



ADVICE TO SHEPHERDS
AND
OWNERS OF FLOCKS,
ON THE
CARE AND MANAGEMENT OF SHEEP.

TRANSLATED FROM THE ORIGINAL FRENCH OF
M. DAUBENTON,

BY A GENTLEMAN OF BOSTON.

To which are added,
EXPLANATIONS OF THE PLATES,
AND A
TABLE OF CONTENTS.

BOSTON,
PRINTED BY JOSHUA HELCHER.

1811.

PREFACE.

THE translation of the following work was made with no view to publication, but was designed merely for private use, to instruct and direct several persons immediately connected with the translator, in the conduct and management of sheep.

The author of the work, M. Daubenton, a philosopher, a man of letters, and profound naturalist, did not think the subject unworthy of minute attention, or public notice: nor did the nation to which he belonged, fail to honour, respect and reward him for this effort of his genius, industry, and patriotism:—he was placed at the head of two learned, important establishments; one in the college of France, for the promotion of natural history in all its branches; the other, at the veterinary school for teaching of Rural Economy, at Alfort:—He was for a long time, the friend, companion, and assistant of the celebrated naturalist, M. Buffon, at his residence on the mountain of Montbard, and at Paris, who, in speaking of him, said, that M. Daubenton had the peculiar qualifi-

cation of *possessing neither more nor less understanding than the subject on which he thought or wrote, required.*

Several of the discourses, which M. Daubenton delivered before the royal academy of sciences, the royal society of medicine, the royal society of agriculture, and the national institute at Paris, on different subjects, which are directly or indirectly treated of in this work, announced not less the ability of the author, than the success and value of his undertaking. The work has been translated and published in Germany, Italy, and Spain, where it passed through several editions: it was first published in France in the year 1782, and several times republished, until it was ordered to be printed and published at the public expense by the national convention, in the year 1796.*

Few subjects have been more recommended, or are more interesting or useful, than that which refers

* The committee of the national convention, which reported the following decree, in speaking of M. Daubenton's treatise on sheep, declared that the methods of improvement therein recommended had stood the test of experience for twenty-five years, and that a great number of persons had successfully practised upon them within that time.

“ Du procès-verbal de la séance de la Convention nationale, du 1. er nivôse an 3.

“ La Convention nationale, ouï le rapport de ses comités réunis d'instruction publique d'agriculture et des arts.

“ Décrète que le Traité sur les moutons, par le C. en. Daubenton, sera imprimé et tiré à deux mille exemplaires, au profit de l'auteur, et aux frais de la nation, sur les fonds mis à la disposition de la commission exécutive de l'instruction publique, qui demeure chargée de l'exécution du présent décret.”

Ce projet de décret est adopté.

to the rearing, managing and treatment of sheep ; it is intimately connected with the wants, conveniences and enjoyments of life, and as such, is deserving the attention of the philosopher, the naturalist, the ingenious artist, the husbandman and patriot. At a time when the state of foreign commerce and of the world seems to say to the people and government of the United States, husband your resources ! look at home for your enjoyments ! lessen your foreign intercourse and relations ! learn to depend less upon others, and more upon yourselves ! to esteem, respect, and love one another ! to cultivate and promote your own industry, arts and manufactures, on which your individual as well as national safety and happiness essentially depend !—at such a period, a work of this sort, must be rendered peculiarly interesting : it is practical, founded on experience, and minute observation : written in a plain and intelligent style to suit the objects and pursuits for which it was designed : the humble title under which it appears, and the plain manner in which it is handled, in the form of question and answer, added to the apparent simplicity of some of the subjects on which it treats, may at first excite some prejudice against it ; but a more minute examination of its contents will shew it to be a work of great merit, much information, extensive public utility, and admirably calculated for publication at this time.

The translator has only to apologize for the short time and little pains he has been able to bestow upon

the translation : in one instance, he has suppressed a small part of the original, and in others, taken some liberties, in giving a liberal translation to suit the idiom of his language. It has been executed in haste, and was intended for private and not for public use : he has at the instance of his friends been induced to permit its publication, trusting, that his motives in so doing, will shield him from the censure of severe criticism.

THE TRANSLATOR.

ADVICE TO SHEPHERDS, &c.

CHAPTER I.

ON THE QUALIFICATIONS OF A SHEPHERD.

Question. **W**HAT should be the age of a shepherd to take the charge of a flock of sheep?

Answer. His age is of no importance, if he is strong enough to carry the hurdles for the pen, and considerate enough to mind his business, instead of playing with his comrades.

Q. Will the business of a shepherd employ a man his whole time, and enable him to obtain an honest livelihood?

A. A careful and well informed shepherd, who has the care of a large flock, is almost continually employed in conducting it properly during the day, in folding it for the night, in feeding it in bad weather, in keeping it clean, in treating its diseases, &c. Shepherds receive good wages and are well paid in countries, where sheep are maintained, that is, when they know their business, and will carefully perform it.

Pages 2-7 missing from original.

Q. Are many qualifications necessary to become a good shepherd?

A. More things are necessary to be known in the business of a shepherd than in most other agricultural employments. A good shepherd should understand the best method of folding, feeding, watering, and pasturing his flock, of treating its diseases, and improving it, as well in the breed, as in the quality and fineness of the wool; to drive, wash, and shear his flock in the best manner; to rear and train dogs, and keep them in subjection, and to protect the flock against wolves, and other noxious animals.

Q. How can it be known that a young man will make a good shepherd?

A. A good shepherd may be expected from one who understands and retains what is told him as well as other young men in the country; if he is careful and patient, and has no infirmity, which will hinder him from walking or standing for a length of time together.

Q. Is it necessary that a shepherd should know how to read?

A. One, who understands reading, more readily acquires information, but it is not absolutely necessary; he however, would be the more valuable for knowing how to read, write, and cypher.

Q. With what necessaries should a shepherd be provided to manage his flock in the fields?

A. He should be well clothed, so as to continue the whole day in the field, without suffering much

from cold, or from being exposed for a long time in the rain, without being wet to the skin. He should have a crook, a whip, a scratcher, a knife, a lancet, a tin box prepared with a suitable ointment, and a scrip.

Q. What ought the shepherd to do, if he has his feet, hands, and some other parts of his body frost bitten?

A. He should take the necessary precautions to prevent mortification in the benumbed parts, as it makes rapid progress: the frozen part grows first pale and then red, attended with great itching, it afterwards becomes purple and black; when it soon after detaches and falls. To prevent mortification, it is proper to rub the frozen part with snow, or to cover it with rags wet with the coldest water; it is then rubbed with linen to restore the warmth, and at last it may be plunged in warm water, or fomented, but not exposed to the fire.

Q. What is a crook, and for what purpose is it used?

A. The crook is a staff about six feet long, terminated on the upper end by an iron, which is in the form of a small spade, and on the other end by a hook bent back on the top; the hook may be put on the side of the flat iron, and then it should be bent inward. The flat iron of the crook is intended to throw earth near the sheep, which stray from the flock, so as to make them return. The hook is made for seizing and catching them by one of the hind legs.

Q. What is a shepherd's scrip, and for what purpose is it used?

A. A scrip is a pocket or knapsack, attached to a leather string, which the shepherd carries like a shoulder belt. He puts, in his scrip, his provisions for the day, a box of ointment to rub such sheep as he sees scratching themselves in the field; a scratcher to remove the scabs of the itch before applying the ointment; a lancet to bleed such sheep as may require it; a small knife to skin, and to open such as may die in the field, &c.

Q. Is it necessary to have a scratcher, knife, and lancet in separate instruments?

A. A single instrument is sufficient, that is, a small knife, which shuts on its handle, the end of the handle being flattened and brought to an edge, makes a scratcher; the blade, being pointed, and sharp on both sides, near the point, serves as a lancet.



CHAPTER II.

OF DOGS AND WOLVES.

Q. Is it necessary, that shepherds should have dogs for driving their flocks?

A. It is to be wished, that shepherds could dispense with them, because they often do much mischief; but they are necessary in countries, where the lands are often sown with corn, and exposed to injury: when sheep stray from the flock, the shepherd can restrain those only, which are near him, and at the distance, at which, he can throw lumps of earth before

them with his crook : dogs, therefore, assist the shepherd in driving his flock, and defend it against wolves, when strong enough.

Q. In what countries can a shepherd manage his flock without the aid of dogs ?

A. In places, where the land is divided into large enclosures, there is always a great deal of ground in fallow, that is, not sown ; a numerous flock can be there conducted without the aid of dogs. Sheep naturally go together ; they do not stray from the flock, except they observe a better pasture, than where they are : this allurements is commonly too far from great fallows, to attract them ; but if the flock should be on one end of a fallow, near land liable to injury, the shepherd places himself on the side of such lands, to protect them.

Q. What injury can dogs do sheep, and how can they be restrained ?

A. Dogs badly disciplined, and too ardent, fly upon the sheep, bite and wound them, and cause abscesses. They frighten the ewes with young, by hurting them, and making them miscarry. They throw down the weak, and such as can hardly follow the flock, or fatigue and fret them, by driving them too fast. To prevent these inconveniences, it is proper to make use of such dogs only in driving as are mild and good natured, and well trained to shew their teeth to wolves, but not to sheep. A good well-bred dog makes them obey without hurting them. Sheep are accustomed to do of themselves, what the dog would compel them to, by force. They withdraw

when he approaches, and do not advance on the side, where they see him a centinel, on the borders of a prohibited ground.

Q. How do dogs serve to direct the course of a flock ?

A. When a shepherd drives his flock before him, he can greatly hasten its speed, and that of the sheep, which remain behind ; but he cannot prevent it from going too quick, nor the sheep from running forward too fast, or straying to the right or left ; it is necessary, he should have the aid of dogs, to place round the flock, to send forward, or to restrain such as go too fast, to bring up those which remain behind, or stray to the right or left.

Q. How can a shepherd make his dog perform these different manœuvres ?

A. He must train them from their youth, and accustom them to obey his voice. The dog goes on all sides ; before the flock to stop it ; behind it, to make it go forward ; on the sides, to prevent it from straying : he remains at his post, or returns to the shepherd, according to signs given him, which he understands.

Q. What is necessary to be done to train a shepherd's dog ?

A. He must be learnt to stop, to lie down, to bark, to stop barking, to place himself on the side of the flock, to walk round it, and to seize a sheep by the ear, at the command of the shepherd, when given him by the sound of his voice, or by the motion of his hand.

Q. How is a dog taught to stop, or lie down, at command?

A. By pronouncing the word *stop*, a piece of bread or other food should be given him, which makes him stop, or he is stopped by force; by repeating this manœuvre, he is accustomed to stop, at the sound of the voice. To teach him to lie down, when required, it is necessary to caress him, when he does it of himself; or after having obliged him to it, by taking him by the legs and pronouncing the words *lie down*; if he would rise too soon, he is chastised, to make him remain. When he is quiet, they give him something to eat, and by these means he is made to obey.

Q. How do they make a dog bark, or stop barking, at command?

A. The barking of the dog is to be imitated, while he is shown a piece of bread, which is given him, as soon as he has barked, when the word *bark* is repeated: he is accustomed also to stop barking, when the word *silence* is pronounced: he is threatened or chastised, when he does not obey, and rewarded and caressed, when he does.

Q. At what age is it proper to train dogs for the use of a shepherd?

A. They begin training them when six months old, if they have been well fed, and are strong; but if they are weak, it is necessary to wait, until they are nine months old.

Q. How is a dog made to go round a flock, to pass on its side, to run before, to come back, or to remain in his place?

A. To learn a dog to go round, a stone must be thrown before him, and then successively from place to place, until he shall have gone round the flock, always repeating the word *turn*, by throwing a stone before, and then behind him; he is trained to run on the side of a flock, by pronouncing the words, *on the sides*; they say, *go*, to make him go before; *return*, to make him return; *stop*, to continue in place; other words may be substituted, in places where shepherds have another language.

Q. How is a dog learnt to seize a sheep by the ear to bring him back when he wanders, or to stop him in the middle of the flock, to wait for the shepherd?

A. A dog is made to go round a single sheep in an enclosure: the ear of the sheep is put to the dog's mouth, to accustom him to seize the sheep thereby: or a piece of bread is tied to the ear of a sheep in the middle of a flock, when the dog is excited to aim thereat, and is thus habituated to seize the ear. In this manner a dog is taught to stop such sheep as the shepherd may shew him in the flock. Dogs may also be taught to stop sheep, by seizing them by the leg, before or behind, or above the fetlock: but this practice has its inconveniencies; the fetlock is often swelled by it, and the sheep made lame for some time.

Q. How does a dog make a flock obey him?

A. He makes the first sheep fly before him, by running at him, and then one after the other, the whole flock takes the same course, if the dog continues to press forward: when a sheep is not ready enough to obey him, he approaches and threatens him by barking.

Q. When a dog is well trained, can he instruct another?

A. It requires less time and trouble to teach a young dog, when he has the example of one, which knows how to drive the flock: the young dog will take the same gait, but he is often deceived; he would, perhaps, be never well taught, if the shepherd did not learn him such things, as the example of the other dog could not make him understand.

Q. What kind of dogs, and how many, are proper for the service of flocks?

A. All active docile dogs are good for training to the service; those are called dogs of the true breed, whose fathers and mothers are well practised in conducting flocks; it is thought, that dogs, thus bred, are more easily trained, than others. In parts of the country, where the lands are rarely exposed to be injured by sheep, a single dog is sufficient for an hundred sheep; but when they are so exposed, and are near to sheep walks, which the flock often approaches, two, and even three and four dogs are necessary; because two could not stand for the whole day, or for many successive days, the almost continual running, which they are obliged to make, to keep the sheep from the prohibited lands; it would therefore be necessary to have other dogs to relieve, and to give them rest, when much fatigued. In countries where wolves are to be apprehended, it is necessary, that the dogs should be strong enough to resist, and bold enough to hunt them. Dogs well covered with hair, support cold and rain better than others.

Q. What breed of dogs is preferred, in countries where wolves are little to be dreaded.

A. A breed of dogs called shepherds' dogs, from being commonly used in the service of flocks; they are naturally active, and easily made docile: dogs of every other breed may be trained for the same purpose.

Q. What is the best breed of dogs for guarding sheep, where wolves are to be apprehended?

A. The mastiff breed is best: these dogs are strong and courageous; but it is necessary to give them collars armed with long iron points; and to incite them against the wolf, the first time they have to fight him, or to put them in company with other dogs trained to the business.

Q. What precautions are necessary, when you have a badly disciplined dog, that wounds the sheep?

A. The long canine teeth, which enter deep into the flesh, should be broken off, in case he bites.

Q. How ought shepherds' dogs to be fed?

A. It costs but little to feed them, in the neighbourhood of large cities, where horse-meat, the scraps of tallow, &c. can be easily procured; for the want thereof, coarse bread must be made for them: it is improper to give them mutton; because, if they are accustomed to this food, they will acquire the habit of biting the sheep, for the sake of the blood. Mastiffs are trained, like other dogs to driving sheep.

Q. Have not shepherds some means of driving their flocks when they have no dogs?

A. Shepherds teach some sheep of the flock, to

which they give particular names, to come to them, at their call; and in order that they may take this habit, they are enticed to follow them by giving them pieces of bread. When the shepherd would make the flock pass a narrow path, or passage-way, on its route, or would collect his flock, he makes the tame sheep come to him; such as are near accompany them, others take the same course, and immediately the whole flock becomes disposed to follow the shepherd.

Q. What precautions should a shepherd take against wolves?

A. 1st. He should tie small bells to the necks of a certain number of sheep, the sound of which points out where to find the sheep, which have strayed into the woods, and other places out of his sight. When a wolf approaches, the sheep are commonly the first to discover him; they are frightened and agitated in a manner, to make their bells heard, which disclose their danger, both to the dogs and shepherd. The little bells also call the shepherd, when something extraordinary happens in the flock, whether by night or by day, which puts the sheep in motion.—2d. The shepherd takes care that his flock be accompanied by dogs strong and courageous enough to face a wolf, to put him to flight, to pursue, and even to kill him.—3d. The shepherd carefully observes his flock, when he drives it near woods, or places frequented by wolves. The same attention should be paid when he is near fields, where the grass or growth is high enough to conceal them; they are

always to be feared in foggy weather, and in the dusk of the evening, and above all, near hedges and bushes, where they keep themselves in ambush.—4th. Shepherds also make fires, or at least smoke, near their flocks.

Q. What ought the shepherd to do, when wolves approach the flock, or have seized upon some of the sheep?

A. When the wolf appears, the shepherd collects his flock, and sends his dogs in pursuit of him; he remains near the flock, to observe if he can see other wolves; halloos to the wolf, and encourages his dogs. But if the wolf has already seized his prey, the shepherd runs after him, without, however, losing sight of the flock, urges the dogs to the battle, and forces him to abandon his prey, which often happens.



CHAPTER III.

OF THE LODGING, LITTER, AND DUNG OF SHEEP.

Q. Is it proper to lodge sheep in enclosed stables?

A. Enclosed stables are the worst shelter, which sheep can have. The vapour from their bodies, and from their dung, infects the air, and puts them in a sweat; they grow weak, and take diseases, in such warm and unhealthy stables; the wool loses its strength, and the dung dries and burns it: when they go out of stables, the outward air affects them, when it is cold; suddenly stops their perspiration, and will sometimes give them severe sickness.

Q. In what manner should sheep be lodged, to preserve them in health, and to have both good wool and good dung?

A. A great deal of air should be given them; they are better lodged in open, than in closed stables: and still better, under open sheds; an open pen, without shelter, will serve for lodging them.

Q. What is an open stable, and what produces its good or bad effects on sheep?

A. An open stable has many windows, which, as well as the doors, are shut by gratings: it is better than a close stable, because a part of the air, which is infected with the vapour from the bodies, and dung of the sheep, goes off through the windows and doors; whilst the fresh air enters through the same openings. But this change of air is made only at the height of the windows; the remaining air round the sheep in the lower part of the stable, under the windows, being always unhealthy, although it may be less heated and infected, than that of the close stables. Open stables only diminish the evil, but are not good shelters for sheep.

Q. What are sheds, and do they make good lodging for sheep?

A. A shed is the flat of a roof, fixed against a wall, and supported before by posts. This lodging is better than stables, because it is wholly open on the side of the posts, through its whole length; but it is shut on the side of the wall; the infected air remains among the sheep, particularly at the bottom of the wall: although these sheds are better for sheep than

the open stables, they are not, however, the best lodging. But a shed, or sheep-cot, supported on all sides by posts, makes the best shelter for sheep, the infected air goes off, and the fresh enters on all sides: the sheep can go out, when too warm, and enter for shelter against rain: it certainly makes the best cover, as it is the most healthy and convenient for them; but they are costly, and the expense may be avoided by a pen in the open air, which may be placed in a yard, or other domestic enclosure, by which only, it is distinguished from the field pens.

Q. What is the least expensive manner of making a covered pen for folding sheep?

A. A covered pen may be made without walls, by posts from six to seven feet high; place them in a manner, that each may be supported by a brace, and arranged in two lines, at ten feet distance from each other; connect them with joists and plates of the same length, to support a roof, the top of which should also be ten feet, and the rafters only seven. In the middle of this space is placed a double rack; and on each side, is built a small shed only two feet broad, with the top placed against the middle of the posts, a foot and a half below the plate; the joists of this shed are two feet long, and the rafters three feet; the posts, which support the plate of the little shed, are only three feet; supports or braces placed at distances, proportioned to the length of the building, and connected with the beams and posts, prevent the work from spreading; a rack is placed against the posts of the small sheds, so that there are four ranges of racks in

its breadth, which is fourteen feet. If it is covered with tile, timber four or five French inches square is sufficient; it may be even smaller, if covered with shingles or straw.

Q. Would the breadth of fourteen feet be sufficient for lodging of sheep of the largest, or only of the middling size?

A. By allowing each sheep a foot and an half of rack, there will be in the fold, a space of five square feet for each animal, which is so much better for sheep of a small size, as there is no danger of the air being heated; for it is enclosed only by hurdles, which answer for gates, whilst the racks on each side, which hold the fodder, are so placed, as to prevent the sheep from passing under them. The air is renewed also, every instant, by the openings, which surround the building. If this shed is designed for middling sized sheep, or those of the large size, it would be necessary to enlarge the dimensions, or suppress the double rack in the middle. In the last case, there would be a space of ten feet square for each sheep, which would be sufficient for the largest. By increasing the breadth of the building three or six feet, this would add two or four feet to the building, or a foot and an half to each of the side sheds; and by omitting the double rack, each animal would have a space of six feet square, and more, which would be sufficient for sheep of the middling size. As to the length of the building, it should be proportioned to the number of sheep; it may be constructed on a right line, or square, according to the shape of the ground.

Q. Is this building for folding sheep, to be preferred to any other?

A. Although the construction of this kind of shed may be less costly than stables, and sheds on the side of walls, it however requires such an expense, as to wish an exemption from it: when the roof is even covered with stubble, it is necessary that the wood work should be strong enough to resist high winds; and in whatever manner it may be constructed, the charge of its maintenance will be required: all this expense may be avoided, by keeping the sheep, as has been before observed, in a pen in the open air, without shelter.

Q. How are sheep able to withstand the injuries of the air, in severe winters, without being under cover?

A. The wool with which these animals are clothed, defends them sufficiently from the air; it has a sort of grease, that is called by the French and by the English *yolk suint*, which prevents the rain from penetrating to the flesh for a long time, so that the tufts of wool near the skin become neither cold nor wet, whilst the rest of it is loaded with water or ice, or is covered with frost or snow. When the sheep perceive they have too much water upon their wool, they throw it off by shaking themselves. They can shake off the snow in the same manner; and even should they be covered with it, or be buried in it for a time, they would not perish.

Q. How can the parts of the body upon which there is no wool, resist severe cold without shelter?

A. The wool preserves all parts of the body, which

are covered with it, from cold and even frost; but extreme cold may injure their limbs, feet, muzzles, and ears, if these animals did not know how to keep them warm. Having laid down upon the litter, they gather their limbs under them; by huddling many of them together, they shelter their head and ears from the cold, in the small intervals, which are between them, and bury their muzzles in the wool. When the weather is attended with moist and cold winds, it is most painful to the sheep exposed in the open air; the weakest tremble and draw their limbs together; that is, when standing, to prevent the cold from reaching the groin, and the hollows under the fore shoulders, where there is neither hair nor wool. But as soon as the animal moves himself, or eats, his warmth is renewed, and the trembling ceases.

Q. What proofs are there, that sheep can live in the open air, the whole winter?

A. They have been kept in the open air without shelter, night and day, through the whole year, near the city of Montbard, in the department of La Cote d'or, for more than thirty years: a flock of about three hundred sheep have had no other cover for that time, than a yard enclosed by walls. The racks are fixed to the walls without any cover; the ewes yearn there, the lambs have always remained there, and all the animals are there maintained, in a better state, than they would be in closed stables, although there has been in that time, many very rainy years, and the most extreme winters, particularly that of 1776. It is known, particularly in England, that sheep re-

main in the open field for the whole of the winter, There are instances of their being buried many days under the snow, and of their being withdrawn from it safe and well. But at the season, when the ewes lamb, the shepherds watch them during the cold nights, lest the lambs might freeze; principally such, as come from young, feeble, and ill-fed mothers. This accident is little to be feared, where the lambs are put to the ewes in September. Before exposing a large flock to the open air, a trial can be made upon a small number, as was done at Montbard.

Q. When flocks are lodged in the open air, what is done with sick, feeble, and languishing lambs during bad weather?

A. When there are sick animals, and it is seen that the air increases their disease, it is necessary to put them under cover from rain, and to shelter them from bad winds, in some corner of the shed, stable, or other building, until they become stronger, or are cured.

Q. What extent should be given to a domestic fold?

A. When litter is scarce, the pen should be so constructed, that all parts of it should have litter enough; but each sheep should be allowed the space of six feet square. When there is plenty of litter, it is proper to enlarge the pen, so as to give each animal ten or twelve feet square: the places covered with dung, being more distant from each other, than in the smaller pen, the sheep dirty, and damage their

wool less by rubbing against each other ; can move more freely ; and the ewes with young, and the newly dropt lambs, are less exposed to injury.

Q. What situation is it best to give to a home pen, or fold ?

A. The best exposures are to the south, south-west, and south-east ; because the walls of the sheep yard put the flock under shelter from the north, and north-easterly winds, which the sheep resist, if in other positions ; but they are more oppressed with them. Sheep scattered over a field, like wild animals, would find shelter therein ; it is necessary then to place their pen in the most sheltered part of the yard, and on a descent, in order that the rain may run off.

Q. What ought to be the height of the enclosure of a home pen, to secure sheep against wolves ?

A. Walls seven feet high have prevented wolves from getting into a sheep pen near Montbard, where there have been a great many sheep and dogs, for more than thirty years. These walls were built of stones, without mortar, and had necessarily open joints, which would give the wolves a facility in climbing them ; but they are terminated by small stones, heaped up in the shape of an ass's back, to the height of eight inches ; some of these stones would fall, if the wolf should put his foot upon them to get over : no derangement has been perceived, which might have led to suspect attempts from the wolves to get into the sheep yard, although their tracks had been seen, where they had rambled round the pen.

Q. In what manner, must the racks for sheep be made ?

A. The bars are two feet long, and are placed at two and a half inches from one another, if intended for the small breed ; they are set wider apart, if the breed is larger, because the muzzle is thicker ; but the wider the bars are removed from each other, the more is the fodder wasted ; for sheep never pick up what they let fall upon the dung, in pulling it from the rack. Simple racks are made to be attached to walls, or to hurdles ; and double ones, in the form of a cradle, to be placed in the middle of the sheep yard.

Q. How should racks be placed in a sheep pen ?

A. If the enclosure, of which it is meant to make a sheep fold, is small, and the flock is large, racks are put against all the walls, and a double rack in the middle :—But commonly the sheep pen is in an inner yard, of which it occupies only a part ; and to form it, there is placed a range of hurdles, opposite to the walls, at a convenient distance, and the racks are attached to the wall. They can be also attached to the hurdles : in this case, there should be a greater distance between the hurdles and the wall, than if there was but one range of racks, in order that each sheep should have the requisite number of square feet : the racks must be placed, in preference, against the wall, because sheep take refuge there, to find shelter for their feet.

Q. Are not troughs necessary in a domestic sheep pen ?

A. Troughs are put under the racks to receive

the seed, and finer parts of the fodder, which fall from the racks, and which sheep would not eat, if mixed with the litter and dung. These troughs are made with scantling, (voliges,) six inches deep, twelve broad on the top, and six on the bottom. When roots, grain, and other things, which would pass through the rack, are given, they are put into the troughs.

Q. Is the dung of a home pen, as valuable as stable dung?

A. Dung, in the open air, is not liable to be heated, to grow white, or lose its strength, like stable dung; because the fogs, snow and rains keep it moist, and make it a richer manure, than if it remained a long time under cover.

Q. Should sheep be always littered in the sheep yard?

A. As long as there is dung in the yard, litter is necessary to prevent the sheep from lying in it, and fouling their wool: but if all the litter be used, it will be necessary, first to remove the dung, and afterwards to sweep it every morning. This experiment has been made at Montbard, for many years, upon a flock without the use of litter; but in this case, sand must be put upon the yard, if the ground is not solid; and a quick descent should be given, for the water to run off.

Q. Does the rain water, which washes the dung of a sheep pen, impoverish the dung, when it runs off?

A. This washing has been observed to diminish the strength of the dung; but it has been found to have as much effect upon the land, as stable dung: but in order to lose nothing, it is best to endeavour

to lead the drain from the yard, to land under cultivation, or into a ditch, where manure is collected, to be occasionally taken away.

CHAPTER IV.

ON THE KNOWLEDGE AND CHOICE OF SHEEP.

Q. **WHAT** are the principal differences to be observed in sheep?

A. Sheep differ from each other in sex, age, size, and in the quality of their wool and flesh.

Q. How is their age ascertained?

A. By the front teeth of the under jaw; they have eight, of which all appear the first year, and are called lambs' teeth, and are not broad, but pointed.

In the second year, the two middle ones fall, and are replaced by two new ones, which are easily distinguished by their breadth, and which are much longer than the six others: during this second year, the ram, ewe, and wethers, have the name of yearlings.

In the third year, two other pointed teeth, one on each side of the middle, are replaced by two large teeth; so that there are four large teeth in the middle, and two pointed on each side.

In the fourth year, there are six large teeth, and there remain only two pointed, one on each side of the range.

In the fifth year, there are no more pointed teeth, being all replaced by broad teeth. The age of sheep,

then, may be certainly ascertained, the first five years, by the state of the eight teeth ; it is afterwards ascertained by the situation of the jaw teeth, which, as they are the more used and worn, the older is the animal. In short, the fore teeth fall out, or are broken, when sheep are seven or eight years old : there are sheep, which lose some of the fore teeth, at the age of five or six years.

Q. How are the sheep of different countries distinguished, when they differ from one another ?

A They are distinguished into different breeds, or branches, according to their height, size, and quality of wool.

Q. What difference is there in the size of sheep ; and how is it ascertained ?

A. The height of sheep is measured like that of horses, from the ground to the top of the withers. It is said, there is a breed of sheep, which is only one foot high ; this is the smallest breed : others are three feet eight inches, and this is the large breed. The middling sized, of the different species yet known, are about two feet four inches high, according to the measures, which have been given of them. But in France, the Flanders sheep are only two feet four inches in height ; therefore, among the other breeds, the small size is from one foot, to one foot seven inches ; the middling size from eighteen to twenty-two inches, and the large size from twenty-three to twenty-seven inches. There is a custom of measuring sheep from their ears to the root of the tail ; but it is liable to vary, from different situations of the head : one of these

measures may be judged of by the other ; for the height of a sheep is a third less than his length : for instance, a sheep three feet long, is only two feet high.

Q. What are the principal distinctions in the wool ?

A. The wool is white, or of a bad colour ;

Short or long ;

Fine or coarse ;

Soft or harsh ;

Strong or weak ;

Nervous or weak.

Q. What are bad colours in wool

A. White wool only will receive lively colours in dyeing : the yellow, red, brown, blackish or black are used only in coarse manufactures ; or for the clothing of country people, when of inferior quality ; but such wool as is fine, is used for stuffs which retain the natural colour, and is not sent to the dyer.

Q. What are locks of wool, and what difference is there in their length ?

A. Locks of wool are composed of many filaments, which touch each other at the end. Each lock forms a separate tuft of wool, in the fleece. The shortest wool is only an inch long, the longest is more than fourteen inches ; there is wool of all lengths, from one to fourteen, and even to twenty-two inches.

Q. What difference is there, in point of coarseness, in the filaments of wool ?

A. There are very fine filaments, in all kinds of wool, even in the coarsest ; but however coarse or fine wool may be, the coarsest filaments will be at the ends of the locks ; by examining these filaments

in a great number of the species, different sorts of wool have been distinguished, which may be reduced to the five following, viz.

Superfine wool ;

Fine wool ;

Middling wool ;

Coarse wool ;

Super-coarse wool.

Q. How can these different sorts of wool be known ?

A. It is necessary to have samples of each kind of wool, to compare with that, whose quality it is designed to ascertain : to make this examination, a lock of wool is to be taken from the withers of the sheep, where the finest wool of the fleece is always to be found ; then separate a little the filaments from one another, at the end of the locks, in order to see them better, and place them on the side of the samples, upon black stuff, to make them appear clearer, when it will be easily seen which samples they most resemble.

Q. Is it necessary to have samples of the different sorts of wool, to ascertain if the wool of one sheep is finer than that of another ?

A. To ascertain, whether the wool of a ram is finer than that of the ewes, with which it is proposed to couple him, it is necessary, to cut off the end of a lock of wool, taken from the withers of the ram, and to place its filament upon some black stuff, whereon are put like filaments from locks of wool, taken from the withers of some ewes, and it will be readily discovered, if the wool is finer or not, than that of the ram.

Q. How is soft wool known from harsh ?

A. It is sufficient, to feel of a lock of wool to discover, if it is soft and mellow, or harsh and dry, to the touch : or by drawing it between two of the fingers, and lightly rubbing its filaments, it will be known, if it is soft or harsh.

Q. How is it known, whether wool is strong or weak ?

A. Take some filaments of wool and stretch them, drawing them by the two ends, with both hands : if they break easily, it is a proof, that the wool is weak, and the more they resist, the stronger is the wool.

Q. How is it known, whether the wool be elastic, nervous, or smooth ?

A. Take a handful of wool and squeeze it : if, on opening the hand, it swells as much as it did before compressing it, it is nervy ; on the contrary, if the wool is weak, it remains pressed down, or swells only a little.

Q. What are the good or bad qualities of wool ?

A. That wool, which is white, fine, soft, strong, and elastic, is the best ; that, which has a bad colour, and is coarse, harsh, and weak, is of an inferior quality ; but that which is mixed with a great quantity of hair (jarre) is the worst.

Q. What is this jarre or hair ?

A. It is a fur or hair mixed with the wool, which is very different from it ; it is stiff and shining ; it has not the softness of wool, and docs not take the dye, when manufactured. Wool of this sort is used only for coarse goods : the more it has of this jarre, the

less valuable it is : some of this jarre may be seen in superfine wool, and it is sometimes found as fine, as the wool itself.

Q. What are the signs of bad health in sheep ?

A. Parts of the body deprived of its wool, a dull countenance, bad breath, pale gums, and veins, &c.

Q. What are the proportions of body, which designate a good ram ?

A. It is said, that rams should be selected, which have a thick head, a flat nose, short and narrow nostrils, a large high and round forehead, large black and lively eyes, large ears, and covered with wool, a broad chest, a lofty, thick, and long body, a broad back, large belly, big testicles, and a long tail.

Q. What are the proportions, which distinguish good ewes ?

A. Ewes should be selected, which have a great body, broad shoulders, large clear, and lively eyes, a thick and straight neck, a broad back, a great belly, long teats, neat, small, short legs, and a thick tail.

Q. By what signs are good wethers known ?

A. It is proper to choose such as have no horns ; which are vigorous, hardy and well shaped ; which have big bones ; and a soft, greasy, clean, and well curled wool.

Q. What choice ought to be made, to have good sheep ?

A. It is necessary to choose such as have the best, and largest quantity of wool, for the greater profit ; the tallest, because they afford more wool, and more flesh : of the most convenient age, to produce much,

and last a long time : in short, such as are most healthy and best proportioned, in order to be robust and vigorous.

Q. How is the quality of the wool ascertained, on the body of the animal ?

A. It is known by separating the locks of wool, in order to examine it quite to the roots, and by pulling out small tufts of it, better to ascertain the fineness of its filaments.

Q. Ought the tallest sheep to be preferred ?

A. No ; a sheep of a middling size, and even small, is preferable to a larger, when it has better wool ; but when the quality of the wool is the same, the largest sized animal should be selected, being more profitable in their fleeces, and for sale to the butcher, and also stronger and more robust.

Q. Is the largest breed to be preferred in every country ?

A. No ; because very fertile pastures are necessary for sheep of the large breed, such as that of Flanders, which would not find nourishment enough, in high, or dry grounds, where the grass is scarce and thin ; such grounds agree best with the small species, which require less nourishment. Sheep of the large size should not be put upon moist grounds, because they are more liable to the rot, than sheep of the small breed, especially as there is less to lose on the small, if attacked with this disease, than upon the large.

Q. At what age is it proper, to select sheep to form a flock ?

A. It is necessary to take rams at two years old, at

which age, they begin to have strength enough to produce good lambs : they continue good rams until eight years old ; but older, they cannot be very serviceable. Ewes should be taken at two years, and such as have had no lambs are to be preferred : at five years old the ewes are still better for producing good lambs ; that is, if they have never had them, or at least, if they have not had them before 18 months or two years old. At seven or eight years, they grow weak, because they want their fore teeth, with which to browse. Wethers are taken at two or three years, for the sake of their fleeces, until the age of seven years, and then they should be fattened for the butcher.

Q. What are the signs of good health in sheep ?

A. A lofty head, a lively and very open eye, a lean forehead and muzzle, moist nostrils without mucus, breath without bad smell, a clean red mouth, all the limbs active, the wool strongly adhering to the skin, which ought to be red, soft and supple, a good appetite, the flesh reddish, and principally the vein good, and the ham strong.

Q. How is it known when the vein is good and the ham strong ?

A. To know the vein, the shepherd bestrides the sheep, and handles the head with both hands, raises the eye-lid with the thumb of the right hand, from the top of the eye, and with the thumb of the left hand, brings it down from the under part : he then examines the veins of the white of the eye ; if they are very apparent, if he observes them to be of a live-

ly red, and the flesh at the corner of the eye, on the side of the nose, is also of a fine red colour, it is a sign the animal is in good health. To know if the ham is strong, the sheep must be seized by one of his hind legs; if he makes strong efforts to withdraw it, and you are obliged to employ much force to retain it, it is a proof, that the animal is strong and vigorous.

Q. What attention is it necessary to pay, in regard to the soil, when sheep are taken from one country, and carried to another?

A. They should be taken from a dry country; as it is to be feared, if they are taken from a moist, marshy soil, they may have a disposition to the rot.

NOTE.

It is generally observed, that sheep, transplanted from a dry to a moist soil, easily take the rot; whilst, on the contrary, one of the means of preventing or curing it, if it is susceptible of cure, is the migration of animals from moist to dry countries... *Huzard*.

CHAPTER V.

CONCERNING THE MANAGEMENT OF SHEEP IN PASTURES.

Q. **WHAT** are the principal rules which shepherds should observe, in grazing their flocks?

A. They may be reduced to seven.

1st. To graze them every day, if possible.

2d. Not to stop them too often while grazing, except in closed pastures.

3d. To prevent them from doing damage, when grazing on lands liable to injury.

4th. To avoid moist soils, and grass covered with dew or white frost.

5th. To put the flock in the shade, during the sun's greatest heat ; and to drive it in the morning as much as possible, on the side lands, exposed to the west, and in the evening, to such as present to the east.

6th. To remove the flock from grasses, which may prove hurtful to them.

7th. And to drive it slowly, particularly when ascending hills.

Q. Why should sheep be made to graze every day ?

A. Because it is the most natural, and least costly manner of feeding them ; and which can be but imperfectly done, by giving them fodder at the rack. In grazing, they have a choice of food, and take it in the best state ; grass is always much better for them, than hay or straw. Even if food could not be found in the field, the exercise they would receive in walking, would give them an appetite for their fodder.

Q. Why are sheep allowed to wander, while pasturing ?

A. Because it would disturb, to stop them when grazing : it is their natural disposition, in seeking their food to wander from place to place ; this exercise preserves their vigour.

Q. Why are not sheep allowed to graze in enclosed pastures, as in open fields ?

A. Because sheep, when allowed to run over a rich pasture, spoil more grass with their feet than they eat. To preserve the feed, the flock should be allow-

ed every day, only such part of it, as it may consume. The flock should be fenced in, by a pen, or fold, within which, there should be grass enough for the number of sheep; the next day the pen should be shifted, and so successively, until the flock shall have eaten the whole pasture.

Q. Why should moist soils be avoided? it is in these, that grass is most abundant.

A. Moisture is injurious to sheep, when there is too much of it in the ground, on which they feed or run over, and in the grass, that it produces. This moisture, when it is cold, as it is when the dew is on it, produces a disease called the rot, the putrid liver, the disease of the liver, &c.—Moisture is also the cause of very dangerous colicks in sheep:—instinct disposes them to wait of themselves, before grazing, till the dew or white frost be dissipated.

Q. Why is the dew of the morning more injurious to sheep, than rain, or the dew of the evening?

A. The morning dew is commonly colder than rain or the evening dew: sheep feed with less appetite, when the grass is wet, except at times, when rain happens after a great drought, moistens the grass, and makes it sweeter, and more relishing.

Q. Why should sheep be put in the shade, and be made to walk in the morning towards the west, and in the evening towards the east?

A. Because great heat is more detrimental to sheep, than great cold: their wool, which prevents the air from cooling them in winter, hinders it from refreshing them in summer, and increases the heat of their

bodies to such a degree, as to stop them from feeding: it is, on this account, necessary to put them in the shade, during an ardent sun, which would heat them excessively, under their wool. These animals have the brain peculiarly weak; the rays of the sun, falling direct upon their heads, give them the vertigo: this disease is called *the heat*; it makes them run round, and presently destroys them, if it is not remedied by bleeding. It is necessary to put them under the shade of a wall or a tree, in the middle of the day. In the morning they should be driven to the westward, and in the evening to the eastward, in order that their heads should be shaded by their bodies; which would be the case, from holding their heads down, while grazing.

Q When sheep stand close together, and each of them bends his neck, and places his head under the belly of its neighbour, is it not sufficiently protected from the heat of the sun?

A. It is true, that the head of the sheep is shaded; but this situation is more dangerous than the heat of the sun; because the head is inclined, and surrounded with air, charged with dust, and infected by the vapour from the bodies of the sheep, which heats and prevents them from receiving fresh air. Sheep also conceal their heads to put their nostrils out of the way of flies, which endeavour to deposit their eggs in them: in this case, it is necessary to lead the flock to a cool place.

Q. In what weather is it, that sheep should not be led out to graze?

A. Sheep cannot feed, when the earth is covered with snow to such a depth, as to prevent them from uncovering it with their feet. Then they should be driven to the field only to give them drink, and exercise. But when the wind is very high, or the rain very abundant, the flock should not be taken out, until the storm abates.

Q. At what o'clock ought sheep to be led to pasture?

A. At sun-rise, when there is no dew or fog; when there is, it is proper to wait, until both are dissipated.

Q. At what o'clock, and how is a flock to be put in the shade?

A. When the heat begins to oppress it in the field; when the sheep stop feeding, are agitated, or the flies torment them, &c. it is proper to put them in the shade; in a cool place well exposed to the air, where they may be removed from flies and chew their cud at ease. It would be dangerous to put too great a number of them, into a close stable; they might die there, suffocated by the heated air, and the vapour from their bodies.

Q. What is chewing the cud in sheep?

A. When they feed in the field, or eat at the rack, they chew their food, so only, as to enable them to swallow it, when it falls into the paunch, which is the largest of the stomachs: when the animal lies down, after having eaten its fill, he draws what is in his stomach into his mouth, at different times, and chews it, afresh; this is called chewing the cud: he afterwards

swallows this food, which passes into another stomach, instead of falling into the paunch as at first.

Q. How is it known, when a sheep is chewing the cud?

A. He is seen to chew without receiving any food from without: when he has chewed a short time, it is observed, that something descends under the skin, from the throat along the neck; it is the grass, which has been chewed, and which forms a ball as large as a walnut: a moment after, the body is seen to contract by an effort, and another ball reascends along the neck, quite to the throat; when the animal renews his chewing: all this is repeated, until he stops ruminating.

Q. At what hour, is it necessary to lead sheep out to graze, after having kept them in the shade, during the middle of the day?

A. They should be led again to pasture, when the sun begins to fall, and when the strength of the heat has abated.

Q. At what hour, is the flock brought back in the evening?

A. The flock may be allowed to graze, until the end of the day, and even during some hours of the night, in grounds where the grass is thick, and plenty enough to be readily seized: but when it is wet by the dew of the evening, the flock must be withdrawn; although many people believe, that the dew of the evening is not hurtful to sheep, or is less so, than that of the morning: it is however the same cold moisture,

which produces nearly the same effect in the evening, as in the morning.

Q. Do sheep eat noxious or hurtful herbs?

A. They do not of themselves eat such herbage, which, if put into their rack, they will often remain a whole day near, without touching it, although they may have had no other food: this proof has been many times given, in a sheep fold, near Montbard. But there are herbs, which have good qualities in themselves, and which sheep eat with avidity, but which, in certain circumstances, do them great injury.

Q. What good herbage is there, which may be injurious to sheep?

A. *Trefoil (1), lucerne (2), wheat (3), rye (4), barley (5), mustard (6), poppy (7), and in general, all such herbage, as sheep eat with the most avidity, or which are too succulent; such as are too tender and watery, like the after grasses, and such as are found in wet furrows, or under the shade of trees; or full grown grasses, when full of dew, or water from cold rains.

Q. How does such herbage prove injurious to sheep?

A. When herbage of the above description is taken, in too large quantities, into the paunch, it inflates it, so as to make the animal fuller than he should be, and gives him the colick of the paunch; called in

* (1) *Trifolium*, L. (2) *Medicago sativa*, L. (3) *Triticum hybernum*, L. (4) *Secale cereale hybernum*. (5) *Hordeum vulgare*, L. (6) *Sisymbrium officinale*, L. (7) *Papaver Rhoeas*, L.

France, Écouffure, enfleure des vents, &c. The sheep then stands erect, without eating, is in pain, and trembles; is short breasted, and beats at the flanks: if the belly is struck with the hand, it resounds without hearing the motion of water: in short, the animals attacked with this disease, fall, and die suffocated, and sometimes in great numbers.

Q. How is the disease prevented?

A. Time should be given for the dew, or white frost to be off the ground, before the sheep be turned out to feed: and they should not be put, in the morning when hungry, into rich and succulent pastures; on the contrary, they should be confined to thin pastures, and afterwards led to the richest, and not left there long enough to take too much food; they should not be allowed to drink, after eating peas, beans, and other farinaceous vegetables.

Q. What ought the shepherd to do, when he sees his sheep inflated with the colick of the paunch?

A. He ought to drive his flock, without loss of time, to another place, where the herbage is not hurtful, and immediately assist the animals inflated. He should make them trot, until they dung, and the inflation abates: he must not fail to make them go with the wind; for if they are driven against it, they would have greater difficulty in travelling, and the wind would contribute, with the inflation of the paunch, to suffocate them. They may be cured by making them swim in water, if it be near; as soon as they dung, the disease terminates.

Q. Are there no other remedies for the colick of the paunch ?

A. There are many others, but when the shepherd is in the field, with his flock, he has choice only of the following : he presses the belly to make the wind pass off ; bleeds them, draws the dung from the fundament with his finger, or with a small wooden spoon, to make the wind pass off : he bridles the sheep by putting into their mouths a small branch of willow, or a piece of twine, which is tied behind the head, in such a manner, as to keep the mouth open, and in this state the animal jumps, struggles, and discharges the wind, and dung, which inflate him.

Q. Why should a shepherd always drive his flock moderately, especially when ascending hills ?

A. Because, in driving his flock too quick, especially on ascending ground, he would run the risk of heating many of the sheep, to the degree of making them sick, and even destroying them.

Q. How ought the shepherd to manage his flock, when driving it ?

A. He ought to prevent any animal from separating from the flock, by running before, remaining behind, or straying to the right or left.

Q. How can a shepherd do all that ?

A. By the aid of his whip, his crook, and his dogs ; when he makes his flock go before him, he drives the sheep behind, with his whip : the dog is before, and restrains the sheep from going forward too fast : the shepherd menaces those that stray to the right or left, to make them return to the flock, or if he has a

dog behind him, he sends him after the sheep, which stray, to bring them back, or makes them return, by throwing a little dirt at them, so as never to touch their bodies, which is improper.

Q. How does he set the flock forward again ?

A. He speaks to the dog, which is before, to let them advance, and then drives forward the hinder sheep ; he can make them go forward, or return by speaking to them in different tones, to which he accustoms them.

Q. Can a shepherd conduct his flock by going before ?

A. Yes, if he has at least one dog, on which he can depend, to prevent any part of the flock straying behind, or on the sides. The flock follows the shepherd even better than the dog, but it is necessary he should have regard to the sheep, behind.

Q. How does the shepherd make the flock pass a narrow passage, or a bad track ?

A. The shepherd causes some animals to follow him, which he has accustomed to come to him at his call : he goes first, and calls them, in order to induce them to follow him ; the first, which pass, are followed by the rest. If there should be no sheep in the flock, acquainted with his call, he should present a piece of bread to such, as are most ready to take it, and in this way, he can make the whole flock to follow him.

Q. How does a shepherd prevent his flock from doing damage to grounds sown to grain ?

A. When the flock is near such grounds, he sends

a dog upon the edge of the field sown, to prevent any of the sheep from approaching it: if there is a like field on the other side, he sends another dog, if he has another; or goes thither himself.

Q. How does the shepherd manage when he has no dog, and has two fields to guard?

A. Whilst he guards one of the fields, he speaks to the animals, which go upon the other, to make them quit it; if they do not obey, he should run after them, and drive them out. But it is necessary that a shepherd should have, at least, one dog, when he conducts a flock near grounds sown to grain; but a dog is not so necessary, where there are great fallows.

Q. What can the shepherd do, to retain his flock in a place, where the feed is good?

A. He induces his flock to continue, if he stays there himself with his dogs, and plays upon some instrument, such as the flageolet, the flute, the hautbois, or the bag-pipe, &c. Sheep are pleased with the sound of instruments, and feed quietly, while the shepherd is playing thereon.



CHAPTER VI.

ON THE DIFFERENT THINGS, WHICH MAY BE USED FOR
THE FEEDING OF SHEEP.

Q. **W**HAT is the best food for sheep?

A. The best of all food for sheep, is the herbage of browsing pastures; but all pastures are not equally good.

Q. On what depends the goodness of pastures ?

A. It depends on the situation and quality of the soil, and upon the state and properties of the herbage.

Q. What are the best pastures, from situation and quality of soil ?

A. The highest, lightest, dryest, and most inclined soils, make the best pastures for sheep.

Q. In what state should the herbage be, to make the best pastures ?

A. The best grasses are such, as have already obtained their growth ; which approach flowering, or have begun to flower : herbage, too young, has not been sufficiently exposed to the sun and air, to make good food ; it is too watery and unripe : such as have had their growth, bear seed, or are too old, are too hard, and not juicy enough.

Q. Can pastures be had out of season, and after frost ?

A. There are grasses, which resist frost, and which are almost as fresh in the depth of winter, as in summer : such as burnet *(1), and woad (2), of which winter pasture can be made.

Q. When pasturing fails, will dry fodder make good food for sheep ?

A. The best fodder makes sheep decline, ewes,

* (1) *Sanguisorba officinalis*, L. (2) *Isatis tinctoria*, L.

The culture of this plant will be productive of great benefit to farmers, and manufacturers ; for the use of the latter, it will afford an excellent blue dye ; and for the former, a valuable winter pasture, both for sheep and cattle, as it stands the frost, and is green all winter ; it may be known by its indented leaves, which issue from the root ; those on the stalk have the form of an iron arrow or dart, with flat extended nodes.

especially with young, and such as give milk, and also their lambs: the bad effect of dry food upon sheep arises from their being unaccustomed to live on such herbage during the favourable seasons: dry fodder is not so congenial to their temperament; it heats them, nourishes them less, hurts their growth, and the good qualities of the wool.

Q. How can the bad effects of dry food be prevented?

A. When sheep remain days together without going to pasture, it is necessary to give them fresh food once in a day, which is sufficient to prevent the bad effects of dry fodder.

Q. What fresh food can be had for sheep in the winter season?

A. * Colewort (1), running cabbage (2), high cabbage (3), curly cabbage, chou frisees (4) These plants stand the frost, and their leaves being high, and not covered by the snow, may be gathered at times, when it covers woad and burnet.

Q. Colewort and cabbages, being gross watery plants, may they not be injurious to sheep?

A. These plants would be injurious in the summer season, when sheep eat fresh grass only; but in winter, when they have fodder morning and evening, colewort and cabbages given, at mid-day, cannot but be beneficial.

Q. What is running cabbage, choux de bouture?

* (1) *Brassica campestris*, L. (2) *Brassica perennis*, L. (3) *Brassica oleracea silvestris*, L. *Brassica sempervirens*, J. (4) *Brassica oleracea sabellica*, L. *Brassica fimbriata*, B.

A. It is a variety in the species of cabbage, unknown to botanists; it was cultivated in small gardens, in the commune of Montbard; it throws out lateral branches, the lowest of which bend quite to the earth, while the rest of the growth is directed upwards:—the part, which touches the earth, takes root, and produces new cabbages, which are perpetuated from year to year, and which form so gross a mass, that it is necessary to destroy a part of it.—It is called *choux de bouture*, because it is planted in this manner without sowing; its branches are broken off and given to sheep: it does not head, but produces a great many leaves, when it grows in a good soil, well dunged.*

Q. Is there not fresh food in winter, better than colewort, or cabbages, for sheep?

A. Carrots,† (1), parsnips (2), salsifis, or goat's beard (3), chervis, or skirret (4), radishes (5), turnips (6), potatoes (7), topinambours, an inferior species of potatoes (8), are more nourishing than the leaves of cabbages, or colewort; scarcity, or turnip-rooted cabbages (9), may also be given.

* This denomination of cabbage, *choux de bouture*, is uncertain: different species of cabbage, even perennial, are perpetuated in the same way. The curly cabbage of the north, *Brassica oleracea sabellica*, L. which resists extreme cold, is one of those, which should be preferred for this kind of culture....*Muzard*.

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|--|--------------------------------------|
| † (1) <i>Daucus carota</i> , L. | (6) <i>Brassica napus</i> , L. |
| (2) <i>Pastinaca sativa</i> , L. | (7) <i>Solanum tuberosum</i> . |
| (3) <i>Tragopogon porrifolium</i> , L. | (8) <i>Helianthus tuberosus</i> , L. |
| (4) <i>Sium sisarum</i> , L. | (9) <i>Beta cicla altissima</i> , V. |
| (5) <i>Brassica rapa</i> , L. | |

Q. Are there not more nourishing things than roots to be given to sheep in winter?

A. Grains, seeds, and vegetables are more nutritious than roots.

Q. What grains are given to sheep?

A. Oats (1), barley, and wheat bran, are very beneficial for them; a small handful of barley and oats, given every day to each sheep, is sufficient to preserve a flock from the bad effects of winter fodder.

Q. What seeds do they give sheep?

A. Hay chaff, hemp seed (2), broom seed (3), acorns, and cakes of hemp, turnip (4), and colewort seed.

Q. What is hay chaff?

A. It is what collects and remains at the foot of hay stacks, and in hay lofts, after the hay has been taken away.

Q. What is there beneficial in hay chaff?

A. The seeds of many sorts of plants, which are nourishing, and among them such as strengthen the stomach, and aid digestion.

Q. What is the effect of hemp seed?

A. It warms and gives strength to sheep, and excites them to copulation.

Q. What is done to procure and prepare broom seed, intended for the use of sheep?

A. When the broom seed is very ripe, to gather it, the branches are shaken over sheets of cloth, and some handfuls of this seed is given with other

(1) *Avena sativa*, L.

(2) *Cannabis sativa*, L.

(3) *Ulex europæus*, L.

(4) *Napus silvestris*, L.

food. Small branches of it may also be cut in June or July, and with their pods and seed, dried in the sun, and taken care of for the sheep in winter : sheep are presently accustomed to the bitter taste of this seed : it however may be steeped in water, or boiled for a moment to take off the bitterness.

Q. What is the effect of acorns ?

A. They are nutritious, but relaxing, and make sheep thirsty, when they eat many of them : it is proper to give them only a small quantity, once in a day.

Q. What are cakes of hemp, turnip, rape, nut and flax seeds ?

A. They are the husks, which remain after having expressed the oil from them, made into cakes, and used for the feeding of cattle.

Q. What is the effect of these cakes upon sheep ?

A. The hemp seed cakes nourish, warm and animate sheep, but make them thirsty, and scour, if given in too great quantities. The oil cakes of turnips and colewort heat but make them less thirsty. The nut and linseed oil-cakes nourish and fatten them more than others.

Q. What vegetables are given to sheep ?

A. Small beans(1), vetches(2), lentils(3), peas(4), and haricot beans (5), if there be any to spare.

Q. Do sheep eat lupines ? (6)

(1) *Faba minor sive equina*, C. B.

(2) *Vicia sativa*, L.

(3) *Ervum lens*, L.

(4) *Pisum sativum*, L.

(5) *Phaseolus vulgaris*, L.

(6) *Lupinus albus*, L.

A. Yes, after they have been steeped in water to take off their bitterness.

Q. What chaff is given to sheep in the winter season ?

A. Bundles of threshed straw, in which some grain is left, make very good food for sheep in winter.

Q. What chaff is best for sheep ?

A. Oat chaff, because both the grain and the straw are more tender, and of course better, than the chaff of rye, barley, and mixed grain. In some countries the chaff of wheat and meslin, which is a mixture of wheat and rye, would be the best of all : but in general these grains are too dear, and ought to be reserved for the food of man.

Q. Is not chaff made from vegetables ?

A. It is made from vetches, lentils, peas and beans, which are gathered before or after being ripe ; but that however is best, which is made from plants gathered before they are ripe.

Q. What other kinds of chaff are there ?

A. There is a mixture of peas and vetches, of oats and vetches or peas, of oats with peas, vetches, lentils, lupines or fenugreek (1), and these have characteristic names in France.

Q. What kind of leaves are given to sheep ?

A. Such as are on branches of trees, which are cut in August, when the sap is in them, and before the leaves are dry : they let them wither a little, and then make them into bundles.

(1) *Trigonella fœnum græcum*, L.

Q. What are the best leaves ?

A. The leaves of elder (1), birch (2), yoke elm (3), ash (4), poplar (5), willow (6), &c. They may be procured from almost all kinds of shrubs and trees.*

Q. What are the best kinds of hay for sheep ?

A. Salt marsh, because of the salt it contains : the hay of dry pastures, where the water never stands, is also very good, because it is fine, delicate and agreeable to cattle. Hay made before it is too ripe, and is only a little withered, is the most agreeable to sheep.

Q. What is the worst kind of hay ?

A. Low marshy meadows produce coarse grass, which is harsh and disagreeable to sheep : the herbage, which grows on the sides of lakes and rivers, marsh rushes, reeds, &c. are still worse for hay : that, which is got when too ripe, or is too much made, or has lost its sap, affords little nourishment : the hay which has been wet while making, loses its colour and its good qualities ; it does not keep, and is subject to heat and rot in the hay loft. The hay, which receives a bad smell from stables, or which has been wet or is mouldy, disgusts sheep. Such as is musty is very injurious to them, and gives them disorders

(1) *Betula alnus*, L.

(2) *Betula alba*, L.

(3) *Carpinus betulus*, L.

(4) *Fraxinus excelsior*, L.

(5) *Populi*, L.

(6) *Salices*, L.

* In countries, which grow wood, and produce but little grain, and of course straw, leaves are carefully collected, as soon as they fall, and are dried rapidly in the sun or behind an oven, and are housed for the winter : the straw is thereby saved for the large animals... *Hazard*.

of the lungs ; they never eat it, but when forced to it through hunger.

Q. Are there not some meadows better than others for the making of good hay ?

A. The best grasses for making hay for sheep are found in greater proportion in high and dry meadows, than in low and moist ones ; but there is always a mixture of grasses of different qualities, in both situations.

Q. Can hay be obtained from good grasses without a mixture with bad ?

A. That a pasture may produce such grasses only, as are good for sheep, it is necessary, to plough the ground, and to sow such as are wanted : it is by this means artificial grasses are obtained.

Q. What are the artificial grasses used for sheep ?

A. Artificial meadow may be made with dog, or twitch grass (fromental) (1), sheep grass, or sheep fescue grass (coquiole) (2), ray grass (3), &c. The name of gramineous is given to those grasses, and to all such as have long narrow leaves, long stalks, and ear out : artificial meadows are made with lucern, trefoil, burnet, &c. ; those grasses are sown alone, or mixed together at pleasure.

Q. What are the qualities of dog or twitch grass ?

A. It rises higher than any other meadow grass ; it grows in all sorts of soils, but produces more in good than in poor soils : it is cut early, and whether for feeding or hay, is excellent for sheep.

(1) *Avena elatior*, L. (2) *Festuca ovina*, L. (3) *Lolium perenne*, L.

Q. What are the properties of sheep fescue grass (coquiote)?

A. Light land agrees with this grass : it is fine and excellent for sheep, whether green or dry.

Q. What are the qualities of ray grass ?

A. Ray grass grows in strong and cold grounds : it makes excellent food for sheep ; but its stalks are liable to grow hard when it is not cut early.

Q. What are the properties of lucern ?

A. Lucern produces abundantly on rich flat grounds : moist soils are not suitable for it : whether as grass or hay, it is very nutritious ; but the grass taken in too large quantities, or when wet, inflates the sheep, and the hay may destroy them by giving them the *molten grease*, or other disorders : it is therefore necessary to mix it with common hay, saintfoin, or straw.

Q. What are the properties of trefoil ?

A. Sweet, rich, moist grounds, and such as can be watered, are favourable to trefoil. It is very nourishing, but is liable to the same objections, both for hay or grass, as lucern.

Q. What are the qualities of saintfoin ?

A. Saintfoin grows on plains, hills or mountains, but it produces best in deep good soils : it is very healthy, but too nourishing, if not mixed with straw, when given to sheep. Its stalks are hard, if cut late.

Q. What are the properties of burnet grass ?

A. Burnet grows in all sorts of soils, but it produces best in good fresh grounds : this grass strength-

ens sheep, is always green, makes a good winter pasture, and may be cut and given to lambs in troughs.

Q. Do not sheep eat the bark of trees?

A. The bark of poplars, pines, and other trees, is peeled, dried and broken to give sheep in the troughs; but is used only, when there is no other or better food.

Q. Cannot sheep be fed with horse chesnuts?*

A. Sheep not only eat them when they are cut into two or three parts, but they eat the outside shell also, although it may have hard sharp points.

Q. What other food is there which may be given to sheep?

A. The stalks, leaves and pods of peas, beans, vetches, lentils, and great beans may be given them, after the vines have been threshed. Sheep like this food better, and it is more nourishing, than straw: the stalks of peas have less moisture than those of beans.

Q. What is the best kind of straw?

A. Oat straw is the best, because it is the most tender: rye straw is better than wheat, because it is not so hard, and there remains some grain in the ears: the straw of bearded barley may be hurtful, on account of the beards, which stick to the wool, when they fall on it. Sheep eat only the ear, the ends of the stalk, and the leaves of the straw. This food is not sufficient to maintain a flock in good plight; something more nutritious should be given with it.

Q. What use is made of the chaff of grain?

* *Æsculus Hippocastanum.*

A. Sheep eat the chaff of oats, wheat, and rye, but do not eat the chaff of barley.

Q. What is the chaff of flax?

A. It is what remains after the flax has been peeled: sheep eat this kind of straw, but it is the worst of all others.

CHAPTER VII.

ON THE MANNER OF FEEDING SHEEP, AND GIVING THEM WATER AND SALT.

Q. AT what seasons is it necessary to fodder sheep?

A. When the sheep do not find feed enough in the pastures and enclosures, or when bad weather prevents them from going out; it is then necessary to give them fodder at the rack, or in the troughs.

Q. In what month do they begin to fodder sheep?

A. In the departments, where the winter is severe, they begin in the month of October or November.

Q. At what time of day, is it necessary to fodder them?

A. In the morning, when the white frost hinders the flock for some hours from going to pasture; and in the evening, when they return therefrom, without being sufficiently filled.

Q. What should be done, when the snow prevents the flock from going out for the whole day?

A. Dry fodder should be given them, morning and evening: but it is necessary, to have fresh food giv-

en them in the middle of the day, such as cabbage leaves, carrots, parsnips, skirret, radishes, turnips, potatoes, topinambours, a species of potatoes, beets, horse chesnuts, acorns, &c.

Q. What quantity of cabbage leaves should be given to a sheep at one feeding?

A. It is found that a sheep of a middling size eats about five pounds of cabbage leaves in a day; therefore it is proper to give him a pound and an half at once, when the leaves are tender, like those of the headed cabbage, *brassica oleracea capitata*, which he eats clean; but when they are hard, like the leaves of the running cabbage, *chou de bouture*, he leaves nearly a third of them in weight: to make up for this loss, you should give him two pounds of such leaves at each feeding.

Q. Why is it necessary, to give sheep fresh food at least once a day?

A. It is because fresh grasses and roots are the natural food of sheep: they are accustomed to it during the whole of the warmer seasons; and when it is altogether changed by giving them only straw, they are not sufficiently nourished, and they gradually grow thin: the shepherds say they lose tallow, that is, they fall away. Dry food makes them thirsty and drink a great deal of water, and thereby lays the foundation of many diseases, particularly the rot: a feed of fresh food every day, prevents them from falling away, or being too thirsty.

Q. When you have no fresh food to give, what other food will prevent sheep from falling away?

A. Grain, vegetables, bundles of straw, or a handful of oats or other grain, will prevent the sheep from growing poor.

Q. In the month of October and November, when sheep should be fed at the rack, what food is proper to be first given them?

A. It is proper to begin with giving them such things as do not keep, and which would spoil, from not being well saved; or such as are the least agreeable, as wheat and rye straw, or both mixed; but if oat straw, which they like best, be first given them, they will revolt afterwards at eating the others.

Q. What quantity of straw is it proper to give sheep?

A. The necessary quantity of straw for sheep depends upon the size of the animal, and on the quality of the straw; it is necessary to give middling sized sheep every day two pounds and an half of oat straw, if you are careful to put back into the rack what falls: a sheep eats every day, according to experiments which have been made, a little more than two pounds of this straw, and there is nearly half a pound left, that they will not eat, and which is mixed with the litter. There is still left some of the hardest part of the straw, and from which it may be calculated that a bundle of oat straw, weighing 50 pounds only, is sufficient for twenty sheep of a middling size, if that which falls from the rack is put back after each feeding.

Q. What quantity of hay should be given to sheep?

A. The quantity of hay necessary for a sheep depends, like the quantity of straw, on the size of the animal and the quality of the hay. It is proper to give every day to a middling sized sheep two pounds of common hay, taken from a good meadow. This quantity is sufficient, if care is taken to put back what falls from the rack. Each sheep eats every day, according to experiments, which were made near Mortbard, two pounds of hay, leaving three ounces: there will remain more or less according as the hay may be finer or coarser, than that which was employed in the experiment. A bundle of hay, therefore, of ten pounds may be considered sufficient for five sheep, if what remains be replaced in the rack.

Q. In winters, when there is no snow to prevent sheep from going to pasture in the field, will straw then be sufficient for them?

A. This food will answer until January, in countries where the winter is severe, because there is then rarely good grass in the fields. To make up for it, it will be proper to mix a little hay or other food with the straw, such as the chaff of peas, beans, vetches, and lentils. It has been remarked for a long time, that the chaff of beans is drier than that of peas, and that it must be given to sheep in the evening, in moist and rainy weather.

Q. At what season is fodder discontinued?

A. In the spring, when the sheep begin to find a sufficient quantity of herbage in the fields for their support; and when they are round and well filled, on returning to the fold in the evening: but as long as

it is found, that they have taken only a part of the food which is necessary for them, what is deficient must be supplied by fodder at the rack.

Q. What quantity of grass does a sheep eat in a day ?

A. A sheep of a middling size will eat every day, according to an experiment which was made of it, eight pounds of grass, which was taken from a good pasture, in the drying of which, it lost three quarter parts of its weight, reducing the eight pounds of grass to two pounds of hay : therefore, a sheep of a middling size will eat eight pounds of grass, or two pounds of hay, in the same space of time. But when they eat grass only, they drink little, or not at all ; and when their food is dry, they drink a great deal.

Q. What water is best for sheep ?

A. River water, and running streams, are the best ; the water of lakes and ponds runs off in part, and is to be preferred to the stagnant water of marshes. It is improper to allow sheep to drink at such places, except at times, when other water cannot be procured. The worst water is that, which is stagnant in swamps, ponds, ditches, furrows, &c. When it is required to give it from wells or cisterns, it is proper to expose it to the air for some time, before giving it : stagnant and putrid water is very hurtful to sheep, and may cause their death.

Q. What quantity of water do sheep drink ?

A. They drink but little, when in good health : when a sheep is seen running to water with great eagerness, it is a sign that he is diseased, or will soon

become so. Sheep drink very little, when the grass is most succulent : they drink more in great drought, great heat, or in great cold, or when they are fed on dry food : thus a sheep drinks from one to four pounds of water per day ; but there are days, when he will not drink, though water should be brought to him. It is known by experiments, made near Montbard, that many sheep, fed with a mixture of hay and straw, in mid-winter, have remained in a close stable for thirty days without drinking ; and no inconvenience but thirst has been observed.

Q. How often should sheep be allowed to drink ?

A. In regard to that, there are different practices : in many places they allow them to drink twice a day ; in others, they are watered once only ; in others, twice, in two, four, six, eight, ten, or fifteen days ; but these practices change according to the season ; and to the difference of food ; but there is no established rule grounded on good proofs. It is however admitted from experience, that it is not necessary to water sheep twice a day, because they drink more water in many times going thereto, than if they drank only once. When water is near, and the flock healthy, lead it gently to water once a day, but do not stop the flock ; the sheep which want to drink, will stop, while the others will pass by, without drinking. The less a sheep drinks, the better is his health.

Q. What is proper to be done, if the water is so remote, as to weary the flock by driving them to it ?

A. To conduct the flock thither, once in two or three days, is sufficient, according to the food and

season of the year : but it is improper to delay watering for too long a time ; because they drink in one day almost as much as they would have done in the preceding days, when they went without drinking. This great quantity of water taken at once, does them more hurt than if it had been taken at different days. This excess causes the *overflowing* of water, to which sheep are very liable from their temperament.

Q. When sheep eat snow, will it prove hurtful to them ?

A. No, and it was proved in the following manner : sheep were shut up in a close stable, for several days together, without being allowed to go out ; they were fed during the time with straw and hay, without giving them drink ; and were afterwards driven to a field, for several days, when it was covered with snow ; they eat a good deal of it from being very thirsty, and received no injury thereby.

Q. Why does dew and white frost prove injurious to sheep, when snow is not ?

A. It appears that snow is not hurtful to sheep, because they take it only at such times as they are thirsty, or heated with dry food ; whilst grass, filled with dew or white frost, makes them cold, causes indigestion, and gives them a relax : sheep will refuse dew and white frost, but eat snow with avidity.

Q. Is it necessary to give salt to sheep ?

A. Where sheep are fed on dry land, and are healthy, salt may be dispensed with : sheep are seen in good health in places, where no salt is given them. But in marshy grounds, where they are liable to the

rot, and other diseases, on account of the water, and in all places where they may be exposed thereto, salt 'll probably prevent, or cure them.

Q. What is the effect of salt upon sheep?

A. Salt gives them appetite and strength; it warms, and makes them digest their food, prevents obstructions, and makes them discharge superfluous water, which is the cause of most of their diseases.

Q. At what time is it proper to give salt to sheep?

A. When they are feeble, and loathe their food: which happens oftenest in foggy weather, or when it rains, snows, or is very cold, or they have only dry food.

Q. Is it necessary to give them salt frequently?

A. In some places, salt is given them every fifteen days; in others, every eighth day, during winter; but it is best to give it them, when it is seen that they want it.

Q. How much salt is given at once?

A. A small handful to each animal every fifteen days; a pound for twenty, every eight days, being about six drachms for each sheep. If it be given every day, half the quantity will be sufficient; too much salt will heat and injure them.

Q. In what manner is salt given to sheep?

A. It is spread in the troughs, after being a little ground; in some places, it is laid on flat stones in the field, where the flock is pastured. Salt is also scattered over the fodder, or the fodder is wet with brine, or with water, in which salt has been melted.

CHAPTER VIII.

ON THE BREEDING OF SHEEP AND THEIR IMPROVEMENT.

Q. What precautions should be taken to draw good profit from the breeding of sheep?

A. The ram should not be put to the ewes, until the season is most favourable for coupling, and best calculated for giving the lambs a good growth. Rams and ewes, the most proper to improve the breed, should be selected, and the rams should be separated from the ewes, when it is apprehended that the coupling may take place too early.

Q. What is the best time for the coupling of sheep, and most suitable for the growth of the lambs?

A. The time is not every where the same; it depends upon the cold in winter, and on the heat in summer, in the different countries, where sheep are kept.

Q. What rules should be observed in different countries, in regard to the time of coupling.

A. The severer the winter, the longer should the time of coupling be delayed. It ought not to be allowed in the northern departments (of France) until September or October, that the lambs may not come until February or March, lest they should be exposed to extreme cold, which would retard their growth, from bad food, if they came earlier. On the contrary, in countries, where the winters are mild, and the summers are very warm, it is proper to advance the coupling, by putting the rams to the ewes in June, or Ju-

ly, for the purpose of having lambs in October or November: nothing is to be apprehended from the winter; good food is to be found at this season, and they become strong enough to resist the extreme heat of the summer: they have much more wool at the time of shearing, and are much larger at the end of the year, than if they had come in the beginning of spring.

Q. Can rams and ewes be coupled when desired, so as to have lambs sooner or later in different countries?

A. The access of the ram disposes the ewes to receive him. They are much sooner inclined to him in warm, than in cold climates. Although the rams may be always with the flock, lambs are seldom seen in the northern departments, until the month of January; for the most part, the lambs come in February. In the southern departments, some of them come in October, and they are almost all born before February.

Q. Which of these customs (the one being beneficial in warm, and the other in cold climates,) is it proper to follow, in countries where the winter is in some years mild, and in others very cold?

A. It would be most certain to wait, till the month of October before the ram be put to the ewes, because there would be a risk of losing many lambs, if the winter should prove severe, and the lambs should come in the month of December or January.

Q. Are the rams, which have no horns, as good as those which have?

A. The rams without horns are to be preferred, because they require less room at the rack, are less liable to wound others, or to be wounded themselves in fighting, and they do no injury to the rest of the flock, or to the ewes with young. The lambs particularly, which come of them, have smaller heads, than those of the horned rams, and are less painful to the ewes, while yeaning; but in places, where sheep are enclosed within hedges, those with horns are to be preferred, because they prevent them from going through them, thereby losing their wool.

Q. At what age are rams in condition to get good lambs?

A. From eighteen months to eight years of age: at three years old, they are the most vigorous. When rams from 18 months to two years are to be put to ewes, the strongest should be chosen: at six months, they are able to smear the ewes, but not having acquired their full growth, they will produce only feeble lambs; after eight years they are too old for service.

Q. How many ewes should be given to one ram?

A. It is proper to put more ewes to a young vigorous ram, than to such as are old and feeble: it is said, that a good ram can serve fifty or sixty ewes; but to preserve a ram without weakening him, and to have strong lambs, which do not degenerate from the breed of the ram, it is proper to put him to only fifteen or twenty ewes.*

* This number is too small: there is an instance of a ram, which was by chance shut up with sixty ewes, and he impregnated all of them in one night; therefore taking a mean number, one ram may serve at least thirty or forty ewes.....*Hazard.*

Q. What precaution should be taken, that the ram may give no bad qualities to the lambs, which he begets?

A. It is proper to use such rams only, as are well shaped, healthy, and well covered with wool.

Q. At what age should ewes be put to the ram?

A. From the age of eighteen months, to eight years: at six months, they give signs of heat, and will take the male; but they are too young to produce good lambs, and after eight years are too old: good lambs have been had, from ewes of a more advanced age,* but they are in their prime at four years old.

Q. What are the defects and bad qualities, which ewes may communicate to their lambs?

A. Their size, wool, and many diseases: the lamb partakes of the bad qualities of the ewe and ram from which he comes: it is proper to choose white animals for coupling, or such only, as have their faces and feet marked.

Q. What is proper to be done to increase the size of sheep?

A. It is proper to choose the largest ewes of the flock, and to put them to rams still larger than themselves: from the first generation, the lambs will be larger than their dams, and almost as large as their sires, and sometimes larger.

Q. What evidence is there of this increase in the size of sheep?

* There were ewes at Rambouillet, which were brought from Spain in the year 1786, then two years old, and which produced good lambs in the year 1800, when they were at least 16 years old....*Hazard.*

A. A ram of twenty-eight inches in height was put to some ewes of twenty inches, and the lambs which were produced were twenty-seven inches high.

Q. How can the wool be improved?

A. There are two ways of improving wool, to make it longer and finer.

Q. What should be done to make it longer?

A. The ewes in the flock, which have the longest wool, should be coupled with rams, which have still longer wool; the wool of the lambs, which they will produce, will become longer than the wool of the dams, and sometimes longer than that of the sires.

Q. What evidence is there of this increase, in the length of the wool?

A. Rams having wool of six inches in length were put to ewes having wool three inches; the animals produced from this admixture, had it quite five and an half inches long: it would be difficult to credit this great improvement, if the wool had not been seen and measured.

Q. How can wool be improved in fineness?

A. Ewes, which have the finest wool of the flock, intended to be improved, should be selected and put to rams, which have wool still finer. The produce of the two will have finer wool than the dams; and sometimes as fine, and even finer than the rams.

Q. What proof is there of this improvement in the fineness of the wool?

A. Rams having fine wool were put to ewes having coarse, and the wool produced from the lambs obtained a quality between the two. Ewes with

middling wool being coupled with rams having superfine, their lambs had fine wool. Sometimes the wool of the lambs has exceeded in fineness that of the rams, which begot them.

Q. What breed of sheep has been improved by these means, and to what degree of fineness?

A. The English breed, and that of the northern departments, of the Cote d'or, of the eastern Pyrenees, and of the kingdom of Morocco, have been made to produce superfine wool, by rams from the eastern Pyrenees, without the aid of Spanish rams.

Q. Can proof be given of so important an improvement?

A. There are convincing proofs of these facts, in a flock of three hundred sheep of different breeds, which produce superfine wool, although they originally came from ewes with coarse wool, and for the most part hairy (jarreuse;) these ewes were coupled with rams from the department of the eastern Pyrenees. The flock thus improved is in the department of la Cote d'or, near the city of Montbard.

Q. Had the improved lambs been better fed, or taken care of, than their sires?

A. They had not been better fed, but had been kept in the open air, night and day, during the whole year, instead of being shut up in stables.

Q. How can the quantity of wool be increased?

A. To increase the weight of the fleeces, it is necessary to have rams, which produce more wool than those of the flock, whose fleeces it is meant to im-

prove; the fleeces of the lambs, will in such case, be in proportion to those of their sires.

Q. What proofs are there of this increase in the quantity of wool?

A. The following experiments were made in a canton, where the pastures are poor; and the wethers and rams afforded fleeces weighing only a pound, or a pound and a quarter, and those of the ewes only three quarters of a pound of wool, washed on the sheep's back before shearing. These ewes were put to rams, which produced about three pounds of wool; their lambs the second year had from two pounds to two pounds and an half of wool.

A ram from Flanders, whose fleece weighed five pounds ten ounces, having been put to a ewe from the department of the eastern Pyrennes, which had only two pounds, two ounces of wool, produced a male lamb, which in the third year had five pounds four ounces and six drachms of wool: this ram had been well fed; for it cannot be expected, that sheep can have heavy fleeces with poor pasture, and little fodder.

Q. Can ewes, having hairy wool (*jarreuse*) be made to produce lambs, which have no *jarre*.*

A. If a ewe in a middling degree hairy (*jarreuse*) be coupled with a ram having no *jarre*, their lambs will have no *jarre*: if the ewes have a great deal of *jarre*, the lambs will also have some of it, but less in

* The French use the word *jarre* to designate a coarse hairy wool, which has the singular property of not receiving the dye when manufactured: it is considered the worst wool in France, and is used only in the coarsest manufactures

quantity : if this lamb, being a female, be coupled afterwards with a ram without jarre, their lamb will have none of it. Many experiments of this improvement have been made, by coupling hairy ewes with rams having no jarre.*

Q. Can the melioration of a flock of sheep be sooner or more profitably made, by purchasing high priced rams ?

A. Of all the methods of meliorating a flock of sheep, the most perfect rams improve one the fastest, and afford the most profit. Money should not be spared to obtain rams from a distance : an improvement in the size of the sheep, and in the quantity and quality of the wool, may be anticipated from the lambs, which will be produced. It is not surprising, that a ram whose wool was twenty-three inches long, should have sold in England, for twelve hundred francs, fifty pounds sterling : the improvement of flocks of sheep can never be obtained, where good rams do not bear a great price ; it would be proper at least, that they should sell dearer than the finest wethers, for the purpose of inducing the owners of flocks to preserve their best lambs to become rams. If earnest money were given to the owners of sheep, to prevent them from cutting, or selling such lambs as should be reserved ; it would be still better to purchase them

* When the fine wooled sheep arrived at Rambouillet in 1786, a great part of them had jarre : it however disappeared in the after generation : Those which have just arrived, and were lately purchased in Spain, by Gilbert, have jarre, but it will disappear as in the first instance. This fact proves, that without crossing, the jarre may be destroyed by care.

for the purpose of feeding them, until a proper age for use, it would be proper also, for the communes to put good rams to their flocks.

Q. Why are good rams more necessary than good ewes, for the improvement of a flock.

A. A ram produces every year, at least, fifteen or twenty lambs,* whilst a ewe has commonly but one; fifteen or twenty times more ewes would be required to procure the same improvement.

Q. Can a breed of sheep be improved without incurring expense?

A. Expense may be avoided, but much time is required: melioration is made by degrees: if the best male lambs are selected every year, to become rams, when of a suitable age, and the best female lambs chosen to be put to the rams so selected, each generation will be better than the preceding, but the progress will be slow.

Q. Are there other means of sooner improving a flock of sheep, and attended with little expense?

A. A ram from a better breed, than that intended to be improved, should be purchased; such rams may be found in the neighbourhood, and cannot cost much: if it is required to go further for them, it is still not expensive; much time is thereby saved, because the rams having qualities superior to the best ewes, selected from the breed intended to be improved, and coupled with them, produce lambs of a better quali-

* The increase from rams, as above stated, was at least double the above estimate...Hazard.

ty than if they had come from rams of the same breed with their dams.

Q. Can the melioration of a breed of sheep be sooner procured at a greater expense ?

A. If rams of the best breed in France, or foreign countries, could be procured, the expense would be greater, but the improvement more rapid. The rams having better qualities, than those, which might be had at less expense, nearer home, will sooner perfect the breed, with which they may be coupled.

Q. Are the lambs, which come from ewes of an inferior quality to the rams, always superior to their dams ?

A. They are not equally so : there is much difference in the degree of improvement, and this difference depends on the health of the rams, ewes, and even on that of the lambs, on the quantity and quality of their food, on the season, from being more or less cold or rainy, and on other circumstances, which may cause the lambs to degenerate, instead of improving ; but the improvement does not fail, unless impeded by unfortunate events.

Q. What is proper to be done, to continue the improvement of a breed of sheep, from one generation to another ?

A. Select the best ewes from the first generation, and couple them with the ram, which has produced them ; if a more perfect ram can be had, he ought to be preferred. Conduct in the same manner with every successive generation. The same ram should not be used for more than two or three generations,

nor changed for another, unless he may be as good, or better?

Q. When a breed of sheep is improved to the extent wished for, how can it be preserved in the same state?

A. The flock should be well lodged and fed, and its diseases seasonably cured or prevented, if possible; proper care should be taken to couple the best rams and ewes, as well for size, quantity and quality of wool, as for good health; for nothing beneficial can be expected from ewes, and especially from rams, which are feeble, and in bad health.

Q. When a breed of sheep has been improved in one district or country, how can it be extended to others?

A. Rams and even ewes of the improved breed should be procured to *establish* them in the different districts.

Q. Is it necessary, that ewes as well as rams should be obtained, to propagate an improved breed, from a distance, or from a foreign country?

A. The expense would be greater than if the rams only were procured: it is true, time might be gained thereby, and the perfect breed would be had at the first generation; but there would be more hazard of the success of the undertaking, than if the rams were procured without the ewes; because it is essential that the rams, and even the ewes and their lambs, should find nothing hurtful in the situation, to which they are conducted: on the contrary, by coupling foreign rams with the ewes of the place, there is no risk but of the

rams; the lambs which would come from this admixture, would have their constitutions half formed to the country, through their dams, which belong to it.

Q. At what age, and in what season ought sheep to journey?

A. The best age for driving them a journey, or to a distance, is at a year old, when they have nearly obtained their growth; the best season is, when it is neither too hot nor too cold, and the earth is neither frozen nor wet: there should be grass on the road to serve them for pasture, and the ewes should not be with young, nor suckle their lambs. These considerations premised, the most favourable weather should be taken, having regard to the distance, and the country through which the sheep are to pass.

Q. How ought sheep to be managed in going from one part of the country to another?

A. They should be driven slowly, without heating or fatiguing them; should be allowed to rest in the middle of the day when it is hot, and to feed while travelling: when these animals have reached their destination to be put up for the night, fodders should be given them, if their bellies are not sufficiently full, and oats should be given to strengthen them: they can travel four, five, or six middling leagues every day; but if they appear fatigued, time should be given to rest them.

Q. How are sheep made to eat fodder, when there are no racks?

A. Several bundles of hay should be tied together by a running knot, and hung up at the height of the

sheep: they will surround the fodder, and as the hay is consumed, the knot tightens, and prevents the remainder from falling.

Q. What precautions should be taken, when sheep are first introduced into a country new to them?

A. If they do not come far, little precaution is necessary; but if they are taken from a distant country, information should be had in regard to the manner of feeding and conducting them to pasture, and care should be taken to manage and feed them in the same way. If some change is necessary, it should be done gradually, and with prudence.

NOTE.

It may be observed by the rules contained in this chapter, that the custom of leaving the rams in the flock is very prevalent, and Daubenton contends against separating them from it, even when it may be apprehended, that the coupling will take place too early; it must be said, that this custom, however prevalent, is a bad one. The rams weary the ewes both before they grow warm, and while they are with lamb, and often make them lustful. There are always more barren ewes and miscarriages in the flock, where the rams continue with the ewes the whole year, than where they do not. The rams themselves are much more fatigued, and grow old faster, than when kept apart. This management is indispensable, especially in a flock of fine woolled sheep, or in one intended to be improved, and the practice has now become general. If it requires an additional expense, the owner of the flock is indemnified by the longer continuance of the animals; and by the annual increase of the number of lambs....*Huzard.*