller quantity of active principles, of living organic particles, which are indestructible*, and common to every organized being. These particles pass from body to body, and are equally the causes of life, of the continuation of the species, of growth, and of nutrition. After the dissolution of the body, after it is reduced to ashes, these organic particles, upon which death has no influence, survive, circulate through the universe, pass into other beings, and produce life and nourishment. Hence, every production, every renovation or increase by means of generation, of nutrition, or of growth, implies a preceding destruction, a conversion of substance, a translocation of organic particles, which never multiply, but, uniformly subsisting in equal numbers, render Nature always equally animated, the earth equally peopled, and equally resplendent with the original glory of that Being by whom it was created.

Taking beings in general, therefore, the total quantity of life remains always the same; and death, which seems to be an universal destroyer, annihilates no part of that primitive life which is common to all organized bodies. Like all

* See Chap. VI. &c. of the second volume of this work.

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subordinate powers, Death attacks individuals only. His blows are confined to the surface: He destroys the form, but has no influence on the matter. He is unable to injure Nature; his strokes, on the contrary, make her shine with additional lustre. She permits him not to annihilate the species, but allows him, successively, to mow down individuals, with a view to demonstrate her independence both of Death and of Time, to give her an opportunity of exerting, at every instant, her power, which is always active, and of manifesting the extent of her resources by her fertility, and, by a perpetual renovation of beings, to make the universe a theatre always filled with objects which attract our attention by their grandeur and novelty.

It is apparent, therefore, that a succession of beings cannot otherwise be effected than by mutual destruction. For the nourishment and subsistence of animals, vegetables or other animals must be sacrificed: And as, both before and after this destruction, the quantity of life remains always the same, Nature seems to be indifferent whether particular species be more or less consumed. Like an economical parent, however, in the midst of fulness and affluence, she fixes limits to her expence, and prevents any unnecessary waste, by bestowing on few animals the instinct of feeding on flesh, while she has multiplied, profusely, both the species and the individuals

viduals of those which live upon plants. In the vegetable kingdom, she seems even to be prodigal of species, which are every where diffused, and endowed with an astonishing fecundity. Man, it is probable, has contributed not a little to promote the intentions of Nature, by maintaining, and even establishing, this order upon the earth; for, in the ocean, we actually perceive that indifference which we have supposed. Fishes of every kind are almost equally voracious. They live upon their own or different species, and perpetually devour each other, without annihilating any particular kind; because their fecundity is proportioned to the depredations they commit, and the whole consumption reverts to the advantage of reproduction.

Man knows how to exercise his power over animals. He selects those whose flesh is most agreeable to his palate, makes them his domestic slaves, and multiplies them far beyond what Nature would have done. By his industry in promoting their increase, he seems to have acquired a right to sacrifice them. But he extends this right farther than his necessities demand. He makes war against savage animals, birds, and fishes. He does not even limit himself to those of the climate he inhabits, but goes to foreign nations, and to the midst of the ocean, in quest of new luxuries. All Nature seems to be insufficient to satisfy the intemperance and caprice of his appetite. Man alone consumes more flesh than

than all the other carnivorous animals in the world. He is unquestionably the greatest destroyer; and he is so, more from abuse than necessity. Instead of enjoying, with moderation, the benefits presented to him, instead of dispensing them with equity, or making reparation in proportion to his waste, by renewing what he annihilates, the rich man places his chief glory in consuming at table more in one day than would be sufficient to feed many families. His abuse is not confined to the animals, but extends to his fellow-men, many of whom languish with famine and misery, and labour only to satiate the vanity and luxurious appetite of the opulent, who kill the poor by famine, and put an end to their own existence by excess.

Man, notwithstanding, like some other animals, might live upon vegetables. Flesh, which appears so analogous to flesh, affords not better nourishment than grain or bread. That nutriment which contributes to the expansion, growth, and support of the body, consists not of the inert and visible matter of which the texture of flesh and of herbs is composed, but of the organic particles contained in both these substances; for the ox, in browsing the herbage, acquires as much flesh as man and other animals who live entirely on carnage and blood. There is but one difference between these two kinds of aliment: When the quantities are equal, flesh, grain, and seeds, contain a greater number of organic

organic particles than herbage, or the leaves, roots, and other parts of plants. Of this fact we are ascertained by examining infusions of these substances. So that man, and the other carnivorous animals, whose stomachs and intestines are not so capacious as to admit a great deal of aliment at a time, are unable to devour herbage in quantities sufficient to afford the number of organic particles necessary for nourishing them. It is for this reason, that man, and the other animals who have but one stomach, can subsist only upon flesh and seeds, which contain, in a small volume, a great number of these organic nutritive particles: While the ox, and other ruminant animals, who have several stomachs, one of which is remarkably capacious, and, consequently, can admit a large quantity of herbage, are enabled to extract from this mass a number of organic particles sufficient for their nourishment, growth, and multiplication. Here the quantity compensates the quality of the nutriment. But the flock is the same. It is the same matter, the same organic particles, which nourish man, the ox, and all other animals.

It will be objected, that the horse has but one stomach, and a very small one; that the ass, the hare, and other animals which live upon herbs, have likewise but one stomach; and, consequently, that this theory, however probable, is not well founded. These apparent exceptions, however, so far from weakening, seem to confirm

firm the truth of it: For, though the horse and the ass have but one stomach, they have sacs or pouches in their intestines, so large, that they may be compared to the paunch of ruminating animals; and hares have a blind gut so long and wide, that it is equivalent, at least, to a second stomach. Thus, it is by no means surprising that these animals are properly nourished by herbage alone: And, in general, it will always hold, that the different modes of feeding among animals depend on the total capacity of their stomach and intestines: For ruminating animals, as the ox, the sheep, the camel, &c. have four stomachs, and intestines of a prodigious length; and herbage alone is sufficient to nourish them. Horses, asses, hares, rabbits, Guinea-pigs, &c. have one stomach only, but they have a blind gut equivalent to a second stomach; and they feed upon herbage and grain. The wild boar, the hedge-hog, the squirrel, &c. whose stomachs and intestines are of a mean capacity, eat little herbage, but live principally upon seeds, fruits, and roots: And those animals which, in proportion to the size of their bodies, have small stomachs and intestines, as the wolf, the fox, the tiger, &c. are obliged to choose food of the most succulent kind, and which contains the greatest number of organic particles, and, of course, to live upon flesh, blood, seeds, and fruits.

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It is obvious, therefore, that the diversity of tastes perceived in the appetites of different animals, arises not from the superior agreeableness of particular kinds of food to their palates, but from a physical cause necessarily depending on the structure of their bodies: For, if they were not oftener determined by necessity than by taste, how could they devour corrupted carrion with equal avidity as fresh and succulent flesh? Why should they eat, without distinction, every species of flesh? We see, that domestic dogs, who have the liberty of making a choice, constantly refuse certain meats, as pork, woodcocks, thrushes, &c. But wild dogs, wolves, foxes, &c. eat, indiscriminately, the flesh of swine, woodcocks, birds of every kind, and even frogs; for I once found two frogs in the stomach of a wolf. When they can procure neither flesh nor fish, they eat fruits, seeds, grapes, &c. But they uniformly prefer those kinds of food which, in a small volume, contain a great quantity of nutriment, or rather of organic particles, proper for nourishing and supporting their bodies.

If these proofs should not appear to be sufficiently strong, let us attend to the manner of feeding cattle, when the object is to fatten them. They are first castrated, which obstructs the passage through which the greatest quantity of organic particles escape. Then, instead of allowing them to feed, as usual, on herbage alone, they are served with bran, corn, turnips, and, in a

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word, with food more substantial than grass*. The quantity of flesh, juices, and fat, soon augments; and, from a flesh naturally hard and dry, good and succulent meat is produced, which is used as the basis of our best dishes.

From what has been advanced, it is likewise a consequence, that man, whose stomach and intestines are proportionally of no great capacity, could not live upon herbage alone. It is an incontestible fact, however, that he can live pretty well upon bread, herbs, and the seeds of plants; for we know whole nations, and particular orders of men, who are prohibited by their religion from eating any animal substance. But these examples, though supported by the authority of Pythagoras, and recommended by some physicians, appear insufficient to convince us, that the health and multiplication of mankind would be improved by feeding solely upon pot-herbs and bread; especially when it is considered, that the country-people, whom the luxury and sumptuousness of the opulent reduce to this mode of living, languish and die much sooner than men of the middle rank of life, who are equally strangers to want and to excess.

Next to man, the carnivorous animals are the greatest destroyers. They are at once the ene-

* No food fattens cattle so successfully or so quickly as green herbage; but turnips, and the dry kinds of nourishment mentioned in the text, are used only in winter, when green vegetables cannot be procured in sufficient quantities.

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mies of Nature and the rivals of the human kind. A constant attention, joined to the most indefatigable industry, are necessary to protect our flocks, poultry, &c. from birds of prey, and from the rapacious jaws of the wolf, fox, weasel, martin, &c. A perpetual war is requisite to defend even our grain, fruits, and garments, against the voracious attacks of rats, caterpillars, beetles, mites, &c.; for insects are to be ranked among those animals which are more destructive than useful. But the ox, the sheep, and other herbivorous animals, are not only the most precious and most useful to man, but they consume less, and are maintained at the smallest expence. With regard to this article, the excellence of the ox is superior to that of any other creature; for he restores to the earth as much as he takes from it: He even enriches and improves the ground on which he feeds. The horse, on the contrary, and most other animals, impoverish, in a few years, the best pasture-lands *.

But these are not the only advantages which man derives from the ox. Without the aid of this useful animal, both the poor and the opulent would find great difficulty in procuring subsistence; the earth would remain uncultivated; our fields and gardens would become parched and barren. All the labour of the country de-

* It were to be wished that the author had supported this assertion by facts; for what he here advances, is not only doubtful, but probably altogether without foundation.

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pends upon him. He is the most advantageous domestic of the farmer. He is the very source and support of agriculture. Formerly the ox constituted the whole riches of mankind; and he is still the basis of the riches of nations, which subsist and flourish in proportion to the cultivation of their lands and the number of their cattle: For in these all real wealth consists; every other kind, even gold and silver, being only fictitious representations, have no value, but what is conferred on them by the productions of the earth.

The form of the ox's back and loins show that he is not equally qualified for carrying burdens as the horse, the ass, or the camel. But the thickness of his neck, and broadness of his shoulders, point him out as destined for the yoke. Though his chief strength lies in his shoulders, yet, in many provinces of France, they oblige him to draw by the horns. In support of this practice, it is alleged, that, when yoked in this manner, he is more easily managed. His head, I allow, is so very strong, that he may draw tolerably well by the horns; but he would draw with still much more advantage, if yoked by the shoulders. Nature seems to have intended him for the plough. The largeness of his body, the slowness of his movements, the shortness of his legs, and even his tranquillity and patience under labour, concur in rendering him superior to every other animal for cultivating the ground, and overcoming

overcoming that constant resistance which the earth opposes to his efforts. The horse, though perhaps equal in strength, is not so well fitted for this kind of labour. His limbs are too long, and his motions too sudden and violent. Besides, he is impatient, and easily disheartened*. When employed in this heavy work, which requires more perseverance than ardour, more force than quickness, and more weight than spring, we rob the horse of all the nimbleness of his motions, and all the graces of his gait and attitudes.

Of those animals which man forms into flocks, and whose multiplication is his principal object, the females are more useful than the males. The produce of the cow is almost perpetually renewed. The flesh of the calf is equally wholesome and delicate; the milk is an excellent food, especially for children; butter is used in most of our dishes; and cheese is the principal nourishment of our peasants. How many poor families are reduced to the necessity of living entirely on their cow? Those very men who toil from morning to night, who groan and are bowed down with the labour of ploughing the ground, obtain nothing from the earth but black bread,

* The horse, when properly trained, is equally firm and steady at a constant draught as the ox, and much more capable of an extraordinary exertion, when that becomes necessary. This quality gives him an evident superiority over the ox; because it renders it unnecessary for the farmer to keep superfluous cattle for the sole purpose of overcoming any violent resistance that may occur.

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and are obliged to yield to others the flour and the substantial part of the grain. They raise rich crops, but not for themselves. Those men who breed and multiply our cattle, who spend their whole lives in rearing and guarding them from injuries, are debarred from enjoying the fruits of their labour. They are denied the use of flesh, and obliged, by their condition, or rather by the cruelty of the opulent, to live, like horses, upon barley, oats, coarse pot-herbs, &c.

The cow may likewise be used in ploughing; and, though her strength is not equal to that of the ox, she frequently supplies his place. But, when employed in this way, she should be matched, as nearly as possible, with an ox of the same stature and strength, or with another cow, in order to maintain the equality of the draught, and to keep the plough in equilibrium between the two forces, which facilitates the labour, and makes the furrows more regular. From six to eight oxen are often employed in stiff land, and particularly in rough fallow-grounds, which rise in large masses. But two cows are sufficient for light soils; and, in very light land, the length of the furrow drawn at once may be farther extended. The ancients limited the length of the furrow, to be drawn without any interruption in the motion of the cattle, to 120 paces; after which they were allowed to stop, for a few moments, to recover their breath, before going on with the same furrow, or beginning a

new one. But the ancients delighted in the study of agriculture, and gloried in ploughing themselves, or at least in encouraging their labourers, and rendering both them and the cattle as easy as possible. Among the moderns, however, those who enjoy the most luxurious productions of the earth, are least acquainted with the means of encouraging or supporting the arts of cultivation.

Propagation is the principal use of the bull. Though he may likewise be trained to labour; yet his obedience is uncertain, and it is always necessary to guard against the improper exertions of his strength. Nature has endowed the bull with a bold and untractable disposition. In the rutting season, he becomes perfectly ungovernable, and often furious. But castration, while it destroys the source of these impetuous emotions, diminishes not his strength. On the contrary, it makes him larger, heavier, and more fit for the labour to which he is destined. It also changes his dispositions; for, after this operation, he becomes more tractable, more patient, and less troublesome to his neighbours. A flock of bulls would exhibit a scene of the most frightful discord; they could neither be intimidated nor conducted by man.

The manner of performing castration is well known to the country-people. Different modes, however, are practised, and their effects are perhaps not properly attended to. In general, the

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time most proper for castration, is that which immediately precedes puberty, which happens at the age of 18 months or two years. When performed more early, the animals seldom survive*. However, when young calves are castrated soon after birth, and survive an operation so dangerous at that period of life, they become larger and fatter *oxen*, than if it had been delayed till the second, third, or fourth year. But, in the latter case, they preserve more of their natural activity and courage: And, when delayed till the sixth, seventh, or eighth year, the animals hardly lose any of the qualities peculiar to the male sex. They are more impetuous and untractable than other *oxen*; and, in the season of love, they are apt to harass the females, from whom they should be carefully separated: For copulation, or even contact with *oxen*, produces warty tumors on the parts of the cow, which it is necessary to remove by the actual cautery. This disease† is supposed to proceed from a certain purulent and corrosive matter ejected from *oxen*, which have either been completely castrated, or have had their testes twisted and compressed, with a view to destroy their power of generating.

* Here our author's usual accuracy seems to have forsaken him. It is a certain and well known fact, that, when castration is performed at the age of eight or ten days, not one in twenty dies, in proportion to the number of those which perish, when the operation is delayed to the age of puberty.

† This disease was never heard of, so far as I can learn, in Britain.

The females generally come in season in the spring; and, in France, most of them receive the bull and are impregnated from the 15th of April to the 15th of July; but some are earlier and others later. Their time of gestation is nine months; and they bring forth in the beginning of the tenth. Hence our calves are numerous from the 15th of January to the 15th of April. They are also plenty during the whole summer, and become more rare in autumn. The marks of ardour in the cow are not equivocal. She then lows more frequently and with more violence than at any other time. She mounts upon cows, *oxen*, and even upon the bull. The external parts swell, and become prominent. When her ardour is greatest, she ought to be gratified; for, if allowed to abate, she is apt not to retain.

The bull, like the stallion, should be chosen from the handsomest of his kind. He should be large, well made, and in good condition with regard to fatness. His eyes should be black, his aspect bold, his front open, his head short, his horns thick, short, and black, his ears long and bushy, his muzzle large, his nose short and straight, his neck fleshy and thick, his chest and shoulders large, his loins firm, his back straight, his legs thick and fleshy, his tail long and well covered with hair, his tread firm and sure, and his hair of a reddish colour*. Cows often hold at the first, second, or third time; and, as soon as they

* La Nouvelle Maison Rustique, tom. i. p. 298.

are impregnated, though the symptoms of ardour still appear, the bull often refuses to cover them: But, in general, their ardour ceases immediately after conception, and they spontaneously repel the approaches of the bull.

Cows with young, when improperly managed, or put to the plough, carriage, &c. are subject to abortion; they should, therefore, be carefully watched and attended, to prevent them from leaping hedges or ditches. They should also be fed on rich pasture, and in parks which are not too moist or marshy. Six weeks or two months before bringing forth, their ordinary quantity of food should be enlarged*, by putting grass into their stalls in summer, and, in winter, by giving them bran, lucern, saintfoine, &c. From this period, no milk should be drawn from them, the whole of it being necessary for nourishing the fetus. In some cows, the milk dries up entirely a month or six weeks before they bring forth; but those which have milk to the last, make the best mothers and the best nurses. This late milk, however, is commonly bad, and in small quantity. The delivery of the cow requires still more attention than that of the mare; for the former is weaker and more exhausted by the operation. She ought to be put into a stable,

* The practice in this country is directly the reverse of that here recommended. When in good order, cows are more sparingly fed some time before they bring forth; because the opposite management is supposed to make the calf grow too large, and, of course, to endanger the life of the mother.

to have good litter, and to be fed, for ten or twelve days, with bean-flour, or oats, diluted in salted water, and plenty of lucern, saintfoine, or good grafs*. This time is generally sufficient for the recovery of her strength; after which she may gradually return to her usual mode of living and pasturing. During the first two months, her milk, which is then not good, should be solely appropriated to the nourishment of the calf.

That the calf may be kept warm, and suck as often as it chooses, it should be allowed to remain constantly with the mother for the first five or six days. After this period, the calf, if always left with the mother, would exhaust her by sucking too much. It is sufficient to let calves suck twice or thrice a-day; and, to improve their flesh and fatten them quickly, they should every day be fed with raw eggs, boiled milk, and bread. At the end of four or five weeks, calves managed in this manner are fit for the butcher. When designed for the market, they may be allowed to suck only 30 or 40 days†. But those which are intended to be brought up,

* For some days after calving, our cows are generally prevented from eating green succulent food. They are preserved from cold; and tepid water, mixed with oat-meal, or some other palatable substance, is given them to drink.

† If this be the practice in France, the veal must be bad. Calves designed for the market should be fatted at least eight or ten weeks, otherwise the veal cannot acquire its full perfection. Neither is it usual, in cultivated countries, to allow the calves to suck; for the milk is given them by the hand.

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should have suck two months at least; for the longer they are allowed to suck, they become the larger and stronger cattle. Calves brought forth in the months of April, May, and June, are best for rearing; those that come later into the world, being unable to resist the rigour of winter, generally languish and die with cold. At the end of two, three, or four months, and before weaning them entirely, they should be fed with good grafs or tender hay, to accustom them gradually to their future nourishment. They should then be separated from the mother, and never again be permitted to approach her either in the stable or the field. In summer, they should be pastured every day from morning to night. But, as soon as the cold commences in autumn, they should be turned out to pasture late in the morning, and brought back to the stable early in the evening: And, during winter, as cold is extremely hurtful to them, they should be kept warm in a close well littered stable. Along with their usual food, they should have saintfoine, lucern, &c. and never be allowed to go out, except in soft weather*. During the first winter, which is the most dangerous period of their existence, they require a great deal of attention. In the succeeding summer, they acquire strength suffi-

* Young cattle should be allowed to go abroad every day, unless the weather be extremely tempestuous. It preserves them in the habit of using their limbs, makes their blood circulate with more freedom, and excites their appetite.

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cient to fortify them against the attacks of the second winter.

The cow arrives at the age of puberty in eighteen months, and the bull in two years *. But, though they are then capable of generating, they should not be admitted to each other till they be three years old. From three to nine years, these animals are in their greatest vigour. After this period, both cows and bulls are only fit for being fattened and delivered to the butcher. As they acquire their full growth in two years, the duration of their life, like that of most other animals, is nearly seven times two, or fourteen years; few of them ever exceed this age.

In all quadrupeds, without exception, the voice of the male is stronger and deeper than that of the female. Though the ancients allege, that the cow, the *ox*, and even the calf, have deeper voices than the bull; yet the contrary is certain; for the voice of the bull reaches much farther. The bellowing of the bull not being a simple sound, but composed of two or three octaves, the highest of which strikes the ear most forcibly, may have given rise to this deception: But, when we listen attentively, we perceive, at the same time, a sound much graver than is uttered by the cow, the *ox*, or the calf, whose lowings are also a great deal shorter. The bull never bellows, but when stimulated by love; the low-

* In this country, cows and bulls are capable of procreating at a much earlier period.

ings of the cow proceed oftener from terror or timidity, than from any other cause; and pain, hunger, or the absence of the mother, produce the complaints of the calf.

The heaviest and most sluggish animals are not those which sleep longest or most profoundly. The slumbers of the *ox* are slight and short. The smallest noise rouses him. He lies commonly on the left side; and the left kidney is always larger and fatter than the right.

The *ox*, like other domestic animals, varies in colour. The reddish colour, however, is most common, and in highest estimation. Some praise the black colour; and others maintain, that bay *oxen* live longest; that the brown soon decay and lose their spirit; and that the gray, the dappled, and the white, are of no value for the purposes of labour, and should only be fattened for slaughter. But, whatever be the colour of an *ox*, his coat ought to be smooth, shining, thick, and soft to the touch; for, when rough and unequal, it indicates bad health, or a weak constitution. A good *ox* for the plough should neither be too fat nor too lean; his head ought to be short, his ears large, and well covered with hair, his horns strong, shining, and middle-sized, his fore-head broad, his eyes large and black, his muzzle thick and flat, his nostrils wide, his teeth white and even, his lips black, his neck fleshy and strong, his shoulders thick and massy, his chest large, his dewlap long, and extending as far as his

his knees, his loins very broad, his belly wide and prominent, his flanks large, his haunches long, his crupper thick, his legs and thighs large and nervous, his back straight and plump, his tail as long as to reach the ground, and covered with fine bushy hair, his feet firm, his skin thick and pliable*, his muscles well raised, and his toes or hoofs broad and short†. He should likewise feel the goad with sensibility, obey the call of his driver, and be well trained. But it is only by degrees, and by beginning at an early period, that the *ox* can be taught patiently to bear the yoke, and to allow himself to be conducted with ease. At the age of two and a half, or three years at most, we should begin to tame him, and to accustom him to the yoke. If longer delayed, he often becomes perfectly ungovernable. Patience, mildness, and even caresses, are the only means which should be employed. Force and harsh treatment serve no other purpose than to dispirit and render him totally unmanageable. He should be stroked and caressed; and he should occasionally be fed with boiled barley, bruised beans, and other aliments of the same kind, mixed with a little salt, of all which he is extremely fond. His horns, at the same time, should be frequently tied. Some

* La Nouvelle Maison Rustique, tom. i. p. 279.

† These marks are at present out of fashion in Britain, and not to be depended on. Every nation, every province, has its own favourite marks; but most of them are temporary and fluctuating.

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days afterwards, he may be yoked to the plough along with another *ox* of the same stature, which has been previously trained. They should be tied up together at the manger, and led to the same pasture, in order to make them thoroughly acquainted, and acquire the habit of having always the same movements. At first the goad should never be used; for it contributes to render them untractable. They should be forced to work only a little at a time; for, when not thoroughly broke, they are soon fatigued. For the same reason, they should be fed more plentifully than usual.

The *ox* ought to labour only from three to ten years; for, when he works till he be farther advanced, the quality of the beef is injured. The age of this animal is known by his teeth and horns. The middlemost fore-teeth fall out when he is ten months old, and are replaced by others which are broader, but not so white. At the age of sixteen months, those next to the former shed, and are succeeded by others. At the age of four years, the whole cutting teeth are renewed; and they are then even, long, and pretty white. In proportion as the *ox* advances in years, these teeth wear and become black and unequal. The same thing happens to the bull and cow. Thus neither sex nor castration have any influence on the growth or shedding of the teeth. Neither do these circumstances produce any

any alteration in the casting of the horns; for, at the age of three years, the bull, cow, and ox, shed their horns*, which are replaced by others, and which, like the second teeth, never fall off. The horns of the ox and cow are longer and thinner than those of the bull. The growth of the second horns is not uniform. The first year, which is the fourth of the animal's age, two neat pointed horns, terminated near the head by a kind of ring, arise. In the following year, this ring mounts farther from the head, being pushed forward by a new horny cylinder, which is likewise terminated by another ring, and so on; for the horns continue to grow as long as the animal lives. These rings are very apparent; and, by their number, the ox's age may be easily counted, by adding three years to the number of intervals between the rings.

The horse eats slowly, but almost perpetually. The ox, on the contrary, eats fast, and fills his stomach in a very short time; after which, he lies down to ruminate. This difference in eating, proceeds from the different conformation of their stomachs. The ox, whose two first stomachs consist of but one large bag, can, without

* Black cattle, it is well known, never do shed their horns. It is astonishing that our learned author should have been betrayed into this blunder, and still more astonishing that it should be repeated in the last Paris edition, in 12mo. The rings he mentions do, indeed, begin to appear at this period, and continue to increase, with some regularity, as long as the animal lives.

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inconveniency, quickly throw in a great quantity of herbage, which, by means of chewing the cud, he digests at leisure. But the stomach of the horse, which is single and small, can only receive a small quantity of food; and he, therefore, fills it gradually, in proportion as the herbage dissolves, and passes into the intestines, where the decomposition of the aliment is chiefly effected. Having examined, in the ox and horse, the successive product of digestion, particularly in the decomposition of hay, I remarked, in the ox, that, when the aliment was passing into that part of the paunch which forms the second stomach, it was reduced to a kind of green paste, resembling boiled spinage; that, under this form, it is retained in the folds of the third stomach; that the decomposition is completed in the fourth stomach; and that hardly any thing passes into the intestines, except feces or dregs. But, in the horse, the hay is not decomposed, either in the stomach or first portions of the intestines, where it only becomes more soft and pliable, being macerated by the liquor with which it is surrounded. With very little alteration, it arrives at the cæcum and colon. It is chiefly in these two intestines, whose extraordinary capacity corresponds with that of the paunch of ruminating animals, that the food of horses is decomposed. But the decomposition is never so complete, as that which is effected in the fourth stomach of the ox.

For

For these reasons, and even from inspecting the parts, it is easy to conceive how rumination is performed, and why the horse neither ruminates nor vomits. Rumination is only a vomiting without much effort, occasioned by the reaction of the first stomach upon its contents. The ox completely fills his two first stomachs, or portions of the paunch. This membrane, when distended, re-acts with great force on the food it contains, which is very little cut by chewing, and whose volume is greatly augmented by fermentation. If the aliment were liquid, this contracting force would make it pass into the third stomach, which communicates with the other by a narrow canal, whose orifice is situated in the superior part of the first, and nearly as high as that of the gullet. Hence this canal can only admit the food, after it is reduced to a more fluid form. The drier parts must, therefore, rise into the gullet, the orifice of which exceeds that of the canal. When the food comes back into the mouth, the animal chews it again, and macerates it with a fresh quantity of saliva, which gradually liquifies it to such a degree, as enables it to pass through the canal into the third stomach, where it is still farther diluted before it enters the fourth. It is in this last stomach, that the hay, which is there reduced to a perfect mucilage, is completely decomposed. To confirm the truth of this explanation, it may be remarked, that, as long as these animals suck, or

are

are nourished with milk, and other liquid aliments, they never ruminate; and that, in winter, when they are fed with dry aliment, they ruminate much oftener than during summer, when the grass is tender and succulent. The stomach of the horse, on the contrary, is small; the orifice of the œsophagus is narrow, and that of the pylorus very large. These circumstances alone render rumination impracticable; for the food contained in this small stomach, though perhaps it suffers a greater compression than from the stomach of the ox, cannot mount upwards; because it descends with greater ease through the pylorus, which is much wider than the gullet. To pass through the pylorus, it is not even necessary that the hay be reduced to a soft mass; for the contracting force of the stomach is capable of pushing it through, when almost dry. This difference of structure, therefore, enables the ox to ruminate, and prevents the horse from performing that function. But there is another singularity in the horse, which absolutely prevents him from vomiting, and, consequently, from chewing the cud. The alimentary canal, by coming in a very winding direction into the stomach, the coats of which are exceedingly thick, makes a gutter in piercing them, so oblique, that, instead of being opened by the convulsive motions of the stomach, they only serve to shut it the closer. Though this, as well as other differences of structure observable in the

bodies of these two animals, are derived from Nature, because they are invariably the same; yet, in the developement of the soft parts, particularly, there are differences apparently constant, which, nevertheless, may, and often are varied by particular circumstances. The great capacity of the ox's paunch, for example, is not solely a production of Nature. Its original conformation, on the contrary, is varied, and its capacity gradually enlarged, by the fermentation and great volume of the aliments it receives: For, in a calf that has never eat grass, though not very young, the paunch is proportionally much less than in the adult. Hence this uncommon capaciousness of the paunch proceeds from the extension occasioned by the great mass of aliment daily devoured. Of this I was convinced by an experiment, which appears to be decisive. I fed two lambs, of equal ages, and weaned, at the same time, the one with bread, and the other with grass. At the end of twelve months, when both were opened, I found that the paunch of the latter was much larger than that of the former.

It is alledged, that *oxen* which eat slowly, support labour longer than those that eat quickly; that the *oxen* of dry and elevated countries are more active, vigorous, and healthful, than those which are fed in low moist grounds; that they are stronger when fed with dry hay than with soft grass; that they are more difficultly habi-

tuated

tuated to a change of climate than horses; and, for this reason, that *oxen* designed for labour ought never to be brought from any great distance.

As the *oxen* are idle in winter*, they may be fed with straw and a little hay. But, in the labouring season, they should have more hay than straw, and even a little bran or oats. In winter, if the hay be scarce, they should be fed with cut grass, or rather with the young shoots and leaves of the ash, elm, oak, &c. But of these last they should be allowed small quantities only; because indulgence in this kind of food, of which they are exceedingly fond, sometimes occasions a bloody urine. Lucern, saintfoine, vetches, whether green or dry, lupins, turnips, boiled barley, &c. afford them excellent nourishment; and, as they never use more than is necessary, they should always have as much as they will take. They should not be permitted to pasture till the middle of May; because young herbage is too crude for them; and, though they eat it with avidity, it sometimes makes them uneasy. They should be pastured during the whole summer, and, about the middle of

* Are we from this to conclude, that the *oxen* in France labour none during the winter? We should rather imagine that winter is the most busy season for ploughing there, as well as in Britain, unless in districts where the soil consists of very strong clay, &c.

October, they should be brought back to the stall, always taking care not to make their changes from green food to dry, or from dry to green, too rapid, but to accustom them gradually to these different kinds of aliment.

Great heat is perhaps more hurtful to these animals than great cold. During summer, they should be set to work very early in the morning, put into the stable, or left to graze under the shade of trees, in the middle of the day, and not yoked again till three or four o'clock afternoon. In spring, autumn, and winter, they may be wrought, without interruption, from eight or nine in the morning to five or six in the evening. Though they require not so much attention as the horse; yet, to keep them vigorous and healthful, they should be daily curried and washed; their hoofs should likewise be rubbed over with grease. They should also have drink, at least twice a-day. Though the horse loves muddy and lukewarm water, the ox always prefers that which is fresh and clean.

Though the cow, in general, requires the same food and management as the ox; yet, the milk-cow demands particular attention, both in the choice and treatment of her. It is said, that black cows give the best milk; and that white cows furnish the greatest quantity of milk. But, whatever be the colour of a milk-cow, she ought to be plump, to have lively eyes, and a lightness in her motions. She should likewise be young,

young, and give plenty of good milk. In summer, she should be milked twice a-day, and only once in winter*; and, when an increase in the quantity of milk is required, she ought to have more succulent food than herbage.

Good milk is neither too thick nor too thin. Its consistence should be such, that a small drop ought to preserve its spherical figure, without running. It should also be very white; when of a yellowish or blueish colour, it is of no value. Its taste should be sweet, without any degree of bitterness or sharpness. Its flavour should be agreeable. In the month of May, and during the summer, milk is better 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 thin, and that of old cows is too thick, especially in winter. These different qualities of milk are proportioned to the quantities of oily, caseous, and serous particles it contains. Thin milk has too great a quantity of serous particles; too thick milk has the opposite quality; and milk that is too dry, has not enough of the oily and serous particles. The milk of a cow in season, or when near the end of gestation, or soon after delivery, is bad. In the third and fourth stomachs of a suckling calf, there are clots of curdled milk, which, after being dried in the air, become runnet, or

* It is a better practice to milk cows three times a-day in summer, and twice in winter.

that well known substance which coagulates milk. The longer the runnet is kept, its strength increases, and a small quantity of it is sufficient to make a great deal of cheese.

Both cows and *oxen* are fond of wine, vinegar, and salt; and they devour a dressed salad with great avidity. In Spain, and some other countries, one of those salt stones, called *salogres*, and which are found in the salt-mines, are placed near the young calves in the stable. They lick this stone during the time their mothers are pasturing, which excites their appetite, or creates thirst to such a degree, that, when the mothers return, the calves suck greedily, and, by this means, they grow and fatten much sooner than those to whom no salt is given. For the same reason, when *oxen* lose their appetite, they are served with grass drenched in vinegar, or sprinkled with salt. To make them fatten quickly, salt, as it increases their appetite, may also be administered. It is common to begin to fatten them at the age of ten years. If longer delayed, success is not so certain, neither is their flesh equally good. They may be fattened in all seasons; but summer is preferable, because less expence is incurred; and, by beginning in May or June, they are fit for the butcher before the end of October. Whenever we begin to fatten *oxen*, they should no longer be allowed to labour. They ought to drink frequently, to have plenty of succulent food, sometimes mixed

with

with a little salt; and they should be permitted to ruminate and sleep in the stable during the heat of the day. By this treatment, in four or five months, they will be so fat as to be hardly able to walk, or be conducted to any distance but by very short journeys. Cows, and even bulls whose testicles have been twisted (*taureaux bistournes*), may also be fattened. But the flesh of the cow is drier than that of the *ox*; and the flesh of the bull, even when maimed, is red, hard, and has a strong disagreeable taste.

Bulls, cows, and *oxen*, are fond of licking themselves, especially when lying at their ease. To prevent this practice, which is supposed to retard their fattening, it is common to besmear every part of the body they can reach with their own dung*. If this precaution be neglected, they swallow great quantities of hair, which, being an indigestible substance, remains in the stomach, and forms a kind of balls, called *agagropile*, of a size so considerable as to hurt the powers of digestion. These balls, in process of time, are covered with a brown crust, which, though formed of mucilage, becomes hard and polished. They are only found in the maw; and, if any hairs enter into the other stomachs, or bowels, they are probably discharged along with the faeces.

* This precaution is unnecessary; for the disorder mentioned in the text is extremely rare. Besides, it is a common notion, that licking promotes the health of cattle. It is certain, however, that licking is a mark of their beginning to get into *acrh*.

Animals which, like the horse and ass, have cutting teeth in both jaws, browse short grass with more ease than those that want these teeth in the upper jaw. The sheep and goat, indeed, cut very close, because they are small animals, and have thin lips. But the ox, whose lips are thick, can eat long grass only. It is for this reason that he does no injury to the pasture on which he feeds. As he only bites off the extremities of young herbage, the roots are not disturbed, and the growth is very little retarded. The sheep and goat, on the contrary, cut the plants so close to the ground, that the stems are destroyed and the roots spoiled. Besides, the horse always selects the shortest and most tender, allowing that which is longer and harder to ripen and shed the seeds. But the ox devours all the large stems, and gradually destroys the coarser kinds of grass. Hence, in a few years, grass pastured by the horse degenerates, while the ox always improves the herbage on which he feeds*.

The domestic ox, which ought not to be confounded with the urus, the buffalo, or the bison, seems to be a native of our temperate climates, excessive heat or excessive cold being equally

* This reasoning has by no means the sanction of experience. Fields pastured by horses or sheep degenerate as little as those pastured by black cattle. Besides, the roots of many of the finest grasses are perennial, and thrive best when closely browsed; and some of the best grasses grow pretty tall, and some of the worst kinds never rise high.

hurtful

hurtful to him. Besides, this species, so abundantly diffused over all Europe, is not found in the equatorial regions, and extends not, in Asia, beyond Armenia and Persia, nor, in Africa, beyond Egypt and Barbary: For, in India, the southern parts of Africa, and even America, their native cattle are either bisons, which have a protuberance on their backs, or other animals of a different species, to whom travellers have given the name of oxen. Those found at the Cape of Good Hope, and in many parts of America, were transported thither from Europe by the Dutch and Spaniards. In general, countries which are somewhat cold, seem to be more agreeable to our oxen than warm climates. They are likewise larger and taller in proportion to the moistness of the climate, and the richness of the pasture. The largest oxen are those of Denmark, Podolia, the Ukraine, and Calmuck Tartary*. Those of Britain, Ireland, Holland, and Hungary, are larger than those of Persia, Turkey, Greece, Italy, France, and Spain; and the Barbary oxen are the most diminutive. The Dutch, I am assured, bring annually from Denmark a great number of large meagre cows, which give more milk than those of France. The milk-cows, called *Lath-backs*, which are numerous in Poitou, Aunis, and the fens of Charpente, have probably been derived

* Voyage de Reynard, tom. i. p. 217. and l'Hist. Gm. des Voyages, tom. vii. p. 13.

from

from this race; for they are larger, leaner, and yield more milk and butter than the common kind. They may be milked during the whole year, except four or five days before they bring forth; but they require excellent pasture. Though they eat no more than ordinary cows, as they continue always meagre, all their superfluous nourishment is converted into milk. But, whenever ordinary cows feed for some time in rich pastures, they become fat, and cease to give milk. With a bull of this race, and common cows, a bastard kind is produced, which is more fertile in milk than the ordinary race. This bastard race frequently bring forth two calves at a birth, and likewise give milk during the whole year. Cows form a part of the riches of Holland, from which considerable quantities of butter and cheese are annually exported. The Dutch cows give twice as much milk as the French cows, and six times more than those of Barbary*.

In Ireland, Britain, Holland, Switzerland, and other northern countries, great quantities of beef are salted and smoked, both for the purposes of trade, and for the use of the navy. These countries also export a prodigious number of hides. The skin of the ox, and even of the calf, are used for many purposes. The grease is likewise a substance of great utility. The dung of the ox is the best manure for dry and light

* See Shaw's Travels.

soils. The horn of this animal afforded to men the first instrument for drinking, for augmenting sounds, for introducing light into houses, and for making lanthorns. It is now moulded into boxes, combs, spoons, and other articles of manufacture. But I must conclude; for natural history ends where the history of arts commences.

SUPPLEMENT.

IN Tartary and Siberia, the oxen are extremely numerous. At Tobolski there are also vast quantities of black cattle*. I formerly mentioned, that, in Ireland, both the oxen and cows frequently want horns: But this happens only in the southern parts of the island, and in some maritime places, where the grass is either scarce, or of a bad quality; which is an additional proof, that the horns are produced by redundant nourishment†. In places adjacent to the sea, the

Irish

* Hist. Gen. des Voyages, tom. xviii. p. 119.

† The want of horns is here ascribed to a deficiency of redundant nourishment. In many places, there are few cattle but those which have no horns, and they are equally fat, and yield as much milk as any other kind, when fed in the same pastures. The truth is, this is a distinct breed, and may be perpetuated in any climate or soil where cattle can live, if all commixture with other kinds be prevented.

Irish feed their cows with fish boiled into a kind of pap; these animals are not only accustomed to this kind of food, but they are very fond of it; and, it is said, their milk is not affected with any disagreeable smell or taste*.

The cows and *oxen* of Norway are, in general, very small. In the islands along the Norwegian coast, they are somewhat larger. This difference must proceed from better pasture, and from their being allowed, in these islands, to live without restraint; for they are left at absolute liberty, with no other guides than being accompanied, in winter, with a few rams, which are accustomed to scrape the snow from the ground, and to uncover the grass both for themselves and the other cattle. Here they often become so ferocious, that they can be taken by means of ropes only. These half-wild cows give very little milk. When pasture is scarce, they eat sea-weeds, mixed with boiled fish†.

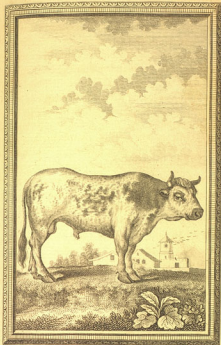
The European cattle have multiplied so prodigiously in South America, that, at Buenos-aires, and some degrees beyond it, no man thinks of appropriating them. The hunters kill thousands of them solely for the sake of their

There is another variety of the ox tribe, that is not taken notice of by our author. They have short horns, which adhere not to the skull, but hang down on the forehead, to which they are connected only by a loose skinny ligament. In some places, they are called *Scurd cattle*, and continue their kind, if not allowed to intermix with other breeds.

* Hist. Gen. des Voyag. tom. xviii. p. 19.

† Pontoppidan's Nat. Hist. of Norway.

Plate XIII.



A. B. Schlegel.

BULL.

hides

hides and tallow. They are hunted on horse-back, and their pursuers either ham-string them, or take them in toils made of strong leather straps*. In the island of Saint Catharine, upon the coast of Brazil, there are a few small oxen whose flesh is flabby and disagreeable to the taste. Both these defects are occasioned by bad nourishment; for, as they have little pasture, they are chiefly fed upon wild gourds †.

In some countries of Africa, oxen are very numerous. Between Cape Blanc and Sierra-Leona, the woods and mountains are covered with wild cows, which are generally of a brown colour, with sharp black horns. They multiply so fast, that, if they were not perpetually hunted, both by Europeans and Negroes, their number would be infinite ‡. In the provinces of Duguela, and Tremecen, and other parts of Barbary, as well as in the deserts of Numidia, there are wild cows of a dark chestnut colour. They are very small, but nimble, and they go in flocks, sometimes to the number of two hundred ||.

* Voyage du P. Lope, tom. i. p. 38.

† Ibid.

‡ Hist. Gen. des Voyages, tom. iii. p. 291.

|| L'Afrique de Marmol, tom. iii. p. 66. 157.