

TREATISE
ON
MERINOS
AND OTHER SHEEP,

WITH PLATES.

RECENTLY PUBLISHED AT PARIS,
BY ORDER OF THE GOVERNMENT,

COMPILED BY

MR. TESSIER,

INSPECTOR OF THE RAMBOUILLET ESTABLISHMENT
AND OTHERS, IN FRANCE.

CONTAINING
THE METHOD OF FORMING GOOD FLOCKS,
OF INCREASING THEM,

And of treating them properly both when healthy and when diseased.

FOLLOWED

By documents, extracts, and short explanatory notes, not contained in the original, which were deemed necessary to make this important work complete, and to render it more instructive to the Agriculturalists of the United States.

TRANSLATED FROM THE FRENCH,

AND DEDICATED TO THE

AGRICULTURAL SOCIETIES OF THE
UNITED STATES.

CONTINUOQUE GREGES VILLIS MOLLIBUS ALBOS.—Virg. Georg.

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...ome a Manufacturing as well as
 ...s perceived how great an injury
 she sustained by being dependent upon foreigners for all the
 fine wool which she employed, and it was well understood how
 great would be the advantages which she must derive from the
 production of it within herself. This subject occupied the
 serious attention of *Colbert*, whom nothing escaped which
 might tend to the advantage and greatness of his country.—
 He projected a change in the system which prevailed. Suc-
 ceeding ministers attempted, without effect, to put his design
 in execution. It was not until the year 1766 that *Daniel-
 Charles de Trudaine*, an able minister, employed the surest
 means of succeeding, and of thus freeing the kingdom from the
 tribute which it paid to procure fine wool. After his death,
 his place was supplied by his son, who followed the plan laid
 down by him. *Daniel-Charles de Trudaine*, had addressed
 himself, not to cultivators of land, whom narrow views and
 prejudices are too apt to deter from adopting whatever they
 have not seen practised by their forefathers, but to *Daubenton*,
 an able naturalist, who instantly perceived the possibility of
 what was proposed, and proved it by satisfactory experiments.

In 1782, having acquired information sufficient to be useful
 to others, *Daubenton* published a volume entitled *Instruction
 pour les bergers et les propriétaires des troupeaux*: it was
 written in the form of question and answer. This work, being
 within the reach of every capacity had great success. Several
 treatises on sheep had already appeared; but no person had
 before composed an elementary work, containing plain direc-
 tions, and proving that by attention and zeal great profits
 might be derived from the propagation and improvement of
 the breed of sheep.

The author himself, in 1794, gave an abridgment of his
 book, having reduced it to half its original size. In 1802 the
 entire work of *Daubenton* was reprinted, at the expense of the
 government, under the direction of *Mr. Huzard*, a member of
 the Institute, who added very useful notes to it.

Daubenton's work was very interesting, as he shewed
 that, by coupling sheep chosen from the finest French breeds,
 there was a certainty of improving them; but it became insuf-

ficient when it was known that
like to ensue by substituting Spa
persons even thought that all co
way from the flocks, and none ad
tions were wanted with respect to
tending these animals. There was at that time a board of
agriculture, which, having been part of one of the executive
commissions, was attached to the interior department. This
board deemed it necessary to compose a work exhibiting the
most proper means of securing the propagation of Spanish
sheep. The compilation of it was entrusted to *Gilbert*, one of
the members of the board, and a professor in the veterinary
school of Alfort, a man of an ardent mind and animated by an
eager desire for the welfare of his country. All that he wrote,
before being printed, was submitted to the judgment of his
colleagues, and discussed in their meetings. The first edition
was printed in 1797, and a second in 1799; both of the same
size with the larger work of *Daubenton*. This work was
equally well received by the public with that of *Daubenton*;
as it afforded instruction to those who were desirous of pro-
curing merinos and of propagating the breed.

These two editions, which the government caused to be dis-
tributed gratis, being expended, the minister of the interior
induced *Mr. Tessier*, a member of the Institute, a cele-
brated agriculturalist, and inspector of the Rambouillet and
other establishments in France, to publish a new edition
of the work, in which the knowledge obtained since the pub-
lishing of the former editions might be imparted to the pro-
prietors of flocks and to such as were desirous of rearing them.

This task was not free from difficulty; and it required a
man of *Mr. Tessier's* abilities to perform it properly.

Such is the work which the editors hasten to present to the
agriculturalists of this country. It is followed by documents,
extracts and short explanatory notes, not contained in the ori-
ginal, which were deemed necessary to render this important
work more instructive to the agriculturalists of the United
States.

The method pursued by *Mr. Tessier*, as he himself remarks,
is agreeable to the very nature of things.

“After some remarks upon the principal breeds of sheep,”
says he “I explain the characteristics of one of them, viz.
of the breed of true merinos, the particular object of this work;

I mention the use which may be made of them to form flocks of a mixed or of a full breed, and show how the greatest advantages may be derived from them. All these articles might be considered as a first part.

“ In what follows, I give details on copulation, yeaning, the attentions requisite in sheltering sheep, on their food, the manner of pasturing them and of conducting them in journeys, also on what relates to shearing, to the fleeces, the wool, the cleaning of the wool*, the trade which is made of them, and the sale of the animals. I should call the articles which treat of the above objects the second part.

“ I then enter into a detail of the diseases to which merinos, like other sheep, are subject ; of the modes of treatment, and especially the methods of prevention. This part is at least as large as either of the others. It appeared to me so useful to give agriculturalists information on this important point, that I have endeavoured to omit nothing which is essential for them to know.

“ I have added, at the end of the work, an article relating to shepherds, a class of men without whose care and skill it is impossible to have good flocks. I have even shown the method of training dogs of a proper kind, in order to facilitate the leading of sheep to pasture and during a journey.

“ Throughout this treatise, I have endeavoured to unite perspicuity and simplicity ; qualities which are peculiarly proper in works of this kind. If I have attained this end, or if I have made a near approach to it, I shall have satisfied the desire which I feel of meeting the views of the Minister by whom I have been entrusted with the performance of this work.”

The judicious reader will be convinced by the perusal of *Mr. Tessier's* work that its learned author has fully attained the end which he had in view. His treatise is complete ; and we do not doubt that it will entitle him to the thanks of the agriculturalists of every country.

* In French this is called *dessuintage*.

To reduce Paris Long Measure to English.

The Paris royal foot of 12 inches	=	12.7977	} <i>English inches.</i>
The inch	=	1.0659	
The line, or twelfth of an inch	=	.0888	
The twelfth of a line	=	.0074	

New French Measures Weight.

ENGLISH GRAINS.

Milligramme = .0154

Centigramme = .1544

Decigramme = 1.5444

Gramme = 15.4440

Decigramme = 154.4402

Hecatogramme = 1544.4023

Kilogramme = 15444.0234

Myriogramme = 154440.2344

AVERDUPUIS.

Poun. Oun. Dram.

Decigramme = 0 0 5.65

Hecatogramme = 0 3 8.5

Kilogramme = 2 3 5

Myriogramme = 22 1 2



TREATISE ON SHEEP,

BY MR. TESSIER.

OF THE DIFFERENT BREEDS OF SHEEP, AND PARTICULARLY OF MERINOS.

AMONG the animals which ruminates, SHEEP form a very interesting class ; which class is divided into several distinct races ; the number of which may be reduced to seven ; viz :—

1. *The African Race.* It is without horns, of a tall make with an upright forehead, a head that projects a great deal, and short hair : under its throat it has a dewlap, and on its neck a mane, in which grow tufts of wool which successively fall in order to make room for others.—Three sheep of this kind have been kept at Rambouillet.*

2. *The Arabian Race.* It is found at the Cape of Good-Hope, in the country of the Hottentots, also in Egypt, whence the French army brought several to France. Its tail is thick, broad and heavy, but is terminated by a part no larger than an ordinary sheep's tail ; in this respect, this race differs from all the following. Some of these sheep are to be seen in the gardens of the Museum of Natural History in Paris, and at the Veterinary School of Alfort.

3. *The Race of Crete or Candia.* Its wool is undulated, its horns are straight and incircled by a spiral groove ; it is called *Sterpsiceros*.

4. *The Indian Race,* imported by the Dutch into Europe. It is remarkable for its height and for the length of its body. The ewe produces, every year, several lambs. The Dutch placed them in the Texel and in Flanders ; so that the sheep of this race are called, *Sheep of the Texel, Flemish Sheep.*

* I attempted, by means of these animals, to ascertain in how many generations, by crossing Spanish sheep with an African ram, the wool becomes hair, thus making an experiment the inverse of that of *Daubenton*. Mine, however, could not be completed.

5. The *Race* of the Feroe islands, Iceland and Norway.— It is very small, wild and lives in the midst of snows; its fleece has silken filaments, others resembling hair, and others of the quality of common wool.

6. The *Indigenous Race of France*, which may be divided into several varieties. It is not tall like the Flemish breed, nor diminutive like that of the north, but between the two, and has ordinary wool. Habit teaches to distinguish all its varieties; for instance, the *Roussillonne*, the *Berichonne*, the *Ardennaise*, the *Beauceronne*, the *Normande*, &c. all of which have distinguishing marks.

7. The *Merino Race*, known by the name of *Spanish sheep*. It is the most esteemed because it possesses properties which render it superior to the others; of this race in particular, I purpose to treat in the following work, although the instructions which shall be given may be equally applied to other sheep.

A persuasion prevails in France that the Merinos came originally from Africa; no satisfactory proofs however, can be given of the truth of this opinion. All that we know is, that they have a long time existed in Spain. We have imported them from that kingdom.

The merino is a distinct breed among sheep; as in the class of dogs, the Danish dog, the greyhound, the shag-dog, the lap-dog, &c. and, in the same manner as among dogs, the cross-breeds may afford individuals more or less approaching to the species, but never the species itself.

Its size, in Spain, when compared with other breeds, is neither the largest nor the smallest, but middling. From the extremity of the forefoot to the withers, it measures from 20 to 25 inches; in its greatest circumference, 3 feet and some inches; from the top of the head to the origin of the tail about 3 feet; so that its circumference is nearly the same as its length. when alive, it weighs from 30 to 40 kilogrammes; in equal bulks, it weighs more than most sheep of the common breeds; the rams are larger than the ewes.

In France, all these dimensions increase, according to the distance of time from the period of importation of these sheep, and in proportion to the care bestowed upon them and the quality of their food: a hoggit of eight months weighed 40 kilogrammes, and a too-toothed teg, 72 kilogrammes and a

half; both raised in the pays de Caux, a department of the lower Seine.

The shape of the merino is rather round; its face is broad and not upright; its back is not arched; its body is broad; its legs are short: some have dewlaps like that on the neck of a stag; some have their cheeks, the lower part of their under jaw and their forehead entirely covered with wool, which sometimes extends to the eyes; some also have folds upon their shoulders, their buttocks and neck.

The males have large hanging testicles, separated by a longitudinal crease very strongly marked; they have thick broad horns, twisted in a spiral form and of great length: I have seen horns of this description which measured across from the extremity of one to that of the other, 20 inches; the length of each, measured along its windings, was 2 feet. All have not horns: those which are without them do not form a distinct species, for experiments made during several years at Rambouillet and Perpignan, have taught us that if rams without horns produce rams without horns they also produce such as have horns, for which reason, the want of them should be considered merely a *lusus naturae*. Mr. Ollivier, who superintends the imperial establishment of the eastern Pyrenees, says that rams without horns may with certainty be obtained, if, during several generations, rams which have none be put to ewes the issue of rams in the same situation. I do not warrant this assertion; experience alone must decide. Some ewes also have horns, but they are small.

The wool of the merino is what principally distinguishes it; this wool is very fine, abundant, soft to the touch, very greasy, thick, somewhat spiral, elastic, not so long as that of the common breeds, and of a dirty and brownish white, occasioned by the dust and filth which adheres to it. The whole body of the animal is covered with wool, except the arm pits, the flat part of the thighs and a part of the face. The young ones, especially those of the second year, have it to the extremity of their feet. The skin beneath the wool of such as are healthy is of a rose-colour. It often happens that in sheep newly imported, one may perceive among the filaments of the wool, particularly on the cheeks, the top-knot, the buttocks and thighs, shining hairs of a bright gray, which are called *jarre*, or *dog's hair*: in France, careful proprietors cause these hairs to disappear, by preventing the copulation of such males or females as have them. This hair must not be confounded with that sort of down which often appears on new dropped

lambs even of the finest breed; when they are two or three months old, this down disappears and is succeeded by fine wool; those which had the most of it are commonly the best sheep.

By means of the above characteristic, it is easy to distinguish a merino from a common sheep: but there is no way of distinguishing it from a mongrel of the fourth or fifth generation; the exterior resemblance is so perfect, that a person who wishes to be assured of a creature's being full-blooded must not trust to inspection alone.

The merino ewe may live twenty years, and even longer.—Such longevity is rare; many reach fifteen years, and continue to bear young all the time. The ewe commonly produces a lamb each year; sometimes she yields two at once; the ram might, with care, be employed an equal numbers of years, but there is more advantage in making use of none but those which are young.

If merino rams be castrated while quite young, and if they be fed in good pastures, their meat becomes excellent, and differs from other mutton only in being not quite so brown.—These animals are also capable of being made very fat and of producing good tallow. These facts were disputed upon the first introduction of merinos into France*, but they have since been established by experience.

Flocks of a single cross.

Crossing the breed, was the first method which presented itself to improve the wool of our sheep; *Daubenton* started the idea and proved its utility; this mode was simple, easy, expeditious and economical. The existing flocks were not destroyed; on the contrary, they were preserved and made use of, and they were improved; all that was done, was to employ rams in covering that bore fine wool, in place of those whose wool was coarse. At first, people chose the best they could find in their neighbourhood; afterwards they went farther, without however going out of France; at length the government stepped in to the aid of private exertion, which it favoured by the introduction of flocks of merinos, and especially by that of *Rambouillet*,

* The butchers at first rejected even the mixed breed, in order to get them cheaper; now they buy them without hesitation, and at a greater price than they give for common sheep, if they buy them when their wool is long.

which was almost the first nursery, or at least the most productive, whence were taken those precious germes which have given life to our rural affairs.

I shall not mention the obstacles which were to be overcome before we could arrive at our present state of improvement, the difficulties which were presented by prejudice, habit, prepossession against every innovation, personal interest and dishonesty. As the evil becomes more distant, it should be forgotten, and the succeeding benefits alone attended to. When a great change is to be brought about, one must expect to meet with impediments.

The first improvers, on seeing the good effects of their crossings, which produced finer rams than those of the native breeds, were induced to employ them for covering, through motives of economy and because they hoped in this way, to be making continual improvement. Several generations were thus benefitted ; but what had been almost a matter of necessity in the beginning, on account of the scarcity of merino rams, which were not sufficiently numerous to answer the demand for them, has eventually become a real evil ; a belief prevailed that at the fifth, fourth, or third mixture, according to the breeds, rams issued from cross-breeds might be regarded as full-blooded, as true merinos ; they were made use of and sold accordingly.— This opinion, which appeared plausible in the infancy of improvement, but which it would be unpardonable to maintain now, spread itself with great rapidity ; it was entertained by *Daubenton* and *Gilbert* : the former said it was of little importance from what country rams came, provided their wool was finer than that of the ewes which were to be crossed ; the latter, actuated chiefly by the desire of seeing our coarse wool disappear, paid little regard to the disadvantages resulting from putting ewes with rams of a mixed breed. The error took deeper root from the authority of these two able men. It gained still farther credit by the beauty of the wool produced by the breeds which had been several times crossed, and by the resemblance of their form to that of merinos. It would have been better to suffer the improvement to advance more slowly than to endeavour to accelerate it by a method calculated in reality to retard it. It was therefore necessary to attack this opinion, and to oppose the proprietors of mixed breeds, in order to prevent farmers, upon whom they imposed, from buying their rams. The result has been, that the former, in consequence of their too great haste to become gainers, have no longer any confidence reposed in them, and that many persons have begun anew to cross their breeds by procuring full blooded rams from places where they are to be had with certainty.

It is known that, in the animal kingdom, the influence of the males upon the offspring is generally very great; it is particularly remarkable in the breed of merinos. Although in the union of the two sexes the male and the female both contribute to the formation of the foetus, yet the first generations possess, in a more striking manner, the characteristics of the male.— If it be wished to continue a remarkably good breed, care must be taken to choose, for copulation, no rams but such as possess the qualities which it is wished to perpetuate; by employing mongrel rams to cross common ewes, a breed will be obtained which, after becoming much more beautiful than that of the original ewes, will remain some time stationary, and will then degenerate; the influence of these dams, though long counteracted, will sooner or later be visible, and degeneration will be the consequence of it, because the rams produced by these crossings have in their blood a germe of maternal *baseness* which will by degrees display itself.

It is certain that offspring frequently, indeed commonly, resemble their progenitors more than their parents. The number of merino rams at present in France is so considerable as to render it inexcusable to prefer mongrel rams to them; whatever their price may be, it is far below the profits which they afford; it is known that a single male is sufficient for many females.

In order to make a good cross-breed, a sufficient number of merino rams must be chosen: in Spain, the proportion generally is one ram to fifteen ewes; in France, three to a hundred. The quality and number of the young which they produce, prove that more are not requisite. When in this proportion, they do not fatigue themselves and they may be preserved a long while. As to the ewes, the best must be taken from that domestic breed to which the preference is given: the wool of all the different breeds may be brought to the highest perfection; but some require a shorter and some a longer time*. The breed of Roussillon is that, among the French breeds, which attains perfection in the fewest number of generations; in the third, its wool is as fine as that of merinos. I place in the second rank the breeds of Berry, Solange and Ardennes.— Their wool is thin, and the fleeces of the cross-breeds obtained

* In order to determine in how many generations and in how many years the wool of the different French breeds might be changed into very fine wool, experiments were set on foot by the Commission of Agriculture, first in Raincy park; they were continued at Sceaux, then at the menagerie of Versailles; they have since been removed to the veterinary school of Alfort, where they are still continued.

from them are not so heavy as those of several breeds whose wool is coarser; they are small, which is another disadvantage. Whatever economical calculations one makes, whatever breed of ewes one chooses, one should always, in beginning a cross, take the finest and healthiest individuals, from three to four years old. If a person desires to cross the breed of that part of the country in which he lives, and chooses sheep from among the flocks in his neighborhood, he has the advantage of being sure that the creatures conceal no latent disease, because he is already acquainted with them.

It is not uncommon in one generation, to have young sheep equal or nearly equal in beauty to their merino sires, not only as to the fineness of their wool, but also as to the shape of their body.

This however, is only an exception which does not destroy the rule. The great mass of lambs produced in this first cross, has only a certain degree of fineness, which increases in each succeeding generation, and its shape does not become perfect until the mixture has been repeated for several generations.

Care should be taken to castrate all the males of the mixed breed before they are able to get young, and to put the females to full-blooded rams. I repeat it, that without this care, the improvement of the breed will be retarded.

I before observed that this method of improving the breed of sheep, by means of crosses, was simple, easy, expeditious and cheap. It has now been seen how simple and easy it is, since all that is requisite, is to procure some merino rams, and among the native breeds to choose the handsomest and best ewes. The expedition and cheapness of this method may easily be shown. In fact, the benefit begins the first year, on account of the increased value of the lambs; to this profit must be added, the following year, that of the wool of the antenois.* This twofold gain becomes afterwards still greater, by the continual improvement in the quality of the sheep and of the wool. The acquisition of a few merino rams and of a flock of one of the native breeds, is not above the means of the poorest farmers.

Progressive Flocks. (Troupeaux de progression.)

I supposed, in the preceding article, that the proprietor of a flock of common ewes, bought only some merino rams, to

* In their second year, the animals are called *Antenois* by the French.

make a cross by uniting them with the ewes. In this way however, though great advantages result from it, he can have only a mixed breed; thirteen years must elapse before all his ewes are of the fifth generation, which time is necessary, if all the ewes with which he began the cross were of a breed which bore very coarse wool; only eleven or nine years are required if he employs breeds which already have a degree of fineness. At the end of this time, he doubtless enjoys a profit; but his stock is not yet become very valuable, because the price of the mixed breed is much below that of merinos. He is obliged, during that time, to renew his rams two or three times, for which he must pay dear, if he is at a distance from full-blooded flocks.— A more lucrative method would be, to form a *progressive* establishment, that should enable him to take his rams from his own stock, and to form gradually an entire flock of merinos.— This method, of which I am about to speak, has been perfectly well explained by Mr. *Morel de Vindé*, a correspondent of the Institute, in a tract upon the means of rendering general in France flocks of merinos. The operation is as follows.

Suppose a farmer has three hundred ewes of a common breed; let him buy, in order to cross them, a sufficient number of merino rams, and at the same time some females of that fine breed, suppose twelve or eight or even four. The capital required for this latter purchase will not exceed the price of the rams which he would be obliged to procure, in order to keep up his stock, if he followed the above described method of simply crossing the breed. By employing the mode here recommended, his flock, during the first years will be composed of two classes, 1. of male and female merinos, produced by the full-blooded rams and ewes; 2. of males and females of a mixed breed, issued from the union of merino and common sheep. His first care must be, without fail, to castrate all the males of a mixed breed, in order to sell them as wethers; he must for some time keep the females of the common and mixed breeds, and get rid of them gradually, beginning with the common breed and the mixed breed of the first degree, in proportion to the increase of the full-blooded breed. From among the rams produced by the full-blooded ewes and a full-blooded ram, let him choose the finest for covering, and dispose of the rest, either by selling them in the state of rams, or by making wethers of them. When the number of his female merinos amounts to three hundred, there is no longer to be found in his flock any sheep of a mixed breed

In order to obtain this result, eleven years will be requisite, if the proprietor begins with twelve merino sheep; twelve, if

to be reformed each year,

EXPLANATION

OF

THIS TABLE.

of the Flock
at the end

900. 1. The reforms, the sale of the lambs, and the amount of the flock at the end of each year, are easy to be found ; because all that is necessary is to cast one's eye on the respective columns.

1,073. 2. As to the amount of the flock at the end of each year, it is composed in the following manner: of the lambs of the present year ; of the thaives ; of the ewes of three years old and upwards. Example, taken at the end of the ninth year: 2,077 animals ; viz. 10 lambs of the 5th. degree ; 168 lambs of the 4th ; moreover, 40 thaives of the same ; 12 ewes three years old of the same degree. For the 3d. 392 lambs ; moreover, 164 thaives ; 125 ewes three years old ; 76 four years old ; 32 five years old ; deducting 20 reformed.—

2,077. For the 2d. degree, 258 lambs ; moreover 154 thaives ; 160 ewes three years old ; 160, four years old ; 150, five years old ; 126, six years old ; deducting 82 reformed. The whole stock of the first degree being extinct, it cannot here be taken into account.

TABLE shewing the Propagation of a flock of 500 Ewes of a common race, crossed by Spanish Rams, during nine years, supposing one fifth of the Ewes to be reformed each year, and deduction being made each year of a fifth of the Lambs for losses and accidents.

YEARS.	1st. DEGREE.		AMOUNTS		of Ewes of the 1st degree.		2d. DEGREE.		AMOUNTS		of Ewes of the 2d degree.		3d. DEGREE.		AMOUNTS		of Ewes of the 3d degree.		4th DEGREE.		AMOUNTS		of Ewes of the 4th degree.		5th DEGREE.		AMOUNTS		EXPLANATION OF THIS TABLE.				
	NUMBER of remaining ewes, of the common breed, bearing young.	LAMBS. males.	SALE of male Lambs of the preceding year.	of the year. and those preceding.	REFORM	of the year. and those preceding.	NUMBER of remaining Ewes of the 1st degree, bearing lambs.	LAMBS. males.	SALE of male Lambs of the preceding year.	of the year. and those preceding.	REFORM	of the year. and those preceding.	NUMBER of remaining Ewes of the 2d degree, bearing Lambs.	LAMBS. males.	SALE of male Lambs of the preceding year.	of the year. and those preceding.	REFORM	of the year. and those preceding.	NUMBER of remaining Ewes of the 3d degree, bearing Lambs.	LAMBS. males.	SALE of male Lambs of the preceding year.	of the year. and those preceding.	REFORM	of the year. and those preceding.	NUMBER of remaining Ewes of the 4th degree, bearing Lambs.	LAMBS. males.	SALE of male Lambs of the preceding year.	of the year. and those preceding.		REFORM	of the year. and those preceding.	NUMBER of the sales of Lambs made in the course of the year.	of the reforms made at the beginning of each year.
1st.	500.	200.	200.	-	900.	900.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	900.			
2d.	100.	400.	155.	155.	200.	710.	910.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.	200.	910.	
3d.	90.	310.	121.	121.	155.	558.	913.	200.	80.	80.	-	160.	160.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90.	155.	1,073.	
4th.	62.	248.	100.	100.	124.	448.	887.	40.	315.	126.	126.	80.	252.	332.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102.	204.	1,219.	
5th.	48.	200.	80.	80.	100.	360.	876.	63.	376.	150.	150.	126.	300.	506.	-	80.	32.	32.	-	64.	64.	-	-	-	-	-	-	-	-	121.	226.	1,446.	
6th.	40.	160.	64.	64.	80.	288.	872.	75.	400.	160.	160.	150.	320.	660.	16.	190.	76.	76.	32.	152.	184.	-	-	-	-	-	-	-	-	131.	262.	1,616.	
7th.	160.	-	-	-	-	-	-	80.	400.	160.	160.	160.	320.	836.	38.	312.	125.	125.	76.	250.	358.	-	32.	12.	12.	-	24.	24.	-	278.	236.	1,218.	
8th.	-	-	-	-	-	-	-	80.	384.	154.	154.	160.	308.	984.	62.	410.	164.	164.	125.	328.	555.	6.	102.	40.	40.	12.	80.	92.	-	148.	297.	1,631.	
9th.	-	-	-	-	-	-	-	73.	311.	129.	129.	154.	258.	1088.	82.	488.	196.	196.	164.	392.	769.	20.	207.	84.	84.	40.	168.	220.	-	175.	358.	2,077.	
																														1,145.	1,938.		

1. The reforms, the sale of the lambs, and the amount of the flock at the end of each year, are easy to be found; because all that is necessary is to cast one's eye on the respective columns.

2. As to the amount of the flock at the end of each year, it is composed in the following manner: of the lambs of the present year; of the thaires; of the ewes of three years old and upwards. Example, taken at the end of the ninth year: 2,077 animals; viz. 10 lambs of the 5th degree; 168 lambs of the 4th; moreover, 40 thaires of the same; 12 ewes three years old of the same degree. For the 3d. 392 lambs; moreover, 164 thaires; 125 ewes three years old; 76 four years old; 32 five years old; deducting 20 reformed. For the 2d. degree, 258 lambs; moreover 154 thaires; 160 ewes three years old; 160, four years old; 150, five years old; 126, six years old; deducting 82 reformed. The whole stock of the first degree being extinct, it cannot here be taken into account.

No.	Date	Description
1	1880	...
2	1881	...
3	1882	...
4	1883	...
5	1884	...
6	1885	...
7	1886	...
8	1887	...
9	1888	...
10	1889	...
11	1890	...
12	1891	...
13	1892	...
14	1893	...
15	1894	...
16	1895	...
17	1896	...
18	1897	...
19	1898	...
20	1899	...
21	1900	...
22	1901	...
23	1902	...
24	1903	...
25	1904	...
26	1905	...
27	1906	...
28	1907	...
29	1908	...
30	1909	...
31	1910	...
32	1911	...
33	1912	...
34	1913	...
35	1914	...
36	1915	...
37	1916	...
38	1917	...
39	1918	...
40	1919	...
41	1920	...
42	1921	...
43	1922	...
44	1923	...
45	1924	...
46	1925	...
47	1926	...
48	1927	...
49	1928	...
50	1929	...
51	1930	...
52	1931	...
53	1932	...
54	1933	...
55	1934	...
56	1935	...
57	1936	...
58	1937	...
59	1938	...
60	1939	...
61	1940	...
62	1941	...
63	1942	...
64	1943	...
65	1944	...
66	1945	...
67	1946	...
68	1947	...
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71	1950	...
72	1951	...
73	1952	...
74	1953	...
75	1954	...
76	1955	...
77	1956	...
78	1957	...
79	1958	...
80	1959	...
81	1960	...
82	1961	...
83	1962	...
84	1963	...
85	1964	...
86	1965	...
87	1966	...
88	1967	...
89	1968	...
90	1969	...
91	1970	...
92	1971	...
93	1972	...
94	1973	...
95	1974	...
96	1975	...
97	1976	...
98	1977	...
99	1978	...
100	1979	...

with ten ; thirteen, if with eight ; fourteen, if with six ; and fifteen, if with four. In case a great mortality should prevail and carry off a large number of full-blooded ewes, which rarely happens in flocks that are well attended, it will be necessary to wait one or two years more, to complete the number of three hundred ewes.

We have frequently advised the purchasers of merino rams, when they came for them from a great distance, to take also some ewes of the same race, in order to enable themselves to recruit from their own flocks, and thus to be spared from the trouble of journeys for the purpose of replenishing their stock ; this was but anticipating the useful views of Mr. *Morel de Vindé*.

By following this method of improvement, one may obtain, with a small capital, a very valuable flock and with no greater pains than would be required for one of a different race ; it will be handsome, productive and healthy, in proportion to the care taken by the proprietor to feed and tend it properly and to choose for covering the finest and healthiest rams.

It may perhaps be asked how it is possible accurately to distinguish the different generations. Nothing is more easy, if such marks be made use of as cannot be obliterated. For instance :

The ordinary sheep, without any mark.

The first generation, a hole in the right ear.

Second generation, a hole in the left ear.

Third generation, a hole in each ear.

Fourth generation, without any mark ; for, by that time, all the ordinary sheep have disappeared.

Fifth generation, a hole in the right ear : there are none of the first generation remaining.

Sixth generation, a hole in the left ear ; none of the second generation remain.

Seventh generation, a hole in each ear ; none of the third generation remain.

Eighth generation, without any mark ; none of the fourth generation remain : and so on for any number of generations.

Instead of holes, slits may be made in the ears, and varied in different ways ; the holes are made with a punch. Whatever mark is employed, it ought to be made soon after the birth of the lambs, that no doubt may exist of the dams to which they belong.

It is to be wished that farmers who are able to purchase a few merino rams and ewes would prefer flocks of the nature we have just described to those in which the common breed is merely crossed ; and too much cannot be said to persuade them to apply, for merino rams and ewes, to the establishments formed by the government, or to individuals whose flocks are known to be of a very pure blood. Their success depends upon this precaution.

Full-blooded Flocks.

A flock of sheep composed entirely of the full-blooded race is a stock far more valuable than one of either of the kinds above described ; whenever such a one can be procured, it ought to be done without hesitation. The abundance and quality of the wool, and the intrinsic value of the animals, whatever be the diminution of their price, are powerful and encouraging motives : in no way can money be more advantageously vested, provided the flock be well taken care of by its owner, or committed to the charge of some honest and attentive farmer who will not neglect it.

The circumstances in which France has been placed, have singularly favoured this species of establishment. The desire of proprietors of land to augment their fortune or to repair its losses, the diminution of the interest of money, the low price of corn for several years past, lastly the high price of merinos resulting from a general sense of the advantages which they afford, all these things have excited a desire to have flocks of this breed and to profit by their means.

That has taken place which always takes place when a branch of industry prospers ; on perceiving the gains resulting from the sale of merinos, rich merchants, and associations of private individuals, sent agents into Spain, to bring thence fine-wooled sheep into France. The choice made by these agents was rarely such as it ought to have been ; instead of making their purchases from the flocks distinguished by the beauty of their race and the fineness of their wool, they had recourse, for the most part to smuggling traders who furnished them with animals of an inferior breed : it would however have been very difficult to procure these animals in any other way as the great proprietors of flocks in Spain would not sell, for exportation, any of their spare sheep, and as the laws of the country prohibiting them from being sent abroad were very strictly executed. Before explaining the disadvantages of these furtive acquisitions, I shall mention the different kinds of sheep

found in Spain, and of the migration of those which twice a year change their pastures; these notices may perhaps be useful to undeceive those who think that the sheep which come from that kingdom are all of the same quality.

There are in Spain two principal kinds of sheep, *Transhumantes** and *Estantes*: the *Transhumantes* are divided into the races of *Leon*, *Segovia* and of *Soria*: the *Estantes* are so called because they do not migrate; a part of them contain a mixture of the blood of the transhumante, and consequently have fine wool; the rest are a base breed and carry coarse wool; these latter are called *Churras*. The transhumantes pass the summer in the northern mountains and in winter return to the plains of the south.

On a map of Spain may be traced the routes followed by the sheep which migrate. The leonese breeds, of which is composed the *Cavagne* (great flock) of *Negrete*, which is the most distinguished, after having been stationed during the winter near *Merida* in the province of *Estremadura*, on the left bank of the *Guadiana*, begin their march about the 15th of April, in divisions of from two to three thousand, they pass the *Tagus* at *Alvarez*, and direct their course to *Villa Castin*, *Trescasas*, *Alfaro*, *l'Espinar* and other *esquileos* (houses for shearing), to be there shorn. After this operation is performed, each division sets forward towards the kingdom of *Leon*, to be distributed, in flocks of five hundred, among the pastures of *bervera*, near *Aquilar del Campo*. In this march, the flocks follow each other without any confusion; some remain upon the *Sierra*, a mountain which separates old from new *Castile*.

The *Sorian* breeds remain during winter on the confines of *Estremadura*, of *Andalusia* and of *New Castile*. These flocks begin to move about the end of April, pass the *Tagus* at *Talavera de la Reyna* and at *Puente del Azobispo*, and proceed towards *Madrid*; thence they go to *Soria*, from which place a part enter the neighbouring mountains, and the rest cross the *Ebro*, to reach the pastures of *Navarre* and of the *Pyrenees*.

The most esteemed of the *estante* breeds remain on the sides of the passes of *Guadarama* and *Somo-Sierra*, and in the environs of the *esquileos* which are near *Segovia*.

Of all the breeds of sheep, those of *Leon* are without doubt superior to the rest, in shape, and in the quantity and quality of

* This word, without doubt, is derived from *trans* and *humus*; and signifies, what leaves one tract of country to go to another.

their wool ; and among these breeds of Leon certain shades of difference are found which give to some a superiority over the others.

The difference is very sensible between the leonese and sorian breeds, although the proprietors of the latter are careful to take their rams from the former. The price of sorian is always a third or a fourth below that of the leonese wool ; it has even been remarked that the sale of the sorian wool has diminished since the mixed breeds have been multiplied in France ; our best wool from these breeds greatly resembles the sorian wool.

I am indebted for these details to Mr. *Poufféré de Cère*, who has pursued his inquiries in Spain with equal zeal and intelligence. From what has been said, it plainly appears how much a person who wishes to form a flock of the finest kind ought to be on his guard against those who sell sheep imported from Spain as being of the highest breed.

It is from the races of Leon, either by immediate importations or by propagation from those importations, that the animals have been drawn which compose the establishments of the Government ; viz. that of Rambouillet, of Malmaison (Seine-et-Oise,) of Perpignan (Pyrenecs-orientales,) of Arles (Bouches-du-Rhone,) of Saint-Genet-Champagnelle near Clermont-Ferrand (Pay de Dome,) of Saint-Georges-de-Ronains near Villefranche (Rhone,) of Ober-Emmuel near Freves (Sarre,) of chateau de Palan near Aix-la-Chapelle (Roer,) of chateau de Clermont near Nantes (Loire inferieure,) of Cere near Mont-de-Marsan (Landes).

This circumstance alone, if there were no other motive, ought to inspire the public with full confidence in these establishments and in the animals which are there purchased. The same thing may be said of those which belong to individuals who have been careful to form their flocks of none but fine-wooled sheep which they have procured either from the best Spanish flocks or from the establishments belonging to Government, and which consequently may be safely depended upon.

All that have been smuggled into the country, have been procured from either the estante breeds, or from the sorian race, at the time when the flocks were in Navarre, and as near as possible to France. Any one may easily be convinced of this, if he will reflect upon the uncertainty which there was of success after penetrating farther into Spain, the difficulties attending

the purchase of them, the almost insurmountable obstacles which would have been presented by the revenue officers, and the price which it would have been necessary to pay for the animals. Besides having been taken from inferior breeds they have been driven by forced journeys, not only during the passage through the Pyrenees, but even after entering the Frontiers of France, with a view of increasing the profits and diminishing the expence. On their way they have been scarcely allowed time to take sufficient nourishment; a part of them have died the first and second years, and the remainder have had nothing but abortions; it is only by culling out individuals, by excellent and abundant food, and by purchasing fine rams in the flocks of the breed of Leon, that French proprietors who had procured sorian or estante sheep, have at length become able to offer handsome flocks to public view.

It appears from the above remarks, that all sheep which come from Spain are not of the same quality. At some future period perhaps in France these different breeds, after having intermingled and after undergoing some changes from the mode of treating them, may form a distinct and peculiar race which may in some sort be considered as national. My only object, in what I have now said, is to shew that two different breeds of merinos are found in Spain, and have thence been exported, and that one of these is preferable to the other.

The error therefore which is run into when a flock is formed of sorian or estante sheep, is in some measure reparable. They may be meliorated, as I have said, by rams of the best breed; but this will not be the case if rams of a mixed breed be employed: however pure the females may be to which they are allied, a degeneration is justly to be feared. When we reflect on the fault of those who, by chance or through a mistaken economy, buy sheep from flocks originally ill composed, without examination or inquiry, we can only pity them and regret their want of care.

I have dwelled upon this matter, on account of its great importance and because of the retardment which is in this way generally given to the improvement of the breeds: I thought that it would be rendering a service to agriculturalists to give them all the light possible on this subject.

A flock of merinos, to be in full perfection, should be composed of rams and ewes of from three to five years old; this is the age at which they are chosen when they are bought in Spain: if taken younger, they would with difficulty perform the

journey ; at a more advanced age, the advantages resulting from them would not be sufficiently lasting to defray the expences incurred. At the sales made from the different establishments belonging to government, many purchasers reject the old ewes ; while others prefer them, because their wool is finer ; they are more likely to produce fine lambs ; they are better mothers. The young rams are preferred to the old, because they have more vigour. In both sexes the power of propagating commences before the age of three years, and continues a long time. If the ability to breed began late and continued but a short time, the profits of the proprietor would be too trifling. It is difficult to purchase a sufficient number of sheep of the proper age when one is forming a flock. Neither the Spaniards nor the proprietors of merinos in France sell them so well sorted. If they did so, they would injure their stock, and would have remaining none but inferior animals of which they could never dispose. For the most part, the old ewes alone are offered for sale.

Some persons are in the habit of dividing the ages, and of offering to purchasers a fifth or a fourth consisting of animals of the second year, and of other ages, up to six years ; in this way an equality is maintained in their flocks, and they never have more than a small number of old sheep.

There is no country in Europe in which the merinos do not succeed. They have been tried in all parts of France, in the south, in the north, in the east and in the west, in the plains, in the vallies, on the hills, even on lofty mountains, near the sea, in situations exposed to all the violence of the winds, and in such as are sheltered from them.* Nowhere, if properly attended to, do they suffer or degenerate ; some have even been known to preserve their form and their original characteristics, after having been purposely abandoned in islands during several years.

We cannot have among us flocks as large as those which they have in Spain, except in places where there are extensive pastures. We already possess a great number of merinos divided into many small flocks, and we shall in time possess still more. They are most easily reared in well cultivated grounds, because food for their support may be there procured at all times.

* The local situations of several establishments belonging to government afford examples. Those of Perpignan, Arles and Mont-de-Marson are in the South ; those of Trèves and Aix-la-Chapelle, in the north ; that of Clermont is near Puy-de-Dôme, and in an elevated country ; that of Nantes is not far from the sea and on an eminence, &c. The flocks in these establishments do very well.

Generally speaking, wherever common sheep can be kept, merinos may be kept equally well ; and instead of a flock which is worth but little, the advantage is obtained of possessing one which is very valuable.

Sheep of a small size should be preferred where the pastures are scanty, the soil dry, and fodder scarce ; or a smaller number should be kept.

In hilly grounds, or such as, though level, are dry, chalky, or sandy, there is no doubt of their success, provided they can find sufficient nourishment.

When the land is divided into hills and vallies, they ought to do still better because they may be led to different parts according to the weather or the season.

Very wet lands, in which common sheep die with the rot, or are fattened and changed yearly, do not answer for merinos.— Yet it may be remarked that the sheep-grounds of Rambouillet are of a clayey soil, that there are woods, ponds and other pieces of water, and that the animals are consequently exposed to fogs and moisture ; some few spots only are higher than the general level ; but constant care and attention and good nourishment during the winter, have vanquished the natural disadvantages of the situation. In cases of this nature, the water must be drained off, and meadows formed, capable of affording abundant food to the flocks ; when well fed, they are less subject to the rot.

There is a very numerous description of men, to be met with particularly among farmers, who reject without examination or reflection whatever is new, or not known to them, or announced by persons who have never followed the plough. Distrust is not in itself blameable, it is frequently a safeguard ; but it ought not to be carried too far. Many objections were at first made to the introduction of merinos into France, which objections are now all done away, and these animals have already been propagated there very extensively ; for the force of truth has prevailed, and the advantages which they have been proved to afford have opened the eyes of many proprietors of flocks, who at first confidently maintained that they could not succeed. I will mention but two of these objections. It was said that they would degenerate ; because they would no longer enjoy the food and climate of Spain, and because it was supposed necessary to remove them yearly from place to place. This opinion is unfounded ; an experience of twenty three years, afforded

by the establishment of Rambouillet, proves that in France the merino wool preserves all its fineness, that its length is increased, and that the fleeces are larger ; they live very well upon the grasses produced by the soil of France ; their health does not require that they should remove from place to place ; in Spain they migrate like some species of birds, for the purpose of finding something to live upon ; in summer they would die of hunger in the parched plains, and in winter it would be impossible for them to live upon the mountains covered with snow. It is therefore through necessity that they remove from place to place ; being in this way plentifully fed, they acquire a healthfulness which has an effect upon their wool ; but if well fed without travelling, the effect is the same. They accommodate themselves with great facility to a new climate ; the race, and not the country whence it comes, is the only thing to be considered.— It remains the same in whatever part of the globe it is transported. The young of the first imported merinos resembled their parents ; and the successive generations have not differed from each other : it is proved that, unless it be adulterated, this race will continue the same as when first brought from Spain. Many instances might be produced ; it will be sufficient to mention that the Rambouillet flock, imported in 1786, has, in twenty three years, lost none of the qualities which it had on its arrival from Spain. The wool is equally fine ;* the form of the animal is well preserved, and has become more marked than it was : the size is augmented ; the fleeces are heavier, and the animal is more fleshy. The merinos, instead of degenerating, are rather improved ; which is not surprising, upon the principle that animals thrive as they proceed northward.— The care of land-holders in France has doubtless contributed much towards this improvement. It must also be remarked that the atmosphere of Spain is subject to inconveniences which seem to belong peculiarly to less southern regions, namely, late colds and snows ; that by migrating, its flocks continue in a temperature little different from that of our own country : and that the soil of Spain is in general more elevated than that of France.

The second objection is directed against the attentions required by the race of merinos. It has been said that they require much more care than the indigenous breeds : upon these latter very little was wont to be bestowed, although it would have been for the real interest of the proprietors. When com-

* I have specimens of wool taken from Rambouillet, year after year, without interruption, from 1786 to the last shearing inclusive : it is easy, by inspecting them, to perceive the truth of what I advance.

mon sheep fell sick, the danger of losing them caused no anxiety; they were either carried off by the disease, or cured by the unassisted power of nature; in winter, they were kept shut up in suffocating houses; in summer they were led to pasture on all sorts of ground; they were worried and sometimes killed by dogs; they were entrusted to children who paid no attention to them; and they were but scantily fed.— It is easy to perceive that a flock of merinos cannot admit of such negligence, on account of its much greater costliness; their thick wool renders them subject to be incommoded by insects which conceal themselves in it, and to get the scab, which, by a little attention, may be prevented or cured. They require fresh air in their houses, they should be kept from unwholesome pastures, & from the neighbourhood of flocks which are infected with contagious disorders; they should be conducted to the fields with gentleness; and they should be well fed: these attentions are necessary in order to keep them in health and to obtain from them an increase which may compensate the expence and trouble indispensably required by them. The objection which I combat is dictated solely by the negligence of the proprietors and the slothfulness of the shepherds. Merinos, far from requiring greater care than a common flock which is well kept, can endure more than any other race, by reason of their native hardiness and longevity: they only who were in the habit of neglecting their flocks, complain of the care which the great value of merinos obliges them to bestow.

One cannot calculate with certainty either the immediate or the future profit resulting from a flock of merinos; it depends upon the price at which they are bought and at which they are sold; upon the judgment of their owners and the confidence which they inspire. Their wool will always be superior to that of the native breeds, both in quality and in quantity, and will deserve that a preference should be given to it. Moreover, the advantages obtained from the rearing of this fine race, will be increased in proportion to the ease and cheapness with which food and persons to tend them can be procured. Artificial meadows will be one of the principal means of economy.

Management of flocks.

A flock may be managed in three ways; 1. by one's own superintendence, on one's own farm or a farm worked by one's self; 2. by hiring a farmer, pastures and sheep-houses; 3. by placing a flock out on shares.*

* The French word for this contract is *Cheptel*.

The first of these methods is that in which the animals are always attended with most care; vigilance is there prompted by personal interest; the eye of the master, which gives life to every work, is open to the minutest circumstances; the shepherds commit no blunders, or, if any are committed, they are immediately checked and corrected. Diseases rarely spread among flocks thus managed; those to whom they belong, besides an abundance of manure with which their grounds are enriched, obtain every year valuable fleeces, and see their profits increased by the birth of fine lambs.

The advantages of the second method are not so great; they are however considerable: it is well suited to a capitalist who, not wishing to risque his funds in commercial enterprises, would rather expend his money in the purchase of sheep, and thus put it to a sure and legitimate use. His profits arise from the sale of his wool and of a certain number of animals each year, which, after deducting all expenses, afford a surprising income, much greater than any other speculation. The farmer who thus takes another person's flock, receives for his share the rent of his pastures and folds, the manure afforded by the sheep, both in the pens and in the sheep-houses, for which latter he need give nothing but straw, and of this he cannot make a better use; he incurs no expence, has no wages to pay; without making any disbursement, he obtains the means of diminishing his ground-rent and of enriching his land. Sometimes, instead of being obliged to carry to a distance and over bad roads his surplus fodder as well as some sorts of grain, he finds a sure market at home, in the flock that is stationed on his own farm.

A farmer may, indeed, be negligent of this stock which does not belong to him; it is to be feared that he may have an understanding with the shepherds, so as to keep the sheep penned too long, to leave the dung in the sheep houses longer than is consistent with the health of the creatures, and perhaps to retain for his own use a part of the fodder for which he is paid and which he ought to furnish. These inconveniences must be avoided by looking out for honest and careful farmers: and fortunately a great number may be found who deserve the utmost confidence; there are even some who make it their business to attend themselves to the flocks which they take, and who do not give the owners reason to regret not being able to attend to them in person, nor to visit them as frequently as they desire.

To place a flock out on shares, is to give up, during a certain time, fixed by contract, a part of its products, in order to pre-

serve the main stock. This species of contract is very common, both for lands and for cattle, in a great part of France ; and laws have been passed to regulate it, and to prevent difficulties from arising between the contractors ; that is, between the farmer who takes and the proprietor who lets out the flock.— This method of managing stock is advantageous both to the owner and to the receiver ; to the owner, by enabling him to have a flock without being obliged to attend to it himself, or to buy or hire a farm on which to place it ; to the receiver, by affording him an opportunity of acquiring a stock, little by little, in a few years, merely by care, by supplying food, and by paying for the necessary labour. In agreements of this kind, the interests of the two parties are so allied that the absence of the owner does not endanger the flock which he has let out.

Conditions on which a FLOCK is put out on shares, and what is to be expected from this contract.

This contract may in general be considered in two points of view, 1. with respect to the immediate value of the animals which are entrusted to a farmer, and that which the increased stock will have at the expiration of the contract ; 2. with respect to the situation of the farm on which the creatures are to live.

If ewes of a common race, and some merino rams for the formation of a mixed breed, be given on shares to a farmer ; as it is certain that the young ones will have qualities not possessed by their dams, if the farmer receives, during the contract, half the produce in wool and wethers, and, at its expiration, half of the whole number of animals, he will gain more than the owner.

If the flock, when first put out, is of the first, second, third or fourth degree of mixture, the owner, in the division both of the annual sales and of the flock at the expiration of the contract, ought to have a somewhat greater share than the farmer, because he paid more for these sheep than he otherwise would have done, on account of the breed being crossed.

Many farmers are desirous of having merinos on shares ; but they do not wish any preliminary estimate to be made and to be taken into account at the expiration of the contract ; they insist that an equal share of the products and of the whole flock ought to be given to them, as no more than a fair compensation for their expense and trouble ; they say moreover, that the wool and the merinos may fall as well as rise in price, so that

if the owner, on the final division of the flock, should take a number of animals equivalent to his original disbursement, he might perhaps take nearly the whole flock : so that the farmer, in his share, would not have sufficient to defray his expenses, and would consequently suffer an injury. On the other hand, the proprietor, who knows how to calculate as well as the farmer, would think himself much wronged if, without making any valuation of the sheep, he were to suffer the farmer to take half the profits arising from the sales during the continuance of the contract, and to make an equal division with him of the animals at its expiration ; for instance, suppose he puts out on shares two hundred merino ewes and six rams, which, at 200 fr. each, cost him 41,200 fr. he cannot consent to make a present to the farmer of 200,600fr. and lose, for his sake, the interest which he might have gained upon that sum if it had been otherwise employed. The farmer's pretensions are unreasonable, in as much as he demands an equal division, without being obliged to restore the value of the original stock. We have every reason to suppose that the price of the wool and of the animals will, with some variations, be kept up a long while. If their value was fixed, estimates would be made, as in all leases, at the time of concluding the bargain, and the usual course would be pursued. In the mean time, to obviate the inconveniences which I have just mentioned, and that justice may be done to the owners as well as to the farmers, it appears to me, 1. that when common ewes with merino rams are put out on shares, an estimate ought to be made, and an equivalent to be taken by the owner when a division of the flock is made ; 2. that, setting aside this estimate and this equivalent when the sheep are of a mixed breed, the portion of the owner ought to be about a seventh more than that of the farmer, if the breed is crossed but once, a sixth if crossed twice, a fifth if crossed four or more times ; 3. that, in like manner renouncing the estimate and the equivalent when the sheep are merinos, the owner ought to take three fourths of the profits and of the animals, if the flock be placed at a distance from towns which afford a market in which fodder may be disposed of ; or two thirds, if it be in a situation where every thing is dear.

Another contract of this nature has been mentioned to me ; it does not encroach upon the funds of the proprietor, yet it is advantageous to the farmer. The conditions are these ; suppose that seven hundred ewes and six rams of this race are put out : the contract is for twelve years ; the farmer engages, for a certain time, to pay the wages of the shepherds, to furnish them and their dogs with food, to provide the flock with lodging, fodder, provender and necessary pasture and to have it shorn and, in case of sickness, tended at his expense ; the increase

of the flock is to be at least four hundred, comprehending, animals of every age ; each year, immediately after shearing, the fleeces and a part of the animals, not exceeding a fifth of the bearing ewes and three fourths of the rams, are to be sold and the proceeds equally shared ; the oldest animals are to be among those which are sold. When the flock is arrived at an increase of four hundred, the owner is to have the right to select one hundred ewes from three to five years old, and six rams of the same age, to be disposed of as he pleases ; the remainder of the flock and its subsequent increase are to be kept at the common expense of the owner and farmer*, and all the profits equally divided. The farmer is not to have upon his farm any other flock beside the one which he has on shares. At the expiration of the twelve years, the owner is to take one hundred ewes and six rams, and to have the half of what remains. If the contract is, for any reason, cancelled before its term, one hundred ewes and six rams are at all events to be taken out by the owner or his heirs before the division of the stock.

Other forms may undoubtedly be given to this kind of contract: as there is a variety in the respective situations of the owners and farmers, in the manner of treating and feeding the flocks, and in the usages of different places, there must necessarily be modifications which I cannot foresee, and which should be admitted, provided the mutual interests of the contracting parties be attended to. The more nearly the above conditions are followed, the less will be the deviation from the line of justice. As a still farther direction, I will shew, in the first place, in a table, the propagation of a flock of five hundred ewes of the common race, crossed by Spanish rams, a fifth of the bearing ewes being reformed each year, and a deduction of one fifth of the lambs being made for losses and accidents ; then I will detail, in three schemes, the whole expense and profit of the proprietor and of the farmer during a contract for nine years, which is the most usual time. I shall rather suppose the flock to be of a mixed than of a full blooded race, because the value of its products is more easily estimated, although every year a part becomes more valuable ; the valuation of the products of a flock of merinos is more fluctuating, on account of the irregularity in the sale of the rams. As the price of grain and fodder, which is different in different

* It may be feared that the farmer will abuse the trust reposed in him, and make the owner pay too dear for what he furnishes for the support of the shepherds and of the flock, and for the wages of the shepherds, but it is easy to know nearly the prices, if a little attention be paid : besides, such bargains as these ought to be made with none but honest men.

places, affects the expenses of the farmer, I shall choose the distance of fifty leagues to the south of Paris, at which it is to be supposed that the following calculations are made.

*First Scheme of a Cheptel**

In this scheme, the farmer furnishes five hundred ewes, the interest of which is paid to him at five per cent during the nine years of the contract ; he gives 50 centimes for each lamb, the 2d. 3d. 4th. and 5th years ; and one frank the remaining four years. The proprietor is obliged to furnish fifteen merino rams for covering. The farmer has the proceeds of the sales of the reformed ewes, of the castrated male lambs and of the wool, and he has the manure ; at the expiration of the contract, what he paid for the five hundred ewes is reimbursed to him and the whole flock remains the property of him to whom the farm belongs.

RECEIPTS OF THE FARMER.

Sale of Wool and of Animals.

FIRST YEAR.

500 fleeces of common ewes, at 2 francs per fleece	1,000f 00c
400 lb. of lamb's wool, first cross, at 40c. a pound	160 00
	<hr/>
	1,160 00
	<hr/>

SECOND YEAR.

Sale of 100 common ewes at 10 fr. each	- - - 1,000f 00c
do. of 200 wethers of a single cross, at 6 fr. each	1,200 00
do. of 400 fleeces of common ewes, at 2 fr. each	800 00
do. of 200 fleeces of lambs in their second year, of a single cross, 3 fr. 50c. per fleece	- 700 00
do. of 300 lb. of lamb's wool, of the first cross, at 40c. per pound	- - - - - 120 00
	<hr/>
	3,820 00
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THIRD YEAR.

Sale of 90 common ewes, at 8 fr. each	- - - - 720 00
do. of 150 wethers of a single cross, at 6 fr. each	- 930 00
310 fleeces of common ewes, at 2 fr. each	- - - 620 00
155 fleeces of lambs in their second year, of a single cross, at 3 fr. 50c. each	- - - - 542 50
	<hr/>
	2,812 50
	<hr/>

* Cheptel signifies a contract by which sheep are put out on shares.

<i>Brought forward</i>	2,812f 50c
200 fleeces of ewes three year old, of a single cross, at 3 fr. 50c each	700 00
248 lbs. of lamb's wool, of a single cross, at 40c. per lb	99 20
160 lbs. of lamb's wool, of a double cross, at 80c. per lb	128 00
	<hr/>
	3,739 70
	<hr/>

FOURTH YEAR.

Sale of 62 common ewes, at 8 fr. each	496 00
do. of 124 wethers of a single cross, at 6 fr. each	744 00
do. of 80 wethers of a double cross, at 12 fr. each	960 00
248 fleeces of common ewes, at 2 fr. per fleece	496 00
439 fleeces of ewes of a single cross, at 3 fr. 50c. per fleece	1,536 50
80 fleeces of lambs in their second year, of a double cross, at 6 fr. 50c. per fleece	520 00
200 lbs. of lamb's wool, of a single cross, at 40c. per pound	80 00
252 lbs. of lamb's wool, of a double cross, at 80c. per lb	201 60
Moreover, the sale of 40 ewes of a single cross, at 12 fr. each	480 00
	<hr/>
	5,514 10
	<hr/>

FIFTH YEAR.

Sale of 48 common ewes, a 6 fr. each	288 00
do. of 100 wethers of a single cross, at 6 fr. each	600 00
do. of 126 wethers of a double cross, at 12 fr. each	1,512 00
200 fleeces of common ewes, at 2 fr. each	400 00
516 fleeces of ewes of a single cross. at 3fr. 50c. each	1,806 00
206 fleeces of ewes of a double cross, at 6 fr. 50 c. each	1,339 00
160 lb. of lamb's wool, of a single cross. at 40c. per lb.	64 00
300 lbs. of lambs wool, of a double cross, at 80c. per lb.	240 00
80 lbs. of lamb's wool, of a third cross, at 1 fr. 20c. per lb.	96 00
Sale of 63 ewes of a single cross, at 12 fr. each	756 00
	<hr/>
	7,101 00
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SIXTH YEAR.

Sale of 48 common ewes, at 6 fr. each	- - -	288f 00c
do. of 80 wethers of a single cross, at 6 fr. each		480 00
do. of 75 ewes of a single cross, at 16 fr. each	-	1,200 00
do. of 16 ewes of a double cross, at 20 fr. each		320 00
do. of 150 wethers of a double cross, at 12 fr. each		1,800 00
do. of 32 wethers of a treble cross, at 18 fr. each		576 00
160 fleeces of common ewes, at 2 fr. each	- - -	320 00
539 fleeces of ewes of a single cross, at 3 fr. 50c.		
each	- - - - -	1,886 50
340 fleeces of ewes of a double cross, at 6 fr. 50c.		
each	- - - - -	2,210 00
32 fleeces of ewes of a treble cross, at 10 fr. each		320 00
128 lbs. of lamb's wool, of a single cross, at 40c. per lb.		51 20
320 lbs. of lamb's wool, of a double cross, at 80c. per lb.		256 00
195 lbs. of lamb's wool, of a third cross, at 1 fr. 20c.		
per lb.	- - - - -	234 00
		<hr/>
		9,941 70
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SEVENTH YEAR.

Sale of 160 common ewes, at 4 fr. each	- - -	640 00
do. of 80 ewes of a single cross, at 16 fr. each		1,280 00
do. of 38 ewes of a double cross, at 20 fr. each	-	760 00
do. of 160 wethers of a double cross, at 12 fr. each		1,920 00
Sale of 76 wethers of a third cross, at 18 fr. each		1,368 00
400 fleeces of ewes of a single cross, at 3 fr. 50c. each		1,400 00
516 fleeces of ewes of a double cross, at 6 fr. 50c. each		3,354 00
108 fleeces of ewes of a third cross, at 10 fr. each		1,080 00
320 lbs. of lamb's wool, of a double cross, at 80c. per lb.		256 00
310 lbs. of lamb's wool, of a third cross, at 1 fr. 20c.		
per lb.	- - - - -	372 00
30 lbs. of lamb's wool, of a fourth cross, at 1 fr. 40c. per lb.		42 00
		<hr/>
		12,472 00
		<hr/>

EIGHTH YEAR.

Sale of 80 ewes of a single cross, at 16 fr. each		1,280 00
do. of 62 ewes of a double cross, at 20 fr. each		1,240 00
do. of 6 ewes of a third cross, at 30 fr. each		180 00
do. of 160 wethers of a double cross, at 12 fr. each		1,920 00
do. of 125 wethers of a third cross, at 18 fr. each		2,250 00
do. of 12 wethers of a fourth cross, at 24 fr. each		288 00
384 fleeces of ewes of a single cross, at 3 fr. 50c. each		1,344 00
		<hr/>
		8,502 00

<i>Brought forward</i>		8,502f 00c
676 fleeces of ewes of a double cross, at 6 fr. 50c. each		4,394 00
227 fleeces of ewes of a third cross, at 10 fr. each		2,270 00
12 fleeces of ewes of a fourth cross, at 14 fr. each		168 00
308 lbs. of lamb's wool, of a double cross, at 80c. per lb		246 40
410 lbs. of lamb's wool, of a third cross, at 1 fr. 20c. per lb		492 00
100 lbs. of lamb's wool, of a fourth cross, at 1 fr. 40c.		
per lb		140 00
		16,212 40

NINTH YEAR.

Sale of 73 ewes of a single cross, at 16 fr. each		1,168f 00c
do. of 82 ewes of a double cross, at 20 fr. each		1,640 00
do. of 20 ewes of a third cross, at 30 fr. each		600 00
do. of 154 wethers of a double cross, at 12 fr. each		1,848 00
do. of 164 wethers of a third cross, at 18 fr. each		2,952 00
do. of 40 wethers of a fourth cross, at 24 fr. each		960 00
311 fleeces of ewes of a single cross, at 3fr 50c each		1,088 50
830 fleeces of ewes of a double cross, at 6 fr. 50c. each		5,395 00
377 fleeces of ewes of a third cross, at 10 fr. each		3,770 00
52 fleeces of ewes of a fourth cross, at 14 fr. each		728 00
258 lbs. of lamb's wool, of a double cross, at 80c. per lb		206 40
490 lbs. of lamb's wool, of a third cross, at 1 fr. 20c.		
per lb		588 00
210 lbs. of lamb's wool, of a fourth cross, at 1 fr. 40c.		
per lb		294 00
15 lbs. of lamb's wool, of a fifth cross, at 1 fr. 40c.		
per lb		21 00
		21,258 90

Product of the Manure, at 1 fr. 50 cent. per sheep and 75 cent. per lamb.

1st year	1,050f 00c
2d —	832 50
3d —	867 00
4th —	955 00
5th —	1,372 00
6th —	1,575 00
7th —	1,563 00
8th —	1,881 00
9th —	2,148 00
	12,243 50

SUMS OF THE RECEIPTS.

SALE <i>Of wool and animals.</i>			PRODUCT <i>of the manure.</i>			SUMS <i>Total.</i>		
	fr.	c.	fr.	c.	fr.	c.		
1st year - - -	1,160		1,050		2,210			
2d — - - - -	3,820		832	50	4,652	50		
3d — - - - -	3,739	70	867		4,606	70		
4th — - - - -	5,514	10	955		6,469	10		
5th — - - - -	7,101		1,372		8,473			
6th — - - - -	9,941	70	1,575		11,516	70		
7th — - - - -	12,472		1,563		14,035			
8th — - - - -	16,212	40	1,881		18,093	40		
9th — - - - -	21,258	90	2,148		23,406	90		
	81,219	80	12,243	50	93,463	30		

Food for the Flock during the winter.

The food requisite for a sheep, during four months in the winter season, at fifty leagues from Paris, may be estimated at two pounds of hay each day and one bushel of oats for the four months, for a full grown animal, and half that quantity for a lamb.

A sheep then will consume, during those four months, two hundred and forty pounds of hay and one bushel of oats.* A lamb will consume one hundred and twenty pounds of hay and half a bushel of oats.

If a bundle of hay be rated at eleven pounds weight, for it usually weighs from ten to twelve pounds, a sheep will consume twenty one bundles in four months ; which, at 20 fr. for a hundred bundles, amounts to - - - - - 4f 20c

It will also consume a bushel of oats : which, at 9 fr. for twelve bushels, comes to - - - - - 0 75

4 95

* Instead of a bushel of oats, other grains may be given, as pease, vetches, barley, rye, weat, &c. or a double quantity of roots, as they are less nutritive, viz. Jerusalem-artichokes, carrots, turnips, beets, potatoes: the cheapest articles should always be chosen. I also take for granted that farmers will not fail to give straw, of which creatures eat a part, and in which they find some grain. As this straw is obtained on the farm, and as it does not sell at a distance from cities, this part of the food is not to be taken into the account of the farmer's expense.

The food therefore of a sheep, during four months	f.	c.
in the cold season, will amount to	4	95
And that of a lamb, to	2	48
	<u>7</u>	<u>43</u>

FIRST YEAR.

500 sheep at 4 fr. 95c.	2,475	00
400 lambs at 2 fr. 48c.	992	00
	<u>3,467</u>	<u>00</u>

SECOND YEAR.

400 sheep at 4 fr. 95c.	1,980	00
310 lambs at 2 fr. 48c.	768	80
	<u>2,748</u>	<u>80</u>

THIRD YEAR.

310 sheep at 4 fr. 95c.	1,534	50c
200 other sheep at 4 fr. 95c.	990	00
248 lambs at 2 fr. 48c.	615	04
160 other lambs at 2 fr. 48c.	396	80
	<u>3,536</u>	<u>34</u>

FOURTH YEAR.

563 sheep at 4 fr. 95c.	3,186	85
452 lambs at 2 fr. 48c.	1,120	96
	<u>4,307</u>	<u>81</u>

FIFTH YEAR.

656 sheep at 4 fr. 95c.	3,207	20
524 lambs at 2 fr. 48c.	1,299	52
	<u>4,506</u>	<u>72</u>

SIXTH YEAR.

750 sheep at 4 fr. 95c.	3,722	50
600 lambs at 2 fr. 48c.	1,488	00
	<u>5,210</u>	<u>50</u>

SEVENTH YEAR.

744 sheep at 4 fr. 95c.	-	-	-	-	3,682	80	
594 lambs at 2 fr. 48c.	-	-	-	-	1,473	12	
						<hr/>	
						5,155	92

EIGHTH YEAR.

896 sheep at 4 fr. 95c.	-	-	-	-	4,435	20	
716 lambs at 2 fr. 48c.	-	-	-	-	1,775	68	
						<hr/>	
						6,210	88

NINTH YEAR.

1,018 sheep at 4 fr. 95c.	-	-	-	-	5,039	10	
828 lambs at 2 fr. 48c.	-	-	-	-	1,893	44	
						<hr/>	
						6,932	54

Sum total of the winter food for a flock during nine years 42,076 51

Annual number of lambs which pay either 50c. or one frank.

2d year.	210	at 50 cent.	-	-	-	105f
3d —	408	do	-	-	-	204
4th —	452	do	-	-	-	226
5th —	524	at 1 fr.	-	-	-	524
6th —	600	do	-	-	-	600
7th —	594	do	-	-	-	594
8th —	716	do	-	-	-	716
9th —	828	do	-	-	-	828
						<hr/>
						3,797

Wages and food of the Shepherds, at the rate of 400 franks each.

1st and 2d years.	3	shepherds	-	-	-	2,400f
3d year	3	do	-	-	-	1,200
4th and 5th years.	4	do	-	-	-	3,200
6th 7th and 8th do.	5	do	-	-	-	6,000
9th year	6	do	-	-	-	2,000
						<hr/>
						14,800

Amount of expenses as follows :

Interest, at five per c. of 6,000f for nine years	-	2,700	00
Food for the flock	-	42,076	71
Lambs which pay 50c. or 1 fr.	-	3,997	00
Expense for shepherds	-	14,800	00
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Sum Total 63,373 55

Balance.

The receipts of the farmer amount to	- - -	93,463f 30c
His disbursements amount to	- - -	63,373 51

Profits of the farmer - - - 30,089 79

If the proceeds of the sale of the fleeces of the Spanish rams be given to the farmer, the amount of these proceeds year by year will be as follows.

The fleece of each ram is supposed to weigh ten pounds, at 2 franks.

1st year.	15 rams	300f
2d —	15 —	300
3d —	15 —	300
4th —	15 —	300
5th —	18 —	360
6th —	21 —	420
7th —	21 —	420
8th —	25 —	500
9th —	28 —	560
		<hr/>
		3,460

If this sum be added to the above 30,089 fr. 79c. the profits of the farmer, the whole of his receipts will amount to 33,549 fr. 79 cent.

Emoluments of the Proprietor

The proprietor, at the expiration of nine years, becomes possessed of a flock of 2077 ewes, which, at an average of 40 fr. are worth

He has received for the lambs, at 50c. or 1 fr. 3,797

Total

 86,877

Expenses of the Proprietor.

The providing of Rams, at the rate of about 3 to a hundred ewes, each ram serving six seasons.

1st, 2d, 3d and 4th years, 15 rams, at 200 fr.	3,000f
5th year, 3 rams more	600
6th do. do	600
7th do. renewal of the first 15 rams	3,000
8th do. 4 rams more	800
9th do. 3 more rams	600

Total

 8,600

N. B. It is to be observed that the rams provided the 7th, 8th and 9th years will not be worn out. Some may still serve three seasons, other four, and the rest five; but this ought not to be taken into account, as it serves to compensate for those which die by accident or disease.

Payment made to the farmer for his first stock of ewes	6,000f
For fodder, about	200
	6,200

Sum of the Proprietor's Expenditures; viz:

The providing of rams	8,600f
Reimbursement of 6,000 fr. made to the farmer, and expense for fodder	6,200
	14,800
Sum Total	14,800

Balance.

The receipts of the proprietor amount to	86,877
His expenditures, to	14,800
	72,077
To the proprietor there remains	72,077

Second Scheme.

Supposing the proprietor to be at the expense of the first five hundred ewes and of the rams, while the farmer has only the profits arising from the ewes which are sold, from the wethers, the wool and the manure, during the nine years, and gives 50c for each lamb the 3d, 4th and 6th years, and 1 fr. the remaining years; what will be the situation of the proprietor and of the farmer at the expiration of the contract?

Receipts of the Farmer.

Sale of wool and animals	81,219f 80c
Value of the manure	12,243 50
	93,463 30

Expenses of the Farmer.

Food for the flock	42,076 71
Lambs which pay 50c. or 1 fr.	3,797 00
Expenses for shepherds	14,800 00
	60,673 71

	<i>Balance.</i>	
The receipts amount to	- - - - -	98,463f 30c
The expenses, amount to	- - - - -	60 673 71

There remains to the farmer - 32,789 59

N. B. By giving to the farmer the profits resulting from the wool of the Spanish rams, he would have 3,460 fr. more; which, added to the 32,789 fr. 59c. make 36,242 fr. 52 centimes.

Receipts of the Proprietor.

2,077 ewes at 40 fr.	- - - - -	83,080f
Lambs at 50c. or 1 fr.	- - - - -	3,797
		86,877

Expenses of the Proprietor.

For rams	- - - - -	8,600f
Purchase of 500 ewes	- - - - -	6,000
Fodder	- - - - -	200
		14,800

Balance.

The receipts amount to	- - - - -	86,877f
The expenses amount to	- - - - -	14,800

There remains to the proprietor - 72,077

Third Scheme.

Supposing that the proprietor furnishes the first five hundred ewes and the rams; that the wool, the proceeds of the ewes and wethers which are sold, as well as the flock at the end of the contract, are equally shared; what will be the results to the proprietor and to the farmer at the expiration of the contract?

Receipts of the Farmer.

The proceeds of the sales of the wool and animals amount to	- - - - -	81,219f 80c
The sale of the flock, at the end of the ninth year, may be estimated at	- - - - -	83,080 00
		164,299 80

If from this sum be deducted 14,600 francs, the money advanced by the proprietor, for the purchase of the five hundred ewes with their rams, there will remain 149,699 francs 80 centimes, the half of which is

Profits obtained from the manure 12,243 10

87,093 00

Expenses of the Farmer.

Food for the flock	- - - - -	42,076 71
Expenses for shepherds	- - - - -	14,800 00
		<hr/>
		56,876 71
		<hr/>
	<i>Balance.</i>	
The receipts amount to	- - - - -	87,093 00
The expenses amount to	- - - - -	56,876 71
		<hr/>
There remains to the farmer	-	30,216 29
		<hr/>

Receipts of the Proprietor.

Half the proceeds of the sales of the wool and animals, and half the value of the flock at the end of the ninth year, previous deduction being made of the sum he had advanced	74,849 90
Sale of the wool of the Spanish rams	3,460 00
	<hr/>
Sum of the receipts	78,309 90
	<hr/>

Expenses of the Proprietor.

* Sum advanced for five hundred ewes together with rams for covering. But this article should here be considered merely as a memorandum, since the proprietor is supposed to have deducted this sum previously to the final partition.

Balance.

The receipts amount to	- - - - -	78,309f 90c
The expenses	- - - - -	mem
		<hr/>
Net profits of the proprietor		78,309 90
		<hr/>

Progressive flocks are also well suited to the three kinds of cheptel; they do not occasion any additional expense; but afford much greater profits during the continuance of the contract; and, at its expiration, a race of full-blooded sheep is obtained in place of a cross-bred flock.

OF COPULATION.

The rutting season cannot be the same in all parts of the country. Towards the south, spring is the time in which sheep are in heat; in the environs of Paris, it is the beginning of summer; and farther north, it is almost in autumn. A proprietor who wishes to make the most of his flock, must deviate more or less from the natural period, as his interest requires. The time of covering is regulated according to the seasons at which it is known that care can best be taken of the ewes when near yearning and while they are giving suck, and of the lambs when

they begin to eat and to grow. This is the general principle, which must vary in its application, according to the means of subsistence which can be afforded, the end which is proposed, and the climate in which the sheep are kept. For instance, if feed be most abundant in November or December,* the rams must be put to the ewes in June, July and August; they should be put to them in October or November, if in April or May there be abundance of grass in the fields. Other considerations, may also serve to determine the time of covering.

When ewes have been weakened by disease, they must be kept from the ram until they are perfectly restored to health; otherwise, they will be unable to conceive, or will produce abortions or sickly lambs.

During a year in which forage almost entirely failed, I have known farmers who, fearing that the expense of keeping their flocks through the winter would be too great, if the lambs were dropped early, delayed the time of covering, that the young ones might come more nearly at the season in which new grass was to be expected.

The ewes in a flock are not in heat all at once; the rams should consequently be left with them a sufficient time.— If we are to believe some persons, nine weeks are requisite, because, say they, as the ewes are in heat again at the end of twenty one days, there is more likelihood of their having all been covered during that time; an assertion which I do not warrant. There is an advantage in having all the lambs dropped within as short a time as possible; an inequality among them is thus avoided, which disfigures the flock, prevents the weak from defending themselves against the strong while at the rack, renders it necessary to rear a part of them separately, and occasions difficulties in weaning them. These considerations, which are weighty, do not however influence proprietors, who think it their interest to obtain from their flocks the greatest possible number of lambs which they can produce in the course of the year; it is usual for them not to separate all the rams from the ewes at the close of the rut, but to keep one at least among them, that those which are late in heat may take him at the end of the season. The lambs which are produced by these last copulations, and which in French are called *tardons* or *tardillons*, are easily reared, if care be taken of them and of their mothers; only they should not be permitted to propagate

* As in countries where they are nourished during the winter almost entirely with corn in sheaves.

within a year after the usual time ; all depends upon the importance which is attached to the multiplication of lambs.

Many farmers leave their rams the whole year round in the midst of their ewes ; for the rams being no more in number than are necessary for covering, they think it too expensive to keep them separate. The consequence is that, the heat of the females being excited by the presence of the males, lambs are produced at almost all seasons : it would be better if the rams, after having been a sufficient time with the ewes, could be put in a flock of wethers. It would perhaps not be a bad speculation to establish in some part of the country a sort of boarding place, at which, for a reasonable price, rams might be received and taken care of during the time they are not used.

The choice of covering rams is a matter of importance ; I have shown how much influence they have upon the young breed.— The best may be distinguished by the following marks. A fine merino ram has a very lively eye, a regular and free gait, short ears, rough horns, a broad nape, short neck, round shoulders, a broad chest, full buttocks, large testicles long and pendent, fine wool, tufted, abundant, and homogeneous, that is, nearly the same upon all parts of the body. A large size is desirable ; yet a ram that is not so tall, but stout and well made, is preferable to one that has only height. Goodness of make is the quality most to be desired. The soundness of the animal's health may be ascertained by examining the veins of the eye near the lachrymal glands. In full health, these veins are of a clear red ; this sign however, is not always to be depended upon. One may be more assured of the rams not being sick, if he does not shrink when the hand is pressed hard upon his rump, or if he struggles vigorously when held by one of his hind legs. The vermilion colour of the gums, the lips not being relaxed, the adhesion of the wool to the skin, are also indications of health.

The ram is able, at a year old, to engender ; but it is better to wait until he is three, or at least two years old : if strong and healthy, he may be employed eight or ten years

An ewe, to be good, should have a large body, round buttocks, a broad back, a large bag, long teats, thin legs, a thick tail, fine wool, and, in short, should as nearly as possible possess the properties which distinguish a fine ram. She might be impregnated while yet a lamb ; but good management requires that she be not suffered to take the ram before the age of

three years, or at least of two, provided she has been well reared and is vigorous. It has been observed that old ewes yield the finest lambs and are the best nurses.

Every other manner of employing male and female merinos in propagation, is contrary to the laws of animal economy and to the melioration of the breed.

The qualities which I have just mentioned are not to be found in all the rams nor in all the ewes of a full-blooded flock.—As very few rams are wanted, it is easy to select the best. As to ewes, it is not so necessary that they should be of the first rate, in order to yield fine lambs; it is sufficient to give them well chosen rams of their own race, and that their wool be fine.—Some ewes have very fine lambs, at one time, and such as are inferior, at another: but these are exceptions which do not militate against the general rule that the finest individuals in each sex should be chosen for propagation. Vigour, in both, is of much importance: by unremitting attention to these things, a fine breed may constantly be kept up.

A ram deficient in one testicle and an ewe with but one teat, would be as capable of generating as those which are perfect in those parts: yet, in order to avoid all risque, it would be better to prevent them from copulating. Rams with both testicles entire have been found incapable of generating, without any apparent cause of this incapacity; these instances are extremely rare.

Some blemishes in the mothers are not communicated to their young; an ewe that has but one eye, especially if this has been caused by disease or accident, produces a lamb with two perfect eyes: the same thing happens in the case of a lame ewe. It would be wrong to reject them. Some lambs have reddish, others have black spots: the former disappear as the wool grows; the black are more durable, they appear to be in the skin. Some are entirely black, or rather of soot colour, although their parents were not so. In the course of twenty years, this has happened five times at Rambouillet, although the flock has never had communication with any other; being kept separate, in a park surrounded by walls, where no strange beast is suffered to enter. The ewes which were of that colour produced lambs quite white. To what can this extraordinary circumstance be attributed! I am at a loss to determine: the general unwillingness, however, to purchase animals thus stained cannot be blamed: it is better to err on the side of caution than of negligence. Caution has been carried so far as to reject

rams which have black marks upon their tongues and in their mouths, which often happens. However antient the opinion may be, that they produce black lambs, I am not the less inclined think it ill founded: *Gilbert* has proved the contrary.

When the ewes of a flock begin to be in heat, while the number of those which in that state is small, only a part of the rams should be put among them; more should be added as the heat of the ewes increases, and they should be removed gradually as it diminishes.

A single ram is able to impregnate a considerable number of females, in a short time. Instances are mentioned which can hardly be believed. One should not however trust to this possibility. In France, one ram is commonly allowed for fifty ewes: The Spaniards go as far as four to a hundred.—By putting three to a hundred females, as I do in my flock, the rams are not worn down, they last a long while, and fine lambs are obtained from them.

Some proprietors, through all the rutting season, leave the rams and the ewes together only during the night, and separate them in the morning: this management implies that the heat of the ewes is less in the day than at night, which is by no means certain: by adopting it, there is danger that this heat may cease or be diminished. It is excited by the constant presence of the rams; who take advantage of it at the most favourable moment.

Others divide into two equal parts the whole number of rams destined to serve, and employ at first only one half, which they withdraw at the end of some days, and supply their place by the other half; when these have remained the same length of time, they are taken away, and succeeded by the former half, and thus alternately. By this method, the rams have intervals of rest which renew their vigour. Another advantage results from it, which is that they are less apt to fight with each other; it is known that their battles sometimes occasion losses even among the ewes when they chance to get between two angry rams. Besides, when they are very numerous, some through jealousy, overthrow others while in the act of copulation, which they thus render fruitless.

In most countries, it is usual to give the rams, some time before the covering season, a more than ordinary quantity of food, and to continue it two or three weeks afterwards, in order to strengthen them and repair their waste. This pre-

caution is useless, if they be constantly supplied with sufficient nourishment.

During the rutting seasons, a separate flock should be formed of the young females which are intended to be kept from the male until they are more fit to receive him. In order to save expense, two neighbouring farmers might agree to keep their young females together during the season.

If any young females are found pregnant, their lambs should be taken from them as soon as dropped, and put to their other ewes or to goats, or fed with cow's milk. Experience has proved that, as gestation causes less fatigue than nursing, those females which have been impregnated too young are not at all stunted in their growth, if their lambs be taken from them as soon as dropped.

Of Gestation and Yeanning.

It is commonly supposed that the ewe carries her young five months, or a hundred and fifty days; this is not always the case, some lambs are dropped earlier and others later. I have observed in my flock, that when the rams had been with the ewes from the first of July to the first of September, more than a tenth of the lambs were dropped before the end of December: the first lamb was born on the 25th of November, that is to say on the hundred and forty seventh day; all the other ewes, four excepted, brought forth their young in the month of December, which proves that they were in good health when they took the ram. It is said that the time is in some instances extended to a hundred and sixty days. In order to know precisely the two extremes and the true average time of gestation, accurate experiments would be necessary, which are not easy to be made, on account of the great number of females in a flock, and because a ram may cover the same ewe more than once.

All the ewes in a flock do not conceive, and many miscarry. In flocks which are well kept and well tended, the number of lambs about equals that of the ewes which have taken the ram, because there are twin births more than enough to compensate for the abortions and the lambs which die. I know one flock in which, during five years, a clear average of five hundred and seventeen lambs has been obtained from four hundred and thirty eight ewes. It sometimes happens that, notwithstanding every care, there is a certain number of ewes which do not bear young: in a flock, belonging to a person in the neighbourhood of Paris, consisting of a hundred and ninety

one ewes, nineteen had no lambs; seven of them were old, and the other twelve young: the summer had been very rainy, and the flock had been folded in almost every kind of weather. This circumstance, the proprietor supposed, might have occasioned the failure.

Abortion may be occasioned by several different causes; some of which are natural and others accidental. The natural, which seem to me never to have been taken into consideration, are the temperament and particular constitution of the females. A vigorous female, may miscarry because the blood tends in too great quantities and with too much violence, towards the vessels of the matrix, and loosens the placenta; one that is feeble, because she does not furnish blood enough for the support of the foetus. The placenta may be separated from the matrix, as fruits from trees, either when the juices are supplied too abundantly and with too much force, or when they are not afforded in sufficient quantities. These two causes may be counteracted by bleeding the animal that is too strong and sanguine, or by giving it less food, and by strengthening the one that is of a contrary habit.

Several accidental causes produce abortion. The following are the principal: acute or chronic diseases; a forced or long journey; violent or sudden movements; food, in too great or in too small quantities or that is spoiled; bad weather; blows upon the belly, the sides or the reins; certain herbs which affect the matrix; fright; a sheep-house whose doors are narrow and whose posts are sharp-cornered. The mere detail of these causes, shows that they may almost all be avoided; and is sufficient to indicate the precautions which should be employed.

I shall say nothing concerning the influence which some authors have supposed the imaginations of pregnant ewes to have upon their young. I will not do so much injustice to the good sense of my readers as to suspect that they can regret my passing this subject over in silence.

It is advisable to give an extraordinary quantity of food to the pregnant ewes a month or two before they yean, that the foetus may be enabled then to grow rapidly without injuring the health of the mother.

About yeaning time, those which are great with young should be separated, during the night, from the others; they may easily be distinguished by the state of their bellies and of their udders: the best pastures should be for the pregnant ewes.

When a female is near bringing forth, the natural parts swell, watery humours flow from the orifice of the womb, and the udder is filled with milk. These symptoms, which are faint at first, become stronger as the time of yeaining approaches; then, if the season be severe, the creatures should be kept housed.

The young are generally brought forth without any difficulty; nature alone operates, and art is useless. Sometimes, however, on account of the position and size of the fœtus or the condition of the mother, the young are produced with great labour, and aid is requisite, according to the nature of the circumstances. See the article *Shepherd*.

The ewes which give suck should be treated in the same manner as those which are in the last months of their pregnancy; that is, they should be well fed, that their milk may be of a good quality and in sufficient quantity.

Some ewes produce twins. An attentive proprietor remarks these females, with the view of retaining them a long time in his flock; they are profitable; they are not sooner exhausted than others, and many of them rear both their young ones very well. I have known one which lived twenty years, bore every year, and often had two lambs at a time. If the mother of twins is too weak to nurse them both, one is to be left with her, and the other killed or suckled by a cow or a goat, or by an ewe which has just lost its lamb. If an ewe has two lambs neither of which will suck any female except its mother, one of them must be fed, by means of a sucking-bottle, with very thin pap made of wheat flour, water and a little cow's milk warmed.

Although twin births are not usual, yet they are by no means rare. I am confident that in a flock of three hundred and seventy one bearing ewes there have been twenty two twin births, which is more than a seventeenth.

It is strange that a belief should ever have been entertained of its being improper to let lambs suck the first milk of their mothers, as being injurious; in countries where this opinion prevails, the shepherd presses the udder with his fingers and wastes the milk upon the ground. This is a manifest error, for it is known that the first milk of females of every species is always adapted to the feeble condition of their young, and that it is destined by nature to evacuate the *meconium*, that is, the excrements contained in the stomach and intestines.

If one attentively observes what passes in a sheep-house during the season of yeaning, it may be seen that the new-dropped lambs crowd together and get into those places which are most sheltered from the cold: they are directed by nature alone; lambs have often died in sheep-houses, for want of sufficient warmth. A still greater number would have perished, if the ewes had dropped them in the open air or only under sheds.—The stronger ones might have survived, but the weaker would have died; in a better situation and with more care, they would have been reared and have thriven, thus increasing the profits of the proprietor, who gains in proportion to the number of lambs which he has.

These remarks serve to shew that the houses for sheep, if they yeau in winter, should be of a mild temperature; without, however, being very warm; so that they may be compatible with the health both of the ewes and of their lambs. When treating of houses for sheep. I shall explain the manner in which they ought to be constructed in order to obtain this end.

If ewes are milked while they give suck, it is done at the expense of the lambs; they are deprived of a part of the milk which belongs to them, by which they suffer much injury. This practice, which prevails in the south, where none but sheep's and goat's milk is used, seems there to hinder the propagation of merinos; the evil, however, may be counteracted by giving more food to the ewes, by not beginning to milk them until they have given suck three or four months, by not continuing more than three months to take their milk, and by ceasing to do so as soon as they are in heat.

Some lambs will eat at the age of three weeks. While their dams are in the fields, food should be given to them, suited to their tender age and to the condition of their teeth, such as grain pounded or ground, and tender grass.

That they may gain strength, they should, from time to time, be let out near the house, during the day, when the weather is fine. Their gambols in the open air give them an appetite and make their limbs grow.

The proprietors of large flocks do well in keeping apart, for some time after the season of yeaning, the young females which have not borne. The young lambs, by sucking them instead of their mothers, would fatigue them and prevent them from growing. In general, if one can afford the expense, it is bet-

ter to have a shepherd extraordinary, to tend during the whole year the ewes-lambs and thaives.

Of Weaning.

If the lambs were suddenly weaned, there would be a risque of causing a dangerous disease among the mothers, from a repletion of their udders; and the lambs themselves would suffer much from the sudden privation of a nourishment which they are fond of and to which they are accustomed; it is therefore necessary that the weaning, for the sake of both the mothers and their young ones, be performed gradually. At first, the lambs should not be suffered to suck during the whole day and the whole night; then, they should be indulged during the night only; then, they should be separated from their mothers at night, and put with them only once or twice in the course of the day; and, at length, they should be separated from them altogether: they forget each other, and the milk dries away insensibly.

When the lambs are dropped late, that is, near the season in which the grass appears in the fields, they may be weaned at the age of two months; if they come early, in December or January, for instance, the weaning should be deferred. In this case, it should not be before they are four or five months old, according to their strength and the abundance of food which they can find in the pastures. As they are not all dropped at the same time, more than a month sometimes elapsing between the first and last, it is necessary to wean them successively.

If the male lambs were to remain with their dams and with female lambs after they are able to generate, which happens at the age of five or six months, there would be a risque of the young females getting with lamb; their products would be but very feeble; the young rams would enervate themselves; and the young females would no longer be of service. By separating them betimes, all these disadvantages are avoided.

Of Docking.

It was not customary in France to dock sheep; but since the introduction of merinos this practice has been adopted, in imitation of the Spaniards, by the proprietors of flocks of that race. Several considerations render it advisable: 1. in many countries, at certain seasons, sheep that live upon young grass are subject to a lax, by which their tails become very foul, and in their turn dirty the wool on the thighs; 2. soft earth would also adhere to them; 3. the udder of the females, distended by

the milk when they give suck, would become tender and painful if struck by a tail loaded with dirt. It has been said that cutting off the tail strengthens the reins; for the truth of which assertion I will not vouch. Ewes upon whom this operation has been performed while young, take the milk better, and lamb without getting the umbilical cord entangled: these reasons are sufficient to recommend this practice.

The tails of lambs should be cut off at the age of one or two months. The shepherd takes them one after another between his legs; with his knife he cuts the tail off at three or four inches from its origin: it would be dangerous to cut nearer, as lambs have sometimes died in consequence of it. If the parts of females were too much uncovered, certain species of flies might deposit their eggs there, and breed worms, as I have myself remarked. When the operation is performed, the animal is let loose without any application upon the wound, which bleeds a little and quickly heals up.

Of Castration.

Before the multiplication of merinos, it was not usual to castrate a male lamb on account of any defect, he was employed like others in generating; since the number has increased, the proprietors of fine flocks castrate only those lambs which are unpromising, or for which they do not expect to get a reasonable price. It has already become an object of speculation to form flocks of full blooded merino wethers: they are bought during the first or second year of their age; they may be fed at less expence than ewes; they are kept four or five years for the sake of their manure and of their fleeces, which are very heavy; with a trifling expense, they may be fattened and sold for nearly as much as their original cost. Proprietors or farmers whose grounds are too wet to admit of rearing lambs, would find it advantageous to procure merino wethers, and to sell them as soon as fat. At some future day the markets will be filled by them, as they have hitherto been by common wethers: they are already to be seen there in considerable numbers.

Rams may be castrated at any age; if they be castrated while lambs, it should be done from three weeks old to six months: the sooner this operation is performed, the less they suffer and the less is the risque of losing them. It should be done before they are weaned; the milk of their mothers serves both to nourish them and to assuage their pain. They are commonly castrated at the age of three weeks or a month, when the testicles have descended into the scrotum.

The best method of castrating is, entirely to take away the testicles. An incision is made in the lower part of the scrotum ; the testicles are separately drawn out ; the operator seizes them one after the other in his teeth, and bites them off ; and he twists the cord, which yields and may be drawn with ease.— Some people rub the scrotum afterwards with hog's lard ; others merely close the wound. The flesh of an animal deprived of these organs, before they have served for the secretion of seed, is very fine and delicate.

This method would not answer for rams of three or four years old ; they could hardly endure it. They must be *twisted* or *whipped*.* The first of these two operations consists in seizing the testicles and twisting them so hard as to render them incapable of secreting the seminal liquor. As they are supposed to be twisted twice round, the operation is in French called *bistourner*. The testicles are made to ascend ; a tie is made below them, to prevent them from descending, and at the end of few days the ligature is removed.

The second operation takes its name from *whip-cord* (*fouet*) a sort of strong packthread which is usually employed. To perform it, the feet of the animal are tied ; the wool which covers the testicles is to be taken off by means of the fingers rather than of shears ; in order to make them descend, the scrotum is rubbed ; between them and the small nipples which rams have, is placed the packthread, which ought to be very strong. A knot is made, in which the testicles are inserted ; each end of the packthread is fastened to a piece of wood held by a man : the knot is drawn, and the two men pull as hard as they can, without giving any jerks and without cutting the strings of the testicles. A second knot is made, and drawn equally tight ; the packthread is cut off, so as to leave an inch and a half : if, in pulling, it breaks, another must be substituted and employed in the same manner, without taking off the former. Care should be taken not to injure the penis, in order to avoid bringing on a *phimosi*s.

Shepherds are, in general, acquainted with the three above mentioned methods ; some of them are so expert, that of a hundred male lambs which they castrate, sometimes not one dies. In some countries, men called *gelders* go round to the different farms, at certain times, to perform this operation : they are very careful, after having performed it, to put their fingers in the mouth of the animal, in order to make it move

* The French words for these operations are *bistourner* and *fouetter*.

its jaws and thus be preserved from the tetanus, which would kill it ; this method succeeds.

The flesh of *twisted* or *whipped* wethers is not so well flavoured as the flesh of those whose testicles were taken out whilst they were young.

The luxury of the table has some times been the occasion of castrating ewes, by taking away their ovaries ; their meat is in this way improved ; this operation is more difficult than the castration of males. The quantity of the wool is not increased by it, neither is it rendered finer ; in these last two respects it is quite useless.

Of cutting off the horns.

The horns which nature has given to the merino rams, apparently as means of defence and attack, become, in the domestic state not only useless to him, but even inconvenient and hurtful ; they prevent him from putting his head between the bars of the rack to get at his food ; frequently they wound the ewes in going through gates or doors ; and the rams themselves often suffer from them in their battles with each other, in which they sometimes are killed upon the spot. Sometimes the horns are curved in such a manner as to enter the head of the animal on which they grow. Although some of these inconveniences do not affect the migrating flocks, since they do not eat from racks and have no folds, yet the Spaniards do not fail to cut off the horns of their rams. Among us, there is much unwillingness to adopt this practice, because it is thought that the beauty of a merino ram depends much upon his horns : and those are even sometimes rejected which are born without them, however pure their race may be, through fear of their being taken for mongrels.

There are two methods of cutting off the horns ; in one, a saw is employed ; and in the other, a chisel. A sharp hand-saw answers very well. One man holds the head of the ram firmly, another uses the saw, and the operation is performed in a moment : a rope turned twice round the horn and drawn rapidly, produces the same effect.

The amputation by means of a chisel is a less simple method ; I have seen this practised by Spanish shepherds. A hole is dug, of 5 or 6 inches deep and of the length and breadth of a ram ; a second hole, not so wide, is dug across one end of the former : in this latter, which is not deep, a plank is laid to

support the head of the ram ; he is thrown upon his back in the larger hole ; one man keeps down the animal's head firmly upon the plank, while another holds a long chisel, weighing two or two and a half kilogrammes, which he places upon the horn, and on which a third strikes with a wooden mallet, which is sufficient to take fairly off the part which it is intended to amputate. The preparation which this method requires renders the saw preferable.

The horns of rams are cut when animals are a year old; they shoot out again, but never become so long as at first: sometimes it is necessary to renew the operation, if they again become troublesome.

Of Marking Sheep.

The shepherd of a small flock which is stationary requires no marks by which to know each sheep. When the flock is large, some marks are necessary, if he would avoid mistakes — They are indispensably requisite when the flock is composed of sheep belonging to different proprietors, especially at the time of folding, and still more so when they are conducted to mountains and from place to place.

Sheep are marked on various parts of the body ; on the face, in the ear, on the nape of the neck, between the shoulders, on the buttocks and on the sides. The most durable marks are those made on the face with a hot iron, and in the ear by cutting a hole in it: the others, being made only upon the wool, are effaced by the oily matter that oozes from it, by the rain, the dust or the mud ; at shearing time, it is necessary to renew them. For these latter marks, a black, red, yellow or blue colour is employed. The black is a mixture of lampblack and oil ; the blue is made with indigo ; the red and the yellow, with ochre, oil and a little meal. In some countries it is usual to stain only one tuft of the longest wool, to interlace it with a tuft of white wool, and to make a knot at the ends ; this cannot be done until some time after shearing. The Spaniards use melted pitch, which they apply to the animal's side, by means of an iron having the form of a cipher of the initial letters of the proprietor's name. This method of marking has been adopted by some persons in France. All marks, except those made on the face and in the ears, do a partial injury, more or less staining the wool ; but marks of some kind are indispensably necessary, to prevent confusion. Those made by the cipher cannot be imitated, which is a great advantage. In Spain, the laws severely punish a person for taking the mark of another : it would be well

if this practice, was adopted among us, and if each proprietor was authorised to employ a mark which could not be counterfeited without incurring a legal penalty; it would be a preventive against fraud and roguery.

Of Sheep-houses.

In *Daubenton's* treatise, no mention is made of houses for sheep; he thought them unnecessary: he has merely given the plan of a shelter intended to protect sheep from rain and violent heat. He has since discovered that, when the winter was severe, his shepherd put his flock, which was at Montbart, in stables, where they were guarded from the cold. His opinion however, so great is the influence of a man of merit, was the occasion of sheep-houses being neglected when the establishment of Rambouillet was formed: but the flock had scarcely arrived from Spain before the fault was perceived. It was found necessary, at the entreaty of the Spanish shepherds themselves who had conducted the flock, to put the animals in barns or other places of shelter. Houses have within two years been erected.

They are of no use for sheep that migrate, which, living always in a temperate climate, seldom suffer from cold, and in summer are prevented from feeling the heats of that season by the elevation of the mountains on which they feed. The case is different with those which remain in one place the whole year round, and are consequently exposed to the vicissitudes of cold, rain and heat. These require some places of shelter, that is to say, sheep-houses. So that the question which, through the influence of *Daubenton's* opinion, remained some time undecided, appears to me to be no longer dubious.— This however has been ascertained with certainty, that low, narrow houses, almost hermetically closed, of which so many are to be found, are injurious to the health of sheep; and that in this, as in every thing else, extremes should be avoided.

It is immaterial whether the walls of a sheep-house be made of stone, of mud, of reeds or of wood; every one may employ such materials as can be most conveniently procured, or which are least costly or most durable. In some parts of the country, it is usual to make the roofs too low, the air passes over the building without going through it: houses of this construction are not wholesome.

A sheep-house, to be good, must be situated upon a dry soil, secure against rain and snow, sufficiently extensive and high to permit the air within to be frequently changed, and provided with means of rendering it temperate.

It is not always easy to find a dry soil; but it may be rendered so by taking the clay or mould from the surface, and putting, in its stead, gravel, sand or iron-dross.

The extent of a house must be accommodated to the number and kind of sheep which are to be placed there: the one designed for ewes that are mothers must be larger, on account of their lambs, than that for large-horned rams; and this latter, larger than the one for wethers which have only small horns, and ewes that bear no lambs. A still smaller space is sufficient, if only young lambs are to be housed: what is most essential is, that all the sheep be able to rest there, eat all at one time, and move about with ease.

The dimensions of a sheep house should be so calculated as to allow 10 square feet for an ewe and her lamb; 8 feet for a ram or a wether, or an ewe that has no lamb, and 6 feet for a lamb; the mean of which three measures is 8 square feet.

The height must not be below 12 feet, provided much dung be not suffered to accumulate, otherwise the height should be 16 feet to the ceiling.

Ceilings in a sheep-house are convenient for holding fodder and grain for the sheep. The fodder is put into the racks through holes made at intervals above; and the grain, through hoppers; so that the trouble and loss of frequent transportation are avoided.

Houses which have only walls and a roof, and those which are made of ill-joined boards, have no need of windows; in one case, the doors, and in the other, the interstices between the boards, are sufficient to admit a draught of air. But those which are ceiled must absolutely have windows; which should be made on every side, if the house stands detached from other buildings; so that they may be opened or shut on different sides, according to the weather and the season. Some people advise small apertures to be made in the lower part of the walls, to serve as ventilators. This precaution cannot but be useful: it clears away from the bottom of the stables those noxious vapours which would injure the health of the sheep. The windows may be made of any size; if they be made small, their number must be increased. The manner of stopping them, when necessary, is very simple: a bunch of straw is sufficient. In winter, the north and the east windows must be closed, and in summer those towards the west and the south, during the day; but all should be left open during the night, if the flock be housed.

If, through economy, it be wished to employ a house already built but which is low, vents should be made in it; and they cost but little, if made of pine boards or other cheap materials; of which long trunks are to be constructed, so as to open, at one end, through the ceiling, and, at the other, through the roof of the loft above. By giving an inclination to these trunks, they may be prevented from reaching the top of the roof, and made to come out only 8 or 10 feet above the eaves.

A general rule is, that upon entering a sheep-house, one should perceive neither cold, nor heat, nor a strong smell of ammoniac.

It would be better to have separate buildings for the different sheep than to admit them all under one roof, as is the case in many countries, where they think it sufficient to divide the building into compartments by means of wicker-work. The quantity of air spoiled by the respiration of a great number of animals is less easily renewed. The neighbourhood of the males and females disturbs the tranquillity of all; the rams become heated by smelling or hearing the ewes; the young lambs, before they are completely weaned, call for their mothers a long time: these are disadvantages. At least, it is expedient to have one or two infirmaries, in which to put the sick sheep.

It is a good precaution to furnish with bars of iron and with grates the stable windows that look from the farm; in this way, wolves are hindered from getting in, roguish shepherds from secretly selling and handing out lambs, and ill-disposed persons from throwing in burning coals, or drugs injurious to the animals. The doors of the houses should be 5 feet wide, two-leaved, and cut transversely nearer the top than bottom: this breadth is not too great, because sheep always crowd one another when they enter, especially when they know that they are to be foddered. The shepherd shuts the two leaves when he wishes to count his flock. By means of the doors being divided, air may be supplied, by leaving the upper part open. The leaves should be so placed as to open outwards; otherwise the sheep, which always press towards them in the morning, would prevent them from being opened. Lastly, care should be taken to round off all the side posts, and to leave no angle jutting out which may cause abortions.

It is usual in many farms, to place the food for the flocks upon the ground: an evident inconvenience results from this practice: a part of the food falls upon the litter, and is trodden

under foot by the animals. In many others may be seen racks, which is the first step towards improvement. Within a few years, mangers have been employed, at first separate from the racks, afterwards joined to them, the two forming one body, of which the manger is the base: by this arrangement, the blossoms, the seeds and the small leaves, instead of being lost, are picked up by the sheep, and help to nourish them. The trouble of carrying troughs in and out is also avoided, and the stable is not incumbered by them.

The racks are made of wooden bars, the upper ends of which are held by a cross-piece, and the lower ends let into the manger. If the bars be placed too far apart from one another, the sheep are apt to get their heads so fast between them as not to be able to disengage themselves; I have seen them strangled in this way. The most proper interval between the bars is 6 inches; it ought not to be less. The racks are made inclining, in order to bring the fodder within reach of the animals; but if too much inclination be given to them, the dust and loose matters among the fodder would fall upon the fleeces and spoil them; they should be nearly perpendicular. Sometimes the manger consists of two pieces sometimes it is one solid piece hollowed out; this latter kind is preferable, because it can bear the rubbing and butting of the rams.

In narrow stables, racks are placed only along the sides of the building; in those which are wide, a double one is also placed in the middle, which makes four that run lengthwise, besides those at the extremities. The ends of the racks should be closed, to prevent sheep from getting in; and the corners rounded off, to avoid accidents.

One thing, which should not be neglected, is to enable the shepherd to watch his flock during the night. For this purpose, he should have a room communicating with the stable, or one made of boards, like a loft, within the stable itself; a common ladder will be stairs sufficient. One disadvantage sometimes results from this; the shepherd, to guard himself from the cold, shuts all the windows: the master must adopt measures to prevent it.

During the season of yeaning, it is indispensably necessary to keep a light in the stable, by means of a glass lantern, grated to prevent fire.

The sheep-houses must be cleansed from time to time, not so often as some have directed, because the manure would

not be formed ; the smell and the heat will be sufficient indications of the proper time. Fresh litter must often be put in.

Sheep-houses may now be seen in France, constructed upon very good plans, according to the taste and fortune of proprietors of merino flocks. Some are even unnecessarily sumptuous. When any one visits these stables, to learn the proper manner of housing sheep, he should copy only their dimensions, the disposition of their mangers and racks, and their good order, and neglect every thing which does not concern the health of the animals. Rambouillet, Malmaison, and some private establishments, may be imitated in every thing ; among the latter, I would choose that of Mr. *Morel de Vindé*, where I have seen well constructed racks and mangers, of which I shall give a description.

In the first place, they unite all the properties necessary to racks in general, however constructed.

1. They are sufficiently erect to prevent the fodder from falling upon the head and neck of the animals, and sufficiently inclined to bring it within their reach.

2. The manger is in form of a prism, to prevent the lambs from jumping into it, remaining there and dirtying it.

3. The lambs cannot get under, so as to be caught there, and be suffocated in the dung, as happens too often with racks that have vacant spaces beneath them.

To these general advantages, may be added the following.

1. They are moveable, and may be transported at pleasure, without the aid of a workman ; they may be fixed and unfix'd as need requires ; and this is very advantageous, both to farmers who only hire their farms, and to proprietors who may wish to change, for a time, the use of their buildings.

2. They may, at pleasure, be converted into double racks.

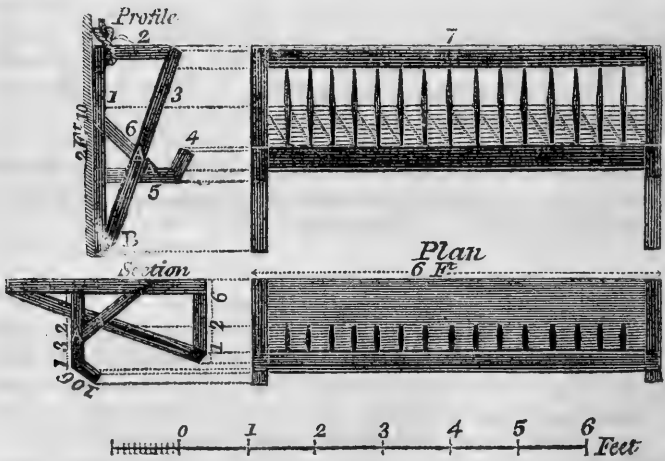
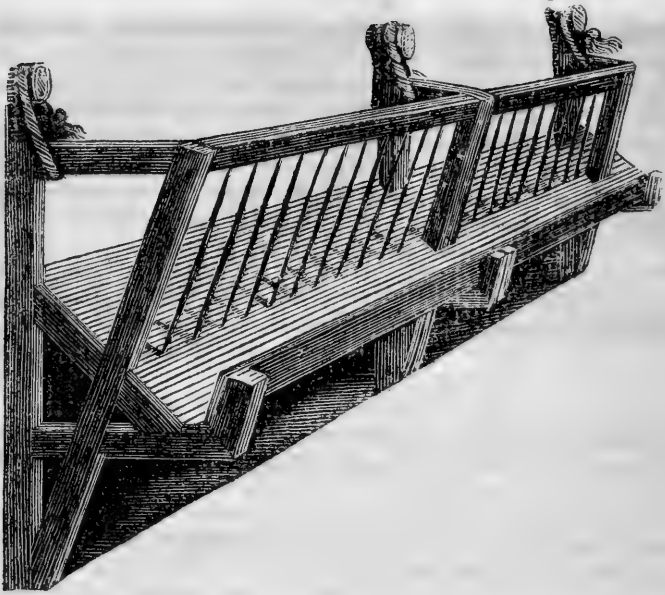
All that is necessary, for this purpose, is to plant posts four feet high and six feet apart, and to suspend the racks from them back to back ; they are joined at the hind part of the large board of the manger, and rest perfectly well one against another.

In order to do still better, the intervals between these posts should be filled with deal boards, or bricks, or with lath and plaster, or with mortar.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be clearly documented and verified. The text continues to describe the various methods used to collect and analyze data, highlighting the need for consistency and precision in the reporting process.

In the second section, the author details the specific procedures followed during the data collection phase. This includes the use of standardized forms and the implementation of quality control measures to ensure the reliability of the information gathered. The text also addresses the challenges encountered during the process and the steps taken to overcome them.

The final part of the document provides a summary of the findings and conclusions drawn from the study. It discusses the implications of the results and offers recommendations for future research and practice. The author concludes by expressing gratitude to the individuals and organizations that supported the project throughout its duration.



3. They afford room for the sheep to lie down; because, being suspended from above and tapering off towards the wall where they end in an angle, they leave all the space free to the foot of the walls; an advantage which cannot be had with racks whose mangers rest upon masonry or timber.

4. They are very solid, as may be seen in the plate, by inspecting the different peices of which they are made.

5. Lastly, they are not costly, if they be made with a view to economy in countries where wood is cheap, as they require neither timber-work nor masonry.

Explanation of Plate 1.

The rack is composed of two similar frames of oak, one at each extremity; a single cross-bar of oak unites them in front at the top.

The pieces numbered 1,2,3,4,5,6, are of oak, 2 inches square, planed; and mortised together.

The three boards which compose the manger are of pine or white wood, the rails of the rack are fixed below in the large board which forms the hind part of the manger, and above in the cross-bar of oak. These rails, being a little swelled in the middle, hold very firmly.

From the plan in perspective of two of these racks, placed together end to end, it may be seen how they are suspended from wooden pegs fixed in the walls.

Of Foddering.

Sheep which migrate are always in the air and live entirely upon what nature affords them. Being continually led to parts where they find fresh grass, art has nothing to do in procuring them subsistence, at any time of the year: it however sometimes happens that unfavourable seasons deprive them of their necessary food. During these calamities, they suffer much from hunger; and great numbers of them die.

Where the migration is not constant, that is, where the flocks returning from their summer pastures have a winter asylum in the domain of their owner, fodder is prepared, sufficient to support them until spring.

The length of time they are foddered depends upon the climate of the country : it is longer in the north than in the south. As soon as the colds of autumn begin to diminish the abundance or the goodness of the pastures, a little fodder is at first given to the sheep in the house, and the quantity gradually increased as the winter approaches, because they find abroad less and less to live upon. When no more pasture is to be found, they must for some time depend entirely upon their fodder, and their allowance is diminished by degrees until the spring produces grass.

Many kinds of food are suitable for sheep ; and may be divided into roots, stalks, leaves and grains.

The roots are potatoes, Jerusalem-artichokes, carrots, parsnips, turnips, among which the swedish turnip has the property of resisting the frost. All these roots are cultivated with little expence in ploughed grounds. I make no mention of the salsifis,* nor of the skirret, nor even of the beet, although sheep eat them very freely, and they are not despicable vegetables ; but they require too much labour to be cultivated on an extensive scale, and they are not very nutritious.

The stalks are, 1. those of all the herbs in natural meadows, consisting, for the most part, of grasses ; they are called hay, when dry ; 2. those of the herbs in artificial meadows, which are sain-foin, luzerne, clover, pimpernel, ray-grass, fromental, coquiole, wild succory, &c. 3. those of the different corns, as rye, barley, oats, indian-corn, millet, &c. 4. those of leguminous plants, viz of pease, vetches, lentils, little chiches, bitter vetches, lupines, fenugreek. The tops of flowers, the ears, the pods, &c. are to be comprehended.

With most of the stalks of the four classes of plants just mentioned, are found the leaves which accompany them at the time of their being dried and which remain with them. None should therefore be strictly considered as leaves, except those of some species of cabbage, which, as they do not perish in winter, may be given green to the sheep ; those of the vine that are kept ; and those of trees and shrubs, such as the alder, the willow, the birch, the yoke-elm, the beech, the elm, the ash, the poplar, the lote-tree, the medlar-tree, the maple, the oak, the acacia, the sea-rush, the broom, &c.

The grains are, hay-seed, wheat, rye, indian-corn, barley, oats, pease, vetches, lentils, bitter vetches, little chiches, fenu-

* Generally known in English by the name of *oyster-plant*,

greek, lupines. Bran belongs to this class of food. We may also add the masses that remain after oils have been expressed from some kind of seed, such as the seeds of colza (a sort of wild cabbage), of rape, of poppies, of hemp, of flax, olives, nuts, &c. I shall not here propose horse-chesnuts, nor acorns, because horse-chesnuts are not sufficiently abundant, and acorns are given to animals of another kind. The small bean must be reserved for horses, and the larger beans for the use of man.

It has been said that sheep will eat the bark of poplars, of fir, and of several other kinds of trees, and the skins of flax-seed after it has been bruised; but those who have no other resources than these would do well not to rear sheep.

Some persons have also pretended that the cuttings from the fruit-trees of the gardens and orchards should be given to them: they would doubtless eat of all the leaves; but there would be danger of their swallowing at the same time eggs of insects or insects themselves. Others, in short, deem the leaves of green trees capable of affording nourishment. Nothing but extreme necessity should compel the use of them, except the leaves of olive-trees, which are given, in moderate quantities, to sheep, in the south of France.

I shall make some observations upon several of these substances.

Potatoes and other roots must be cleansed from the dirt that adheres to them, and cut into pieces, before they are put into the mangers. To effect this, they are washed in tubs filled with water, which have a double bottom; the upper one is pierced with holes through which the dirt passes, and is let out through a cock. They are cut by means of a hand-mill. The description and drawing of a mill of this kind, constructed under the direction of *Mr. Bourgeois*, at *Rambouillet*, shall be given at the end of this article.

Of all these kinds of food, the turnip is the most watery; of which, the species called in French *rutabaga* is a little less so than the others; the potatoes contain many viscous particles; the carrot and parsnip are sovoury; and the Jerusalem-artichoke, which is easily cultivated, may be preserved without difficulty. This plant is one of the richest presents which America has made to Europe, and its application to the feeding of cattle is one of the happiest thoughts; it is due to *Mr. Iwart*, pro-

fessor of agriculture at the Imperial Veterenary School of Alfort. Mr. Bagot has made this plant well known.*

The best hay from natural meadows is that which is made on elevated spots, where the grass is fine and tender; the sweet smell which it exhales when gathered in is an evidence of its goodness.

It is necessary to avoid curing the hay from artificial meadows longer than is sufficient to prevent it from fermenting in the loft; when too much dried, some of the leaves are lost, and those that remain turn to dust. The hay which is cut in hot weather is subject to this disadvantage.

The best time, as is well known, is when the herbs begin to flower.

The stalks of the corns and of the leguminous plants afford little nourishment; they are really of service only when some ears or pods remain that still hold a few grains. Oat-straw however should be excepted, which is tender because the oats are mowed before they are perfectly ripe. Barley-straw should not be used, on account of its long and harsh beard, which irritates the throat, spoils the fleeces, and occasions itchings violent enough to raise pimples.

Instead of thrashing out the grain, it may be put into the racks, while in the ear or pod, together with the stalks: it is easy to know how much grain is thus given in the ear, by previously thrashing some out and examining the quantity.— This is a practice of the province formerly called Beauce, where flocks were formerly fed in winter on nothing but bunches of wheat, oats, pease, vetches, &c.

The manner of preserving vine-leaves is to put them into casks and sprinkle them with a little salt; or to dry them by themselves; or to mix them with alternate layers of straw, which imbibes their taste. Leaves of trees and shrubs may be treated in the same manner; the boughs are commonly gathered before the second sap (*deuxième sève*) and placed in the shade to dry, in such a manner as not to become mouldy. The sea-rush, before it is given to sheep, must be beaten, chopped or pounded. Bran would be of no use if deprived entirely of meal, because it is the meal alone that nourishes. The masses or cakes that remain after the making of oil are rendered fit for use

* See the *Annales de l'Agriculture Française*, t. XXVII, p. 5 et 272, t. XXVIII, p. 129 et 272.

by mixing them with water and giving the mixture to the sheep to drink.

Although I have mentioned many substances proper for the feeding of sheep, yet I may probably have omitted some ; but I have mentioned the greater number. There are few countries which do not cultivate some of them in such quantities as to afford an adequate supply. Good economy requires, in general, that each year that kind of fodder be employed which can be procured at the cheapest rate. For instance, if wheat be more abundant and cheaper than oats or pease, wheat must be given to the sheep ; where little grain is raised, but abundance of grass or roots, their food must consist chiefly of hay or roots.

When several kinds of food can be procured, it is right to give them alternately to the sheep at different meals in the course of the same day ; the qualities of one kind aid or compensate those of another. At certain hours of the day, dry fodder should be given, and at others, roots or grain. If there be any danger that the roots may decay, the winter should be begun with them, mixing however some dry food with them, for alone they would not be sufficiently nutritious.

It is difficult to determine accurately the proper quantity of food which should be given to a sheep ; it would be necessary, in order to form any certain rule, to know how much it eats in the open fields. *Daubenton* supposes the quantity so eaten to be eight pounds of grass, which, according to him, are reduced to two when dried ; but it seems improbable that an animal which bites off at once but a small portion of very short grass, although it feed during a great part of the day, can supply its stomach with so great a quantity. *Daubenton's* estimate does not appear to me to be exact. Besides, the diminution of weight which the grass suffers when converted into hay depends upon the degree of its dryness ; the grass that grows on a moist soil loses more than that of an elevated spot : attention should likewise be given to the quality of dry fodder, which varies as it contains more or fewer nutritious particles. A wether, and even a ram, does not require so much food as an ewe that is with lamb or that gives suck ; the full-grown animals consume more than the young ones : nothing then can be fixed without taking some one country and one race by which to form a standard. Let us suppose a farm at 50 or 60 leagues to the south of Paris, which is about the centre of France : in such a situation, at the season when there is no more pasture, a merino ewe that is with lamb or nursing may very well be nourished within doors upon 2 pounds of hay.

together with one pound of a mixture of grain and fine bran, or two pounds of Jerusalem-artienokes or other roots; for a portion of dried fodder and grain is equivalent to a double quantity of roots. A lamb should have but half this allowance.

One pound of leaves should be reckoned no more than a half-pound of hay.

Care should be taken to place in the stable shallow tubs of water, for the sheep to drink in. If the season is very wet, and the sheep go every day to the fields, they should have no drink in the stable; they get more than is necessary in the grass upon which they feed: when the weather is frosty or dry, they should drink in the stable, especially if they have dry food. The water which remains over night should be changed every morning. Any water seems to answer for sheep, that from ponds as well as that from rivers, or springs, or wells: the last is preferable to that of a pond in which are putrescent matters.

In many countries, it is deemed necessary to give salt to sheep. It is certain that these animals, as well as many others, are fond of it: if we may judge by this natural appetite, it seems proper not to deprive them of it. *Gilbert* directs half an ounce per day for each individual to be given in a little oats or bran, without saying whether it should be given at all times and in every place: a greater quantity might purge them,* and even this is a large dose. They may be made to take it in various ways: it may be given without any preparation; it may be mixed with the feed; or it may be tied in a linen cloth and suspended for the sheep to lick; it is often dissolved in water and sprinkled upon the fodder; a good practice, particularly if the fodder be not very relishing. Many proprietors give no salt to their flocks,† which notwithstanding, have no diseases. It may be indispensably necessary in very wet countries.

If *Daubenton* may be believed, dry fodder, a long time continued, occasions sheep to waste away. Although this assertion may be doubted, it seems proper to mix, as much as possible, watery aliments with those which are dry, and to turn the sheep out to pasture as soon as the grass shoots.

* Sheep have been known to be attacked by long and troublesome loosenesses in consequence of having taken too much salt; which has induced the belief that sea-water is poisonous to them, while in fact it is injurious only when taken in too great quantity.

† I may instance my own, which have always been healthy, though I have never given them any salt.

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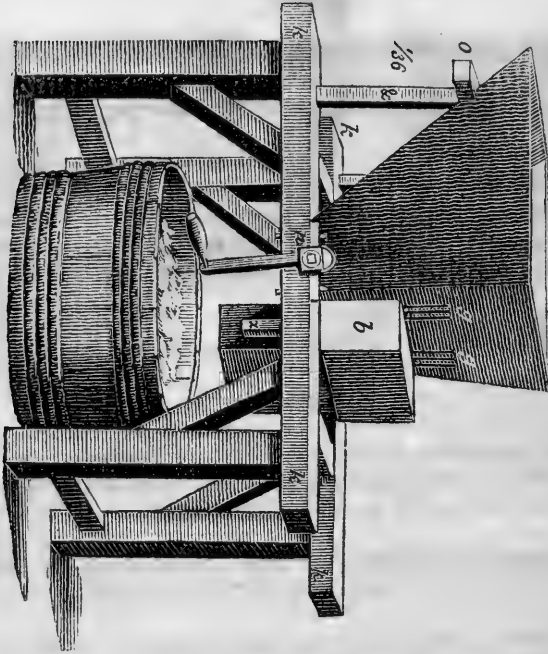


Fig. 1.

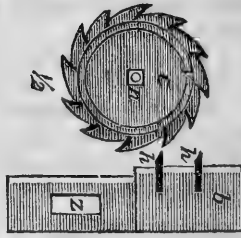


Fig. 3.

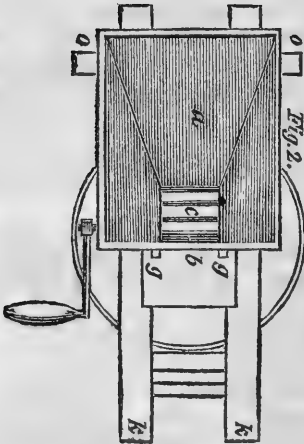


Fig. 2.

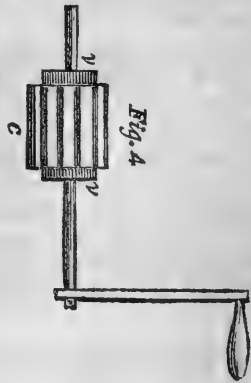


Fig. 4.

One thing cannot be too much recommended, which is, to place the hay in the racks while the sheep are out of the house ; by this precaution, the dust does not fall upon the fleeces.

When sheep of different ages are housed together, the strongest place themselves first at the racks, and keep the others away, which languish for want of nourishment. It is therefore advisable to have separate stables for the full-grown sheep and for the lambs, or not to feed the latter until the old ones are gone to the fields.

Description of the Machine for cutting roots.

PLATE II.

a a.—The hopper into which the roots are thrown : the upper part of it is 2 feet 6 inches long and 2 feet wide, the lower part within is 6 inches by 7 ; and it is 2 feet high.

The hind part of it rests in a notch made in the cross-piece of wood *o o*, which is supported by two upright pieces.

On the front part are two rabbets *g g*, *g g*, which fit two grooves in the moveable piece *b*, *fig.* 1, 2, 3.

Fig. 1, 2, 3.

b, b, b,—is a block which may be set farther from or nearer to the nut *c*, *fig.* 3, according to the size of the pieces into which it is intended to cut the roots ; it is fixed by means of the wedge *x*, *fig.* 1, which is driven below the frame *k k k k*, into the hole *z*, *fig.* 3, made in the lower part.

The upper part of this block is 9 inches broad, 6 inches long, and 10 inches high.

It is armed, on the side towards the hopper, with two iron blades *h h*, *fig.* 3, 7 inches long, sharp, and projecting 1 inch 6 lines.

Fig. 2, 3, 4.

c, c, c. is a nut, made of a wooden cylinder, 9 inches long, and furnished at each end, with a circle of iron *v v*, *fig.* 3 & 4 ; its diameter, at the extremities, is 4 inches without taking in the thickness of the iron circle ; and, in the middle part, 6 inches.

Nearly its whole length is armed with iron blades, ten in number. They are fixed in the wood, which is cut in ridges

in such a way as to strengthen them and to prevent one side of them from projecting beyond the wood more than 6 lines, while the other side, which is concave, has 1 inch 6 lines clear of the wood. Each blade is 7 inches long; they correspond with the blades *h h* of the block.

Through the nut runs an iron axis of one inch square, rounded in the two parts only where it rests upon the frame *k k*, and held at the extremity of these two parts by irons fixed by means of nuts *n, n*, *fig 1 & 3*.—At one extremity is fixed an iron crank the arm of which is 15 inches long. Its handle is of wood, and about a foot long.

The hopper *a*, the movable block *b*, and the nut *c*, are supported by the frame *k k k k* which is 9 feet long and 3 feet high. The two principal pieces of this frame, which are the upper horizontal ones, are 7 inches apart from each other, that the block *b* and the nut *c* may play between them.

A tub or a basket is placed under the frame, to catch the roots as they are cut.

One man, in a few hours, can cut with this machine as much as is requisite for a large flock; it may be rendered still more commodious and simple. In the environs of Paris, it costs but 72 franks.

Of Folds and Folding.

When sheep have passed the severe season in well-aired houses; they may, if it be convenient, (for this transition is not necessary) be placed for some time, during the nights, under sheds that are something between houses and folds: they may there acquire hardiness sufficient to endure the fold.

This name is given to an inclosure intended to contain a flock of sheep in the open air and without covering.

Folds are of two kinds, one domestic and the other of the fields. The former is made in or near a farm-yard, and is an inclosure formed of hurdles or nets, in which the flock is placed every night. Care is taken to cover the ground with litter.—If the weather be too rainy, the sheep are carried again to the sheep-house, and not put in the fold until the sky becomes serene.

A two-fold consideration demands that attention should be given to folding in the fields: it not only contributes to the

Health of the flock, but it furnishes the ground with a good manure. Some persons have thought that folds are injurious to sheep; that they suffered much in them, and that the manure from the houses was better than that from the folds. The former of these assertions is true only when sufficient precautions are not taken. Free air is salutary for all sheep, provided they be protected from heavy and long rains, great heats and the severe cold: these things are not always attended to. Much of the discredit which has fallen upon folding is to be attributed to the laziness and negligence of many shepherds who are averse to trouble, and absent themselves at times when their presence is requisite. In order to make the folding of sheep answer a good purpose, it should not be begun before the approach of mild weather. The flock should be kept in the shade during the heat of the day in summer. At the approach of storms it should be put under shelter; and the folding should be discontinued in the autumn soon enough to avoid the rains and cold. In this way, sheep may be preserved from colds, to which they are very subject, from obstinate running at the nose, and from several other disorders which are caused by checked perspiration. One of the great advantages of folding, is its saving the labour of carrying dung to distant grounds; and the manure is just as good as that from the sheep-house.—Folding should not be begun before there is abundance of food in the fields; sheep, when they lie in the open air, have a great appetite.

The folding must be hastened or retarded, according to the nature of the country: one farmer may be able to continue it no more than three months in the year; another, four or five, &c. The consideration of the fodder necessary to be consumed has also some weight in determining how long the sheep should be housed.

Some farmers, through a mistaken idea of saving time, instead of breaking down the clods of new-ploughed fields where they make their fold, leave them whole, by which means the sheep are incommoded and even hurt. Others make it in moist grounds, without taking care to choose the season in which they are least so. All these circumstances contribute to the ill effects which folding sometimes has upon sheep.

Sheep that are folded are in danger from violent winds, from hail and from wolves. The winds are guarded against by securing well the hurdles or nets of the fold. Unless the hail come suddenly in the night, it is avoided by housing the sheep. There are several means of protecting sheep from the

cunning and voraciousness of wolves.* The most usual are the courage and vigilance of dogs ; the shepherds should also go away from the woods at the approach of night, fold their sheep early, and fix the hurdles firmly. They are commonly armed with guns or piltols, and fire them whenever they hear a noise. This precaution is of no great effect, for the wolves often carry off sheep before the shepherds awake. In many countries it is usual to tie bells about the necks of several of the sheep ; this practice has, for the most part, no other tendency than to encourage the indolence of the shepherds, who, thinking it will enable them to find their flocks again, are apt to go away and leave them. It may however be of some use ; when the sheep are disturbed by the approach of a wolf, the noise of the bells gives notice of it. A farmer has thought of a method which promises to be successful : to the end of a long stick is tied a tin lantern, 10 inches high and 6 inches wide, containing a lamp ; the glasses are of different colours, red, blue, yellow, &c. The shepherd can, without opening it, pour oil into the lamp, by means of a little funnel attached to it, and which is provided with a hinged covering ; the upper opening is shut, to prevent the rain from entering. This lantern is also of use, in dark nights, to light the shepherd in changing his fold. It is tied to a hurdle on the side opposite to that near which the hut stands ; the lamp burning all night consumes but little oil.† The wolves are frightened away by the colours. Other means have been proposed, which it is useless to mention, as those which I have already pointed out are sufficient.

They are mistaken who suppose that folding improves the wool : that of sheep which always pass the night in the sheep-houses is equally fine. It contributes to their health, and for that reason increases their fleece, but does not render the wool finer.

Daubenton sees no inconvenience in folding sheep during the winter ; it is however attended with great inconveniences. At that season the sheep find little or no food in the fields ; as soon as they feel the cold, they crowd together in clusters to keep themselves warm ; which proves that they suffer, and that it is better to make them lie in the house during that season. Besides, sheep are not well folded when they do not place themselves at some distance from one another.

* In one year, after rewards offered to those who should destroy wolves, either by snares, or by arms, 5351 were killed.

† In the environs of Paris, this lamp is supposed to consume each night no more than two-pence worth of oil.

Of Pasturing Merinos. |

The time during which flocks are to be led out to pasture, depends upon the climate: in some parts, it cannot be more than four or five months at most; for instance, among mountains which remain a long time covered with snow and are exposed to severe cold: in other places, it may be seven or eight months, on account of the shortness of the winter.

The methods of pasturing sheep are not the same every where; in some places they are pastured upon heaths; in others, upon untilled or wild lands; sometimes they are permitted to run upon fallow grounds, upon meadows during the after-grass, and upon fields that have been reaped until the time when they are ploughed; many husbandmen sow grain for their flocks, such as rye, barley, oats, vetches, pease, lupines and other plants, which they suffer them to crop while young.

To these differences in the manner of pasturing sheep we may add two others, viz. in the quality of the grass, which is not equally nutritive, and in the extent of the pasture grounds. In the south, upon mountains and calcareous soils, any weight of vegetables contains more nutritious particles than an equal weight growing in the north in vallies and clayed soils. Some proprietors have many fields, others have but few, and among the latter some of superior intelligence obtain better crops from their tillage.

It is often asked how many sheep may be supported per *arpent*.* From what has been said it may be perceived that this question is not easy to answer. If, to relieve us from this difficulty, we have recourse to the ancient rural laws, it may be seen that an act of the parliament of Burgundy allows for each *arpent* one ewe and her lamb, and that an ordinance of the parliament of Paris restricts the number to one animal; though doubtless it also meant an ewe with her lamb, which is always comprehended. As the lamb consumes but half as much as its mother, the laws may be said to have allowed a sheep and a half to an *arpent*.

It was supposed that a greater proportion than this could not be kept upon a farm; this reasoning was founded upon the then prevailing system of husbandry; it is known that this system was to divide the farm into three portions, one of which was

* The French word *arpent* is retained, because the translator does not know how nearly it answers to the english *acre*, by which it is generally rendered.

left fallow every third year, during which it was not sown, but ploughed three or four times, and in the intervals it rested, and the grass sprung up ; another produced wheat or rye, which was sown in autumn, to be reaped in the following summer ; in the third, grain was sown in the spring, that it might ripen in the summer. Thus it appears that in the territory within the jurisdiction of these two parliaments, the proprietor of three hundred *arpents* had the right to keep a flock of four hundred and fifty wethers, or of three hundred ewes yielding three hundred lambs. The conversion of a part of the fallow grounds into meadows, by making it practicable to support a greater number of sheep, prevents any precise calculation from being made, 1st. because these meadows may be more or less extensive ; 2d. because they vary in their fertility, both in different countries and in different years ; 3d. because they are partially quitted for other pastures, according to the need of the animals.

Farmers, knowing their own resources, must determine for themselves the numbers of sheep which they can keep upon their farms. It may however be observed, that it is better to have a number less than the soil is capable of sustaining, during the spring, summer and autumn, than to have a greater number, unless the proprietor is willing to fodder them longer than usual. Some seasons are so dry, that in the months of June and July, recourse must be had to foddering, to prevent the animals from suffering.

Merinos feed upon all vegetables that suit the common breeds of sheep. I have thought, while following my flock in the fields, that the Spanish sheep ate several sorts of plants which the others rejected, and my observation has been confirmed by the shepherds at Rambouillet.

The flocks should not be let out of the stable while it rains, except in the great heats of summer, when the rain is light and not likely to continue long ; under these circumstances the rain is not injurious to them ; the dew is at that season even serviceable to them, because by moistening and making tender the grass that is too dry, it renders it more palatable to them, quenches their thirst and contributes to nourish them. At every other season, care should be taken not to lead them to wet pastures, before the sun has dispersed the dew. Artificial meadows, luzerne, and particularly clover, are most dangerous. The least imprudence on the part of a shepherd may destroy the sheep, unless they are speedily succoured. See the article, *Sudden swelling of the paunch.*

When the farm on which merinos are kept has some parts elevated and dry, and others low and cool, the sheep should be pastured on the former during the bad season, especially while the weather is damp; and on the latter, only after a continuance of dry weather, in the middle of the day, and for a few minutes only.

From time immemorial, a great number of shepherds, proprietors of their flocks, have been in the habit of quitting, after the vintage, the Pyrenées and ci-devant Béarn, of traversing Landes and coming to winter among the vineyards about Bourdeaux, on the left bank of the Garonne: these flocks live upon vine leaves and wild herbs. This practice is productive of some inconveniences, for the earth gets heaped up, the vines are rubbed, and the props are thrown down; but this mode of feeding is wholesome, and affords good nourishment to the sheep at a time when they greatly require it.

Proprietors sometimes reserve, as pasture for their sheep, a part of the first growth of their artificial meadows. It would be as dangerous as extravagant to suffer them to remain there long. Prudence requires that they be made to pass through quickly, at different times; or that the extent of ground be marked out each day on which they may browse without injuring themselves. Prudence also demands that in the spring the flocks be suffered to feed but sparingly in rich pastures, at first particularly, and not without previously giving them some food in the stable, so as to moderate their fatal greediness.

If rains and dews be attended with ill consequences, so also on the other hand, are drought and heat. The soft and loose texture of a sheep's body renders the animal liable to disease produced by moisture imbibed; which proves that it should always be guarded from whatever gives too much humidity to the blood. It would seem, according to this principle, that dryness and heat are always favourable to sheep. Yet, when extreme, they are very injurious and often fatal to them. The sun shining directly upon their heads, which are constantly held down towards the ground, expands the humours within the skull, and occasions apoplexies, which are more common in open countries than in others: it is of course necessary to place flocks under trees, or in the shade of walls or in houses, during the heat of the day.

I will here repeat a remark which I made with regard to feeding in the house, the lambs should be led out to pasture with their mothers, until they have acquired strength; they

would run the risque of finding little to eat, or only coarse grass, because their mothers, being more active and eager, would always go before them and consume the best and tenderest grass.

Inattentive or slothful shepherds, when they are at a distance from water in summer, often neglect to water their flocks; the sheep, in consequence, suffer much, and digest imperfectly their dry food, which is also often covered with dust. If they be conducted to the margin of a river, stream or pool, without hurrying them, those which are thirsty drink no more than is necessary for them. It is only in wet weather that care need be taken to prevent them for drinking too much.

Of the precautions necessary when sheep travel.

Sheep that migrate, when they go to the mountains which afford their summer pastures, make every year long journies; the distance they go each day and their resting places are fixed. Such flocks are not the subject of our present inquiry, but such as are bought in one country and transported to another.

If sheep be observed while at pasture, it will be seen that they are continually in motion, except during great heats. It follows that they may easily be conducted to great distances. Many importations of merinos from Spain have speedily arrived at their places of destination. Those which came to *Mr. Poyferé de Cere* were but fifty four days in travelling from Carravias (near Soma Sierra, in Spain, 18 leagues from Madrid) to Rambouillet, thirty three of which were spent in going from Mont-de-Marsan to Rambouillet, a distance of 220 leagues: a part of the flock which got separated, arrived in thirty one days at a farm belonging to government, situated three leagues from Trèves, which is distant from Rambouillet 115 leagues, after having travelled more than 300 leagues through very bad weather. These animals are therefore able to perform great journies; yet some precautions are necessary, to prevent them from being too much fatigued.

If the flock is numerous, one man is not sufficient to conduct it on a journey; two, and sometimes more, are necessary: one walks in the front, and the others in the rear; the first, by means of a little bread, makes some of the sheep follow him.—A dog might serve instead of a part of the men, and would be useful in passing through cultivated lands and plants in growth: the dog should be active, but not disposed to bite or worry the

sheep. The shepherds of the south of France carry only a stick ; they throw stones at the sheep, and in this way sometimes hurt them, they also whistle to them ; they commonly teach a wether to obey their voice, and it becomes the leader of the flock. I believe this method, except in some cases, preferable to the use of dogs, which favour the indolence and carelessness of the shepherd, and do much hurt, by crippling the sheep and causing abortions.

It is difficult to make a small number of sheep travel, two or three for instance : being accustomed to go in flocks, they run among any which they perceive as they go along. It is better to transport them in a cart ; they should there be kept on their feet, by placing before them a little fodder : when carried in this manner, they can bear a long journey. They have been carried in stage-coaches, and even in a sort of cages, care being taken to prevent them from struggling and bruising themselves ; and have arrived in very good order at their places of destination.

When they travel on foot, they should not be made to go more than five leagues a day. It is advisable, if they are to go far, to begin with three or four leagues, in order to accustom them by degrees to the journey ; after a few days, they increase their pace of their own accord ; in bad weather, or when they are fatigued, they should be made to stop and rest for a while in convenient places. On their way, they feed along the roads in which grass grows, or in the fields that are not sown ; and the consequent delay is beneficial to them, for they should never be hurried. Care should be taken to let them drink when they travel in dry weather, if they meet with brooks or a river or a watering-place of which the water appears to be good.

Every morning, before setting out, the conductor should review all his flock, and count it, to see if none of the sheep are missing : he should examine the feet of such as appear lame, and take out the stones or hardened mud, which often occasion them to limp ; he is to view the condition of each animal, to dress such as have any eruption or other disorder, and then to proceed on his journey.

By following the high roads, there is less danger of getting lost ; but as one is there liable to meet carriages which may hurt the sheep, or other flocks which may communicate to them a contagious disorder, it is safer to take by-roads, if good guides can be procured.

In the spring and autumn, which are the most favourable seasons, sheep may travel at any time of the day : in summer, they should move only early in the morning and in the evening ; the extreme heat of the sun is thus avoided, by permitting the flock to rest in the shade in the middle of the day ; it is also right to shelter it during violent rains. When the road is paved or stony, the sheep should be made to go along the sides ; for unless the ground there be soft and adhesive, their feet will suffer less than if they went in the middle where it is hard.

On arriving at the place of rest for the night, it is better to place the flock in horse-stables or in empty barns than in sheep-houses, for fear of contagious disorders. If the weather permitted, it would be better to leave the flock in a yard ; but there is danger of thefts, exchanges or accidents, which it is prudent to guard against. A nightly guard would be the safest, but it would be very fatiguing for the conductors, unless they were numerous.

It often happens that flocks have nothing, or too little, to eat upon the roads ; sometimes they find no water ; in the evening, these wants must be compensated by provender, fodder and water : a rack may soon be made of ladders a little inclined ; if it be necessary to lay the fodder on the ground, the place should first be cleaned.

In a flock composed of rams and of sheep, if the number of rams be considerable, two companies must be formed, and made to go separately : the rams precede, because if they followed the ewes, they would be too much fatigued. It has been remarked that in long journies, more rams perish than ewes. If the number of rams be too small to form a separate flock, and if on account of the season it be wished to prevent the males from covering the females, a piece of linen reaching to the ground is tied to the rams, placed so as to prevent copulation.

The great price of merinos renders both the purchasers and the venders attentive, the former, to have the animals delivered to them in good condition, the latter, to prevent the conductors from changing or parting with them on the road, and then pretending that they died. These frauds may be prevented by employing the most honest and vigilant men that can be procured ; by requiring of them not to arrive at the place of destination before a certain day ; by marking the sheep when they set out ; by requiring the skins of those that die, and certificates of their deaths from constituted authorities, and moreover receipts from the purchasers.

The age at which sheep travel best, is between two and six years: when younger, they are less able to bear the fatigues of the journey; when older, they require to be treated with more tenderness. The most favourable season for travelling is the autumn, because the temperature of the air is then mild, there is grass along the roads, and the females, if pregnant, are not so far advanced as to be hurt by travelling. The flock which went from Carravias to Trèves stopped only twelve days upon the road; seven at Mont-de-Marsan, and five at Rambouillet. In the south of France it was exposed to great heats and much dust; and in the north, to heavy rains. Many ewes, it is true, miscarried; of four hundred, only two died. An ewe, whose foot was broken at Tours, went on with the rest to the neighbourhood of Paris; in this condition she travelled 50 leagues without any ill consequences; when the creature arrived at her place of destination, her foot was dressed, and she recovered.— I mention these facts to show with how much facility merinos may be transported to great distances when prudently conducted.

It would perhaps be better not to suffer ewes to take the ram when they are going on a journey. In general, lambs that are dropped when their dams are fatigued, are weakly and do not thrive so well; but the profits resulting from those which survive are too great to admit of such a privation: besides, though the feeble are lost, good nourishment is given to the others, and something is gained the first year.

Prudence requires that, when a flock comes from a distance, it be made to feed as nearly as possible in the same manner that it did in the country from which it came; and it should be accustomed gradually to a new diet, if such be expedient: every sudden change is injurious. Merinos coming from Spain, where they have lived upon nothing but fresh grass, do not know how to eat dry fodder at a rack. If they have some sheep mixed with them that have been accustomed to it, they soon learn to imitate them; besides, hunger and instinct alone are able instructors.

After sheep have made a long journey, especially in summer, it is proper to wash and rub them one by one. It should be done in fine weather, that they may dry the sooner. This operation frees them from dust, and preserves them from the scab. Care should also be taken not to put them immediately with other sheep, lest they should have caught some contagious disease by the way; six weeks at least should elapse before they are put with others.

Of Shearing.

Shearing is the shepherd's harvest ; it was formerly attended every where with a sort of ceremony ; it has become a matter of still greater importance since the introduction of merinos, because the profits have more than doubled. It is from the yearly fleeces of his flocks that the proprietor is recompensed for the trouble and expense which they occasion him.

Some sheep, especially among the common breeds, lose a part of their fleece before shearing time, in consequence of either sickness or weakness caused by insufficient nourishment.—Merinos are rarely in the latter case, because they are not suffered to want : it sometimes happens, however, that locks of their wool are pulled out, when they are permitted by inattentive shepherds to feed among bushes.

Daubenton was mistaken when he pretended to point out the time at which the young wool displaces the old, and offered this as a sure sign of the necessity of shearing : the fact is not so ; he has been misled by the growth of young wool, which does indeed take place when any part of the old has fallen out, from whatever cause. Sheep do not in this respect resemble horses, which have a winter and a summer coat, and therefore change their hair every year. The wool of a merino, unless the animal be sick or ill-conditioned, constantly grows. It may keep its fleece several years, which will increase in weight and length ; it is the same wool which continues to grow each year : after some time, it becomes so troublesome to the sheep, on account of the dust and insects which it harbours, that they begin to rub themselves, and thus to lose their wool. As a proof that it is the same wool which continues to grow, it may be observed that when a sheep is not shorn while a lamb, its wool, the second year, is not so fine as it would have been if shorn twelve months before.

In general, the time for shearing is when warm weather approaches ; the animals then suffer from the weight of their fleece ; they should therefore be relieved from it. The time of shearing, of course, cannot be the same in all climates ; it may also depend upon other circumstances. When they migrate, it is proper to shear them immediately before they set out for the mountains. A proprietor who wishes to transport a flock from one part of France to another distant part, should use the same precaution, in order to enable it to walk with more ease. If any sheep should have the scab to such a degree as to require the whole body to be dressed, it would be necessary to shear them sooner.

In the south of France, shearing-time comes about the middle of May ; and in the north, at the end of June ; for the rams and ewes, temperate weather is chosen. In countries where the lambs are dropped in December and January, they are shorn the first year. Some proprietors have them shorn before the ewes, that the young wool may have time to grow before they are made to lie out in the fold, which is commonly done three weeks after their mothers. This interval is permitted with the view of letting their wool gain strength, and that they may not be exposed too young to the inclemency of the air.

It is a matter of doubt whether lambs should be shorn the first year of their lives, or whether the shearing should be deferred to their second year. Some agriculturalists have maintained that by leaving their wool on, they would be preserved from the staggers ; others, that the quantity of wool is thus increased. The former assertion is a mistake ; and so also is the second, if confidence is to be placed in experiments made at Rambouillet and in the department of Aveyron.* The animals are not preserved from the staggers by leaving their fleece on them eighteen months, and the quantity of wool is not increased : but, on the other hand, the wool is finer when taken young, and the lambs are freed from lice† and ticks,‡ which, in some countries, are very troublesome to them.

The instruments used for shearing are shears or scissors of various sizes and forms.

Two customs prevail ; one generally, and the other in some of the departments : the former is to shut up the sheep in a close place, one or two days before they are shorn ; the second is to wash them, for the purpose of getting out the coarsest of the filth with which the wool is loaded. The custom of sweating sheep that are to be shorn,§ favours the shearer, renders the operation easier to the animals, and gives to the wool more grease, which is advantageous in washing ; it is also supposed to increase the weight, but this augmentation is trifling. If the proprietor of the sheep stops here, the manufacturer of the wool has no reason to complain§§. This sweating should not be carried to an extreme in sheep that are vigorous and sanguine,

* They are to be found in Vols. VIII, XVI and XXXVIII of the *Annales de l'agriculture française*.

† *Pediculus ovis*.

‡ *Acarus*."

§ This practice prevails in Spain as well as in France.

§§ In Roussillon, after making the sheep sweat, they make them run in the dust, which, falling upon the fleeces, increases the weight of them. This is a dishonest practice of which the manufacturers justly complain.

nor in those that are inclined to cachexy ; there would be a risque of losing a great number of them ; some, because the force of the muscular action and of the circulation of the blood would be increased ; others, because they would be exhausted by a too violent effort. By choosing warm weather for the time of shearing, there is less need of making the sheep sweat. If it be necessary to shear while the air is yet cold, care should be taken, after the operation, to put the animals in some temperate place during several days.

In many countries it is customary, before shearing, to wash the fleeces on the backs of the sheep. To do it well, the sheep are exposed one after another, to a fall of water from the flood-gate of a mill, or a dam in a river or brook ; two men hold the animal with one hand, and with the other rub the wool, and clear it of its filth, which the stream carries away. It should be done in fine weather, that the sheep may dry quickly. The principal advantage of this practice results from the diminution of weight which it occasions, and the consequent saving of expense in freight ; another advantage to the proprietor is that the fleeces being thus rendered all equally clean, the merchants who buy them have no longer any pretext for lowering the price. This washing does not serve, as has been supposed, to render the wool finer. *Daubenton* has advised it, because it was practised in the country where he lived, but he was ignorant of the disadvantages attending it. It cannot be employed except in places near the water : it gives a great deal of trouble and does not diminish the succeeding operation, either in the laundries, or at the manufacturer's. Besides, long and thin wool may be washed upon the back of the animal, but not tufted wool, like that of merinos, without great difficulty. As to its effect upon the animals, if practised upon such as are sanguine, it may be conducive to their health, but it would be improper for such as have a disposition to the rot. However, in Germany, especially in Saxony, this manner of washing is generally practised.

The proprietor of a flock should be present when it is sheared : he can then judge whether the animals are in good condition, or whether any of them are diseased, for the latter are shorn with less ease than the former ; he also sees the quality of the wool, and knows beforehand what changes in his flock are necessary. He does not suffer to be left, through negligence, among the fleeces any portions that have been affected by scab, nor any jar, nor long hairs, and, above all, no filth.

The place on which the shearing is performed should always be clean ; too much attention cannot be paid to this.

The fleeces are tied in bunches, by means of straw, or bits of rush, or packthread ; these last two things are best, because they weigh so little that no allowance need be made for them when the wool is weighed. It is better to separate the wool of the belly, of the head, of the thighs and the feet, which is inferior to that on the rest of the body ; but merchants ought, in consequence to pay dearer for the fleece.

Care should be taken not to expose sheep, immediately after shearing, to cold rains nor to hail, which might occasion the death of many.

Daubenton advises, in shearing, to lay the animal upon a table which has several holes near its edges, and, by means of a rope passed through these holes, to fix the fore-legs in one place and the hind-legs in another, and if it be a ram, to tie him by one of his horns also : in this way the shearer may be seated. He thinks this method least painful to the animal, and most easy for the operator. He is greatly mistaken : when the animal is thus stretched out it is not more at ease than if its four feet were tied together ; and the shearer seated and leaning over a table, is much more fatigued than if he were on his feet : his movements are not free and easy, and he shears fewer sheep in a day. A man who stands, is, it is true, obliged to stoop ; but, like the reaper, he soon becomes accustomed to it. The animal remains tied but a short time, half an hour at most : as soon as the wool is taken from the body, its feet are loosened.

A good shearer should cut the wool as near as possible to the skin, without leaving ridges and without wounding the animal. An expert man may shear from forty to fifty sheep a day. I have known some men who could shear as many as seventy ; but they were sheep of the common breed ; merinos require a considerably longer time, as they carry heavy and thick fleeces ; from twenty to twenty four is as great a number as can well be shorn in a day, if they be ewes ; and from fifteen to twenty, if they be rams. Notwithstanding all the care that can be taken, the sheep sometimes receive wounds in consequence of their struggles ; pulverised charcoal, or dust from a smith's forge, or pounded slate, should be immediately applied : sores are thus prevented, and the flies are kept off.

Hitherto the proprietors of flocks in France, have been in the habit of selling their merino wool unwashed ; and some merchants have made it a practice to wash it before they disposed of it to the different manufactories ; but the greater part of the wool has been prepared entirely by the manufacturers themselves.

The wool should be kept in a place which is neither damp nor dry. In a damp place it would grow heavier, to the disadvantage of the purchaser ; in too dry a place, it would lose part of its weight, which would be unfavourable to the vender.* To keep it well, it should be placed in a lower room that is exposed to the north, and cool, 3 or 4 feet from the ground, and not touching the walls. No dust should enter this place, otherwise the wool must be covered with linen.

Of the Fleeces and Wool.

The fleeces of merino rams which come from Spain weigh at most, unwashed, 8 pounds, and those of the ewes, 5 pounds ; and in France we obtain from rams of that race as much as 18 pounds, and from ewes as much as 12 pounds,† this is the *maximum*. The usual weight, for ewes, is from 7 to 8 pounds, and for rams, from 8 to 10 pounds.

What is the reason of the difference between the weight of the fleeces of merinos in Spain and in France ? It is because in Spain sheep live only upon what they find in the fields ; sometimes they find very little there : besides, as they are of a smaller size, they must carry less wool. In France, the deficiency of pasture is always amply supplied in the stable.

The weight of wool does not depend upon its thickness alone, but also upon its length : in this latter respect we have gained much ; our wool has become more fit for the manufacture of casimirs.

All parts of a fleece are not alike ; it may be distinguished into wool of four different qualities ; the first grows upon the shoulders and the back, from the neck to about half a foot from the tail, including a third part of the body ; the second covers the sides, and extends from the thighs to the shoulders, approaching to the neck ; the third grows about the neck and covers the buttocks ; the fourth covers, 1. from the fore part of the neck to the extremities of the feet, comprehending a part of the shoulders, 2. the two hind-legs to the hoofs : in Spain this fourth sort is called *cayda*, and in France *basse laine*. The more equal in quality the wool is on all parts of the body, the greater is the value of the animal which carries it.

* In a parcel of wool weighing 758 pounds, I have remarked a diminution of 4 pounds from the 15th of June to the 15th of September, that is to say, in three months, during the summer.

† An ewe sold at Rambouillet has been known to give a fleece of 15 pounds.

Experiments which we have made in the garden of the Museum of natural history, by covering with linen-cloth, during a year, the bodies of some wethers, have proved that wool, when protected from the air, grows finer and whiter: the difference is very sensible. But it remains to be determined whether the expense of covering them does not more than counterbalance the increased value of the wool; any person may easily make the calculation.

The wool of dead or sick sheep should be put by itself, as being less fit for manufacturing than that of healthy animals.— I suspect it is more liable to be attacked by vermin; Mr. *Roard** has proved by experiment that in dying it does not take colours so well. † Of three kinds of wool which I gave him, one from healthy sheep, another from sick sheep, and a third from dead sheep, the first took a deep dye from the different colours with which it was tried; the second took them faintly; and the third more faintly still. It follows, that proprietors of sheep should be careful not to mix these different kinds of wool, and that manufacturers would do well to show peculiar favour towards those who do not deceive them. I also think that the wool of sheep killed in the slaughter-houses, which is taken off by means of lime, is much inferior to that of sheep shorn while they are alive. It wants that oily matter which nourishes it during the animal's life, and which continues in the wool if it be shorn while the sheep is in full health; which is not astonishing, since the same thing may be observed with regard to hair. Lime also renders the wool hard.

With a view of obtaining fleeces both fine and long, sheep at *Ranbouillet*‡ have been suffered to go without shearing, two, three, four and five years. These animals bore their burden without appearing to be much incommoded by it; only they could not get up again if they happened to fall upon their sides, especially during the third year, for they carried a weight of from twenty four to thirty pounds. After three years, the wool began to come out, and its quantity continued to decrease; none of them fell sick after their fleeces were taken off. The manufacturers, every year, purchase, with eagerness and at a great price, these noble fleeces; it is not yet known to what

* He has charge of the dying department in the imperial manufacture of the Gobelins, and is an able chymist.

† See the details of these experiments in the XXII vol. of the *Annales de l'agriculture française*.

‡ I believe this experiment was first thought of by *Gilbert*, it has since been adopted and continued by my colleague *M. Huzard* and myself.

use they apply them. I advise proprietors who wish to try this method, to do it with wethers rather than ewes, because the length of the wool is troublesome to ewes when they give suck.

Daubenton, in order to distinguish the different degrees of fineness in wool, makes use of a micrometer. But this instrument, though it affords the surest method, is troublesome for farmers, who do not know how to make use of it. Habit teaches them to distinguish the different kinds of wool, by simply comparing them together, or by laying them upon paper or black cloth.

Another observation, for which I am indebted to Mr. *Roard*, is that the wool of different breeds does not all take die equally well; merino wool takes the deepest colour.

Wool may be kept longer if the yoke remain in it, than if it be washed; this oily substance keeps off a long time the insects which are apt to attack it. By placing it in the manner which I have before described, it will be still less exposed to vermin.

Wool is liable to be destroyed by several kinds of moths or caterpillars (*tinea pellionella*, *tinea topezella*, *tinea vestinella*, *tinea sarcitella*); the butterflies which produce them flutter about places in which wool or woollen goods are kept, from the months of April to the the months of October; that is, almost from spring to winter, with some variation, according as the season is more or less warm. During all that time, they deposit upon the wool little eggs which can scarcely be perceived; from these eggs are produced the caterpillars; they are hatched in October, November and December; they grow slowly at first, and become stiff when the weather is very cold. In March and April they grow more; at that period they cut off many filaments with which to nourish and cover themselves. They afterwards form a sort of sheath in which they gradually envelop themselves; when they are entirely sheathed, they are in the chrysalis state; at the end of three weeks, they change to butterflies.

There are three ways of discovering when wool is attacked by insects: at first, butterflies of a bright yellowish colour, and three lines in length, are seen flitting about it; afterwards, are found upon the wool little dry, angular grains, which appear grey if the wool is white, and blackish if it is black: lastly, along the walls and ceiling are perceived sheaths of a line in diameter,

and four or five in length, a little swelled in the middle, and widened at the extremities.

It is difficult to guard effectually against these insects. The furriers beat with rods, several times during the summer, the fur and wool which they have in their stores: the woollen-draperies are careful to brush their cloths frequently; but these preventives would be ineffectual, if it were requisite to keep large quantities of wool; I know of no other than to place it as I have directed, taking care to kill all the butterflies which are found upon the walls, and to search for and sweep down the sheaths. The penetrating substances which have been proposed are of no use.

Of Washing the Wool.

The wool, before it can be used, must be freed from a great proportion of that oily matter (in French called *suint*) with which it is impregnated, and be cleansed from all the filth which adheres to it. As the wool of merinos contains more grease than that of common breeds, and as it is shorter and more curled, it is usually dirtier, so much so that a flock of merinos may be distinguished at a distance by this mark alone. Common wool is more easily cleared of its grease than the fine kinds; nothing more is requisite than to wash it in water which is a little warmed by fire or by being exposed to the heat of the atmosphere. If the sheep-houses are kept clean by frequently changing the litter, if the sheep are not led through the dust, and if their folds are not upon a dusty soil, the fleeces are more profitable to the merchant or manufacturer who purchases them, because they loose less in washing. It is desirable that the proprietors of merinos attend habitually to the cleanliness of the fleeces, and particularly at the time of shearing, by preventing any dung from getting among the wool, of which manufacturers sometimes justly complain. And this should be attended to not only from considerations of probity, but also that the manufacturers may have no pretext for beating down the price of the wool. But notwithstanding all the care of the proprietors, the fleeces become more or less dirty, and consequently lose more or less in weight, according to the nature of the soil on which the sheep are kept; so that it is best to wash the wool and put it nearly in the condition in which it is when sold by the Spaniards, or at least to clear it of the greatest part of its filth.

Many people endeavour to imitate the Spaniards: and, as is always the case when a first attempt is made at a process which

is not understood, the wool was but imperfectly washed and cleared of its grease. The manufacturers complained of it; they said it was ill-washed, knotty and brown; they preferred buying it in the state in which it was when taken from the animal: in which they were right; for Mr. *Roard* has remarked that when wool is imperfectly washed it cannot be properly cleaned by a second operation. Latterly, people have in many places been more successful, notwithstanding what the manufacturers say, who, for the most part, being guided by interest, pretend to see no difference between what is well or what is ill done. It must, however, be confessed that many people in France do not yet wash it well. If we can establish laundries, we shall be able to offer for sale wool like that which comes from Spain: all haggling between the owners of flocks and manufacturers will be prevented; the wool will be sold according to its quality: the expense of carriage, as has been already observed, will be saved, and no pretext will be left for purchasing at a low price. This is still wanting to complete our improvements, and to enable us to arrive at the end proposed in introducing merinos into France.

Above twenty years ago, I procured information in Spain upon this subject; I am also indebted for information to Mr. *Poyféré de Cère*, who has given me the plan of a laundry drawn by himself upon the spot.

In France, wool cannot be well washed except between the time of shearing and the end of October, because time is necessary to dry it.

The first operation is, to part the different qualities, that they may be washed separately; practice teaches to distinguish the various sorts. After this, the wool is spread upon hurdles, tossed about and beaten with rods, in order to clear it as much as possible from dust and other dirt; all the dung, pitch, &c. must be picked out by hand; it is then combed with a little instrument that has short curved teeth set far apart; this operation must precede every mode of washing.

I shall first give *Gilbert's* method of washing wool, with the more confidence, as I found that it was followed in a famous manufactory at Louviers; the workmen may perhaps have concealed a part of their process from me; yet it is certain that the method I am about to explain answers very well. I shall afterwards describe the method of washing on a great scale, brought by Mr *Poyféré de Cère* from Spain, with the description and plan of the fine laundry at Alfaro.

Gilbert's method.

“ The fleeces are put into tubs or casks or any other vessels of a capacity suited to the quantity of wool to be washed. When they are filled with wool gently pressed down, but not trampled, water warmed to 30 or 40 degrees (of Reaumur, equal to 67 1-2 or 90 of Farenheit) is to be poured in gradually, till it covers the wool. The next morning, or at the end of twenty-four hours, the washing is to be begun; the soaking should not continue less than 18 hours. In order to avoid trouble, the tubs should be placed as near as possible to the place where the washing is performed. The water in which the wool is soaked becomes filled with grease ;* it is this water which is most necessary in the washing ; and care should be taken not to waste it ; some of it is to be poured into caldrons, and heated to 50 or 60 (112 1-2 or 135) degrees ; a heat below 50 (112 1-2) degrees would not be sufficient ; if above 60 (135,) it would crisp the wool, and render it hard and brittle. The proper temperature may be determined without the aid of a thermometer ; it should be just that at which the hands cannot be held in the water without scalding them.

“ When the water is at this temperature, some wool is put into the caldron : the less is put in at a time, the more completely is the end answered. A smooth stick or rather a smooth wooden fork, should be employed to stir the wool, which should be continually lifted up, in order to open it and render it more permeable ; if it were turned over, it would twist, and thus impede the subsequent operations. After having been immersed three or four minutes, it is to be taken out either with the hands or with the fork ; it is put into a basket, which is held a short time over the caldron, to drain and to save the greasy water : as the water in the caldron diminishes, it must be replenished : if it becomes muddy, the caldron must be entirely emptied, and fresh water from the tubs poured in. The water is warm enough if the wool washes well ; before taking it out of the caldron, it should be tried from time to time. It would be well if the place where this operation is performed was under cover ; this cannot always be the case, for which reason fine weather should be chosen. When the wool is taken out of the caldrons, it is to be carried near the place where it is to be washed ; baskets are made use of for this purpose. It is not a matter of indifference what kind of water is used ; the best is that which washes linen well, in which vegetables are soon cooked, which makes good soap-suds, and which is very good

* This grease, according to the experiments of Mr. *Vauquelin*, is partly composed of a soap whose base is potass.

to drink ; running water is better than stagnant water ; well-water is the worst ; if no other can be procured, it should be previously drawn and exposed to the air several days, or it should be boiled.

“ To wash wool effectually in running water, two open-wrought baskets should be placed in the stream, one higher up than the other ; care being taken that the water does not rise to the top of the baskets, lest the wool be carried away : the washing is done in the lower basket, and the wool when washed is thrown into the one which is higher up ; it there takes its last degree of purity. Care should be taken not to rub the wool ; it is sufficient to move it about rapidly in the water and to open it as much as possible with rake ; it should be drawn continually from one part of the basket to another. As soon as the wool opens freely and floats on the surface like a cloud, and the water of the first basket becomes clear, it is taken out to dry.

“ When the washing is performed in water that does not flow, baskets with two handles at the sides are made use of, and are plunged repeatedly into the water until it ceases to be fouled by the wool.”

Gilbert directs a press to be used in order to squeeze the water out of the wool, or a compression produced by two strong men twisting a cloth into which the wool is put. This method, which does no injury to the wool, accelerates the drying of it, and is convenient when the season is far advanced ; a single fine day is afterwards sufficient.

A spot of short thick grass should be chosen on which to dry the wool, unless there be a building constructed for the purpose : the place must first be cleaned and swept, so that no filth may adhere to the wool ; it would be better to dry it upon hurdles or upon flint-stones.

According to *Gilbert*, merino wool well washed and well dried loses two fifths of the weight which it had before washing ;* and according to our own observations, it loses three fifths or fifty four per cent.

In all the manufactories, a last washing is given to wool brought from Spain, which never comes thoroughly washed ; it loses in this last operation from fifteen to twenty per cent.—

* It was probably wool very little dirtied, and perhaps washed upon the animal's back.

To the water in which the wool is soaked, urine and potash are added : according to *Gilbert*, these additions are useless. If the wool be soaked in warm water for eighteen or twenty four hours, it preserves its flexibility and elasticity ; and it is whiter than that which comes from Spain.

Method recommended by Mr. Girou de Buzaringues.

A proprietor in the department of *Aveyron*, who has succeeded well in cleaning his merino wool, says that he soaked it twenty four hours in cold water, to obtain the grease. I think that warm water would be preferable. *Mr. Girou de Buzaringues* advises, properly I think, to spread the fleeces and to place them in the tubs, with the outside of the fleeces uppermost, lest the pressure of the water, if they were placed otherwise, should render them impermeable. When, for the purpose of obtaining greasy water, he employs coarse wool, which is always dirtier, he strains the water. On these three points he differs from *Gilbert*, whose method, on the whole, he follows.

The methods recommended by *Gilbert* and *Mr. Girou* may be practised by any body. Every one may wash his own wool, if he follows the directions given : it is only necessary to proportion the apparatus and water to the quantity of the wool to be washed.

Spanish method.

In Spain, where numerous flocks belong to great proprietors, buildings have been erected for the purpose of washing wool, in which are at once united economy of time and expense, and where the wool is cleansed sufficiently for the subsequent operations which it is to undergo in the manufactories. This was a subject worthy of inquiry. *Mr. de Poyféré de Cère* has afforded us every requisite information, by giving us an exact description of one of their fine laundries, of which he took a drawing upon the spot ; it is that of *Alfaro*, where the wool of the *Paular*, *Montarco*, *Turbietta*, and other famous flocks, is carried every year to be prepared, at a small expense, and afterwards sold to foreigners.

The united waters of the *Eresma* and of other streams which have their source in the mountains which separate Old from New Castille. flow towards *Segovia*, and thence into reservoirs or basins at *Alfaro*.

“ These reservoirs, says *Mr. de Poyféré*, contain above one hundred and fifty eight thousand nine hundred and four cubic feet of water ; an immense resource, supplied by a constant stream, which serves to afford a temporary supply to the laundry, if at any time the stream becomes muddy and unfit for use.

“ The water being admitted into the laundry and the wool having been picked by hand and separated into first, second, third qualities, and refuse, it is placed under a shed near to the vats.

“ The vats are filled to two thirds of their depth with hot water, by means of a cock communicating with a boiler. This water may be tempered at pleasure with cold water. A man is stationed to regulate it, which he does by putting his leg into each vat and ordering hot or cold water to be added as he sees proper, until the degree of heat is such that he can endure it without being scalded. He then gives the signal for immersing the wool ; the length of the immersion is regulated by the time requisite for emptying the second and third vats before returning to the first.

“ A man descends into one of the vats, takes out a certain quantity of wool, and put it into wicker baskets.

“ Children, holding fast by lines, get upon the wool in the baskets, and tread it with their feet, to press out the greasy water with which it is charged : this water escapes through the drains of the grated-work on which the baskets are placed, into a cistern, and empties itself out of the laundry.

“ The wool thus pressed is emptied out upon a grated-work. Three children take it up, divide it, and deposit it on the margin of one of the lavers. A man (this is the principal hand,) placed upon a flight of steps, takes the wool, handful by handful, divides it again, and lets it fall into a canal.

“ Two men are placed in a laver, resting their hands on a cross-piece, which is firmly fixed, who move their right and left leg alternatively, so as to drive back the water and separate the flocks of wool. The depth of the water in the laver is from 11 to 12 inches.

“ Four men placed in the canal of the laver, resting their hands upon the sides of it, repeat the motions of the two men stationed in the basin.

“ Four other men, also standing in the canal, gather up the wool as it is carried along by the current of water : they make it up into bundles, without wringing or twisting it, press out the water, and throw the wool upon the floor. A child takes it and deposits it on a shelving drainer. After passing through several hands, it is finally placed in a heap on the top of the drainer.

The wool is suffered to remain here during four and twenty hours. At the expiration of which time, it is carried to a neighbouring meadow, which has been raked and even swept with care, and there spread out in small parcels until it is quite dry, which commonly requires three or four days.

The wool which escapes the four men placed in the canal is carried by the stream into a wooden cage, whose bottom and sides are covered with a net that has very small meshes.— Three men stationed in this cage stir about the wool with their feet ; and as they gather it up, they make it into small bundles which they press out with their hands, and which they throw upon the floor, where two children receive it in small baskets, squeeze it, and carry it to the great heap at the top of the drainer.

Such is the operation of washing practised in Spain for wool of the highest reputation. At Alfaro, the work begins at three o'clock in the morning and does not end till night. In one working day, which is about sixteen hours, three hundred French quintals (antient measure) of wool are washed.*

Method communicated by a Manufacturer of Montjoie.

A manufacturer of Montjoie, in the department of Roer, is of opinion that proprietors of merino flocks, who are distant from manufactories, might advantageously confine themselves to a simple washing, so as to take off nearly all the filth, and to preserve grease sufficient for the washing at the manufactory. He directs the different sorts of wool of which a fleece is composed to be picked, and put separately into a basket ; the wool to be placed in a stream of water, and taken out and plunged in again from time to time ; to be stirred with a wooden rake ; and when no more filth comes out, to be dried in the open air. According to him, fleeces thus cleaned do not lose in the washing at the manufactory more than thirty three per cent, while that which is sold dirty and with all its grease, may lose as much as seventy five, if the animals have

* Mr. *Sylvestre*, my colleague, after reading this description, thought that the labour might be diminished by substituting machinery for a part of the men there employed ; and his opinion is very just.

been ill taken care of, and kept in dusty places. This at least is certain, that having tried this method with a small quantity of my wool, a distinguished manufacturer of Verviers who saw it, assured me that it would wash perfectly well at the manufactory, and that this was the state in which it answered best. If this assertion be true, as in all probability it is, nothing is easier than to give the wool a first preparation, which will diminish the expense of carriage, which may be effected by all proprietors of flocks in the neighbourhood of streams of water, and which will not prevent the last washing, indispensable before the wool is manufactured. If this method be pursued, the coarse and very dirty parts of the fleeces should be excluded, such as the wool of the forehead, of the belly, the thighs and the legs. This mode of washing answers nearly to washing the wool upon the sheep's back, except that it cleanses it more effectually. If the manufacturers will be just enough to give a price for this wool such as to compensate for its diminution in weight, and proportioned to what they would have given if they had bought it dirty and greasy, I do not doubt that many proprietors will adopt this method.

Washing at the Manufactory.

The washing at the manufactory is performed in the following manner. A caldron, capable of holding with ease from 30 to 40 kilogrammes of wool, is filled with a mixture of two thirds water and one third urine, and is heated. When this liquid arrives at the temperature of from 40 to 45 degrees (90 to 101 of Farenheit) so that the hand can bear it, the wool is put in, and left there half an hour, being stirred about continually with much care by means of small wooden forks; it is then taken out and drained, then washed, in small parcels, in a river or brook, until it ceases to foul the water, and finally dried for use. In some manufactories, the mixture is made with three quarters water and one quarter urine, which answers as well.

Private individuals who wish to wash small quantities of wool, in order to manufacture it at home, may employ *Gilbert's* method, or that recommended by the manufacturer of Montjoie; whichever be adopted, it must be succeeded by the wash with urine just mentioned. If no river nor rivulet be near at hand, baskets filled with wool may be plunged into tubs of clean water, which must be constantly renewed. This operation is indeed long; and I do not recommend it unless the quantity of wool is small.

Sale of the Wool.

Two opposite interests meet in the sale of wool, that of the proprietor of the flock and that of the manufacturer: if they deal by an intermediate agent, that is, by means of a merchant or a broker, a third interest arises, distinct from both. It is best for the manufacturer to purchase immediately from the proprietor; they thus save between them the profit which would have gone to the third person: but it is difficult to effect this. Those who raise flocks are not acquainted with the manufacturers, and have no way of applying to them; they are therefore obliged to wait until traders come to them; and thus they deal with none but merchants, who afterwards dispose of the wool to the manufacturers.

The manufacturers, however, send their agents into the country to purchase wool at a low price, by persuading the country-people that what they offer is the current price, and that it is for their advantage to accept their offers. The want of money, and the fear of losing by delay, induce them to sell at a low price. Some great proprietors of flocks obtain better information; they learn the prices of wool in Spain, know the vents for manufactures, and, being less in haste, bring the manufacturers nearly to the just price.

It is customary to give four pounds of wool over and above every hundred; the manufacturers call this a *gift*: this custom is to the disadvantage of the vender; it would be better to make the bargains for a real and precise quantity without any addition. This custom has arisen from the allowance which was formerly made for the weight of the bands; the manufacturers have since insisted upon the gift of four per cent and an allowance for the bands besides: the proprietors of flocks should consent to neither of these reductions; the weight of the bands is nothing, if pack-thread or rushes be employed.

The vender derives an advantage from disposing of his wool immediately after shearing; because, in drying, the weight is diminished. It is also profitable to the purchaser to obtain it as soon as possible after it is shorn, because it can be cleaned better, as it contains more grease; the season is besides more favourable for washing. If it be sold ready washed, the above advantages do not result from selling it at one time rather than at another.

Many French manufactories had contracts, for a certain number of years, with proprietors of flocks in Spain, for the

purchase of their wool: it was usual for the latter to give credit. Nothing hinders similar bargains from being made in our own country. Flocks remarkable for the fineness of their wool, would undoubtedly find manufacturers desirous of securing it for themselves.

By experiments made with great care and exactness in 1807, which I myself witnessed, it is proved that the wool of French merinos is equally as strong and elastic as that of Spanish merinos. By an attentive comparison, it has been discovered that, when employed in manufactures, their products are strictly equal in quality and in quantity; consequently, the price of French merino wool ought to be regulated by that of the Spanish merinos.

Of Selling Sheep.

The sale of the wool is one of the profits resulting from flocks; that of the sheep is another. In the preceding article I showed that, in bargains for wool, the purchaser, particularly if treating with farmers, may easily deceive, without running any risk of being deceived himself; for he knows the quality of the wool, the use to which it may be applied, and the true price: the vender is at his mercy. Persons who buy wool may easily have an understanding among themselves, by means of their mutual communications and their meetings which take place at the exchange. The venders, on the contrary, being very numerous and at a distance one from another, have no means of entering into a general agreement.

The reverse of this takes place in the sale of sheep: here the purchaser is exposed to the danger of making a bad bargain, as he may buy animals which have some secret defect or latent disorder which he cannot easily discover. In truth, the vender himself may be ignorant of it, and this is commonly the case; but, unfortunately, some persons make no scruple to sell, for sound, sheep which they know can be of no service to the purchasers.

It is customary in the government-establishments to sell annually, at times determined by the peculiar circumstances of the places where they are situated, a certain number of sheep of both sexes; these sales are announced in the public papers and by bills of advertisement. On the appointed days, the animals are exposed successively to the examination of the purchasers, and set up at auction. All such as have any material defect are carefully kept away: if however any such get among the others,

either through accident or by any other means, as soon as the persons who direct the sale discover it, the animal is removed, and another substituted in its stead. When the defects are such as not to prevent the animals from producing perfectly sound young ones, they are not excluded, but proper care is taken to give notice of them. Several times at Rambouillet, sheep have been exchanged for others, bought at the sales, which were found incapable of producing, when the fact has been clearly ascertained; they have even gone so far as to replace sheep which died shortly after leaving the establishment, upon proof being afforded that the purchaser was not in fault. This example has been followed by other establishments belonging to government, and by some individuals who to honesty add an ardent desire for the improvement of our flocks.

The rams and wethers may be sold at any season of the year. As for the ewes and young lambs, the sale of them must be deferred until the young are weaned, until the mothers no longer suffer any inconvenience from their milk, and until the lambs eat grass readily, unless they are to be removed to a very short distance.

In the establishments belonging to government, the animals are always sold with their wool on. The quality of the wool might indeed be known, even after the sheep are shorn, by the inspection of the skin; but it is more convenient to be examined when long: besides, the purchasers, in the first place, have the benefit of the fleeces, and, in the second, they enjoy the pleasure of shewing, in the places where they introduce the merino breed, that it yields much more and far better wool than the common breeds. Many proprietors, when they sell sheep, demand an extraordinary price for the fleeces, unless, like the government, they make public sales.

On account of the responsibility of the overseers of the government-establishments, all the sales are there made for cash; between private individuals, no rule on this subject exists. Some persons sell sheep, and afterwards take them on shares; this is a new practice which may have its advantages or disadvantages, according to the conditions entered into.

Means of knowing the age of sheep.

The age of sheep, during the first five years of their life, may be ascertained by means of their front teeth or incisors. Sheep have incisors only in the lower jaw; a cartilaginous substance serves instead of them in the upper jaw. The first

year, eight incisors appear, which are afterwards shed. The animal is born with these teeth, or, if any of them are wanting, they soon make their appearance. They are narrow and sharp. The second year, the two front teeth fall and are succeeded by two new ones broader than the six which remain. The third year, the two next to the front teeth also fall out; two broad ones grow in their room; so that, there are then four broad teeth and four not shed. The fourth year, the two next likewise disappear, to make room for two broad ones; finally, the fifth year, the two corner teeth fall, and the whole eight are then broad teeth. Merinos, especially when well fed, lose their two first young teeth generally six months before the common breeds.—Is this the case because merinos are natives of the south, or because they are better fed? Both causes may concur to produce this effect.

After the expiration of five years, an estimate of the age may still be formed from the teeth; but it requires much experience and practice. One must then be directed by the wearing away and by the position of the teeth. They wear in two ways; commonly on the inside, by the effacing, in a sloping direction, of two small cavities which are below on the side next the jaw. In the other way, the edges of the teeth look as if filed almost horizontally, and not in an inclined direction, as in the first case; breaches are also to be found, generally between the two middle teeth, or at their extremities. Some judgment of the age may also be formed from the corner teeth, according as they are more or less entire. When the animal is young, the teeth are short; they appear long at an advanced age, because they continue to grow, and the gums shrink.

Lastly, the shape of the teeth, which is in general pyramidal, the base being at the extremity and the apex in the socket, ceases to be so much so in old age, and approaches more to a cylindrical form.*

Merinos keep their teeth longer than other breeds, although they change them sooner. The habit of living in the midst of flocks, of observing them, of handling them often, teaches other means of discovering their ages, after the teeth no longer afford any certain criterion. When the eyes are less lively, the lips hanging down, the nostrils wrinkled, it may be presumed that an animal is not young. It will readily be believed that

* The knowledge of these details is the fruit of a conversation with *Mr. Girard*, professor of anatomy in the veterinary school of Alfort, and of an examination which we made together of a great number of under-jaws of sheep.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

Furthermore, it is noted that the records should be kept in a secure and accessible format. Regular backups are recommended to prevent data loss in the event of a system failure or disaster.

In addition, the document outlines the procedures for handling discrepancies. If there is a mismatch between the recorded amounts and the actual cash flow, it is crucial to investigate the cause immediately. This could be due to a clerical error, a missing receipt, or a fraudulent transaction.

The process involves a thorough review of the relevant entries and a comparison with the source documents. Once the error is identified, it should be corrected and the records updated accordingly.

Finally, the document stresses the need for regular audits. These audits help to ensure the overall accuracy and integrity of the financial records. They also provide an opportunity to identify areas for improvement in the record-keeping process.

By following these guidelines, organizations can ensure that their financial data is reliable and compliant with all applicable regulations.

Fig. 1

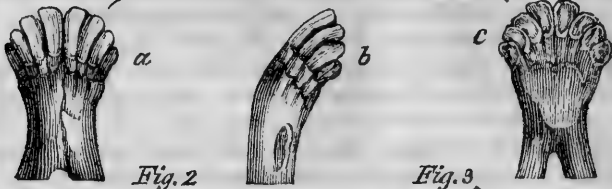


Fig. 2

Fig. 3

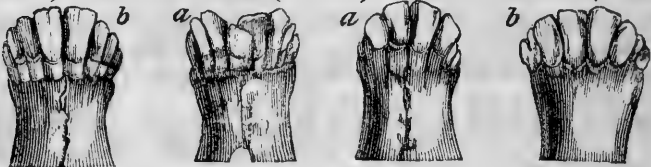


Fig. 4

Fig. 5.



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12



Fig. 13



Fig. 14



Fig. 15



these signs alone can afford no more than probable conjectures ; but it is not always an object of importance to determine the age precisely. It has been supposed that the age of rams is indicated by the rings on their horns ; but these rings are not sufficiently regular to afford a certain rule. It should be observed that, when the pasture is coarse, sheep lose their teeth much sooner. This circumstance should be attended to. Sometimes also the teeth of particular sheep wear out very soon.

PLATE III.

Teeth of sheep at different ages.

Fig. 1st. Lower or posterior jaw of a lamb, with its eight unshed teeth, which remain fifteen or sixteen months, at the expiration of which they begin to fall.

- a.* Exterior front of the jaw.
- b.* The same in profile.
- c.* Interior of the same.

Fig. 2d. Jaw of an animal two years old, having six unshed teeth, and the two front ones new.

- a.* Manner in which the two new front teeth grow out.
- b.* The position of the same some time after they have grown out.

Fig. 3d Jaw of a sheep three years old, retaining four unshed teeth, and having the two front ones and the two next to them new.

- a.* The two teeth next the front ones beginning to shoot.
- b.* The same, after having grown some time.

Fig. 4th. Jaw of a sheep four years old, having two unshed corner teeth, and the rest new.

Fig. 5th. Jaw of a sheep five years old, having shed all its teeth. The animal in this state is said to be full-mouthed.

Fig. 6th. Jaw of a sheep three years old, whose two front teeth are unusually worn.

Fig. 7th. Jaw of a sheep four years old, having four teeth in front worn, and a breach between the two middle ones.

Fig. 8th. Jaw of a sheep from five to six years old, having all the teeth more or less worn.

Fig. 9th. Jaw of a sheep four years old, having the four front teeth not only worn, but broken at the edges.

Fig. 10th. Jaw of a sheep four years old, in which the four front teeth are even, and equally worn.

N. B. *Figs. 6, 7, 8, 9 and 10* shew the variations observable in the wear of the teeth.

- Fig. 11th.* Inside of the jaw of a sheep in its second year.
Fig. 12th. Inside of the jaw of a sheep three years old.
Fig. 13th. Inside of the jaw of a sheep four years old.
Fig. 14th. Inside of the jaw of a sheep five years old.
Fig. 15th. Inside of the jaw of a sheep from six to seven years old.

General remarks upon the diseases of sheep.

While none but indigenous breeds, of comparatively little value, were reared, sheep were without much regret seen to die of diseases: but the high price of merinos has counteracted this carelessness; diligent inquiry has been made into the means of preserving, deranging and restoring their health. The efforts of the veterinary art, united to those bestowed upon agriculture, afford reason to hope that exact observations and multiplied essays will yield us more light, and that we shall at length be able to guard our flocks from these destructive foes.

The diseases of sheep are distinguished into several kinds; they are epidemical, endemical, sporadic and contagious. By epidemical, are meant such as spread themselves among a great number of animals, without distinction of country, and at all times; for example, the pox, the scab, &c.—by endemical, such as are peculiar to certain countries, and return annually at the same season, such as the disease called *falère* in Roussillon, the rot in low, foggy and wet places: by sporadic, such as happen, without regularity, and in all places indiscriminately, to some individuals only; for instance, the staggers, &c. The word *contagious* implies a quality, and not a distinct disease; it signifies such diseases as are communicated by one animal to another, either by immediate contact, or by intermediate communication; for instance, the carbuncle, the rot, the scab, &c. Among the epizootic and sporadic diseases, some are contagious and some not contagious.

Besides these different classes of diseases, there are some less extensive, which must be regarded as accidental; of this kind

are gatherings, tumours, wounds at the roots of the horns, occasioned by the battles of the rams with one another, wounds made by careless shearers, bites of dogs and fractured legs.

While speaking of the symptoms of diseases, and the manner of treating them, it is proper to confess a truth well known to those skilled in the veterinary art, and which they readily acknowledge. In general, little advantage to ruminating animals, and consequently to sheep, is to be expected from internal remedies, except from drinks much allayed, and from injections.* It is known that these animals have four stomachs; viz. the *paunch*, the *bonnet*, the *manyplies*, the *red*. The paunch, the largest of the four, receives the aliments, and holds them in a mass, until they return successively to the mouth, to be chewed, and afterwards to pass into the three others. It is easy to conceive that medicines swallowed by an animal, getting mixed among a large quantity of undigested substances, must lose all or a great part of their power, and consequently produce little effect.† In order to have much effect, they must be very subtle; but in this case there is danger that they may touch the coats of the stomach, corrode it, and produce inflammation and even gangrene. Veterinary surgery is almost the only surgery which can be employed; the surgical cases are rare, and unfortunately there are many instances in which it would be desirable to employ some other means. The greatest dependence is to be placed upon preventive medicine; a good diet, much attention and exactness in following the directions which I have given with regard to the food, lodging, leading, &c. of sheep, are the surest means of saving them from diseases. Every thing is to be gained by preserving them in good health; expense and trouble are saved; they acquire a stronger constitution; they produce better; and they increase faster.

The strictness of the police of Paris has preserved the environs of that capital from contagious disorders, by prevent-

* See a memoir by *Gilbert* on the effects of medicines upon ruminating animals, vol. III of *Annales de l'agriculture française*. This memoir contains very interesting experiments. In the same volume are reflections upon this memoir which are worth reading.

† Having weighed the four stomachs of a sheep with their contents, together with a small part of the œsophagus and the duodenum, I found their weight to be between 21 and 22 pounds; and after they were emptied, between 3 and 4 pounds. *Gilbert*, in his memoir above cited, says that the aliments contained in the paunch of a sheep which died of hunger after eight days of perfect abstinence, weighed 5 pounds and a half.

ing sheep attacked by them or suspected of them from entering the markets. Besides, a wise law prohibits the butchers of the precincts from pasturing cattle, as they formerly did, in the fields of the farmer, whose flocks were by this practice ruined.

Although I regard migration in Spain and in France as resulting purely from the necessity of leading sheep to parts where they may find nourishment, yet I think that journies and change of place may be of use to preserve these animals from certain diseases ; for instance, if the owner of a flock kept in a damp country, could make it pass some months every year in one that is dry, he would counteract the ill effects of the former by means of the latter. Farmers situated in countries of opposite natures, might agree to send their flocks to each other's lands ; Sologne and Beauce have made this experiment, and have derived advantage from it.

In treating of the diseases of sheep, it is not my design to enter into very minute details ; it is the business of veterinary books to describe them with great accuracy, and to point out the treatment proper for each case, without omitting any.— These books may easily be procured by those who wish to study and understand them. It is my design, in this treatise, to give only a summary of the diseases, and to mention merely what is requisite for the constant use of proprietors of flocks.— My object is not, nor ought it to be, to make a complete treatise upon the diseases of sheep ; it is sufficient if my work be not imperfect : it would have been so, if I had limited myself to the manner of forming flocks, of multiplying them, and of treating them in a state of health. I have retrenched whatever was too scientific, with the view of being more concise and clear, and I have studied to advance nothing that is not proved, or at least probable. In difficult cases, recourse must be had to able professors of the veterinary art.

It should be remembered that, to make sheep swallow liquid remedies, which must always be done by force, precaution must be used, for nothing is more easy than to suffocate them : the drink should be poured into their month at several times, and in the intervals they should be suffered to breathe freely.— The same care should be taken if they be exposed to pungent fumigations.

Of the SHEEP-POX ; in French called CLAVEAU.

This disease has a variety of different names in France. It is dreaded, on account of the ravages which it commits among

sheep: it is one of the most deadly disorders which is known. The sheep-pox sometimes kills more than half a flock ; it spares nothing : it is seen to attack, in every kind of country, flocks fed and managed in different ways ; it distinguishes neither constitution, nor sex, nor age ; rams, ewes, wethers, lambs, strong or feeble, all are liable to it. If it be accompanied with the *rot* or the *disease of the blood*, the danger is increased ; and in such cases, it is always fatal.

A belief generally prevails that a sheep can have this disease but once in its life. I am certain that, it having raged in a flock twice in the course of three years, the animals which had it the first time had it not the second. This fact, it is true, does not prove that they cannot be attacked by it more than once.— However, the exceptions, if there be any, do not destroy the rule.

The progress of this disease is regular ; three very distinct stages may be observed : the attack or inflammation, the eruption and the desiccation. Some veterinaries admit four ; viz. the attack, the eruption, the suppuration and the desiccation : but these four may be reduced to three, the eruption comprehending the suppuration. The animals are at first dull, languid, without appetite, and stand with their hind and fore-feet near to each other ; they do not chew the cud, are thirsty, and heated ; no doubt they have much fever. These symptoms, however, are not to be considered as peculiar to the sheep-pox ; for they are the precursors of several others. In the second stage, pimples appear upon the body, which gradually increase in size, and which at first are red, and afterwards become white : they are sometimes spherical, sometimes flat ; they appear first about the parts not covered with wool, such as the face, the inside of the thighs, the arm-pits, the under part of the tail, the belly, the teats ; they afterwards are formed beneath the wool ; in four or five days, the eruption is complete. In the third stage, the pimples fill with matter, dry, and form a black crust which finally falls off.

This disease, like the small-pox, may be distinguished into two kinds. The one is mild, the other malignant ; the latter is generally confluent ; that is to say, the pimples are small, numerous and close together. The symptoms of this latter species are more violent ; the eruption is incomplete ; the pimples flatten, dry and grow black, without containing any matter ; a thick mucus runs from the nostrils ; the head swells, the eyes close, and the respiration becomes painful : the animals seldom recover. It has been thought that during an

epidemic of the mild species, it is in some individuals confluent. Some persons admit of a third kind, which they call crystalline, and which they place between the mild and the malignant; but it does not appear to me sufficiently marked to admit of being made a distinct species.

When the eruption is complete, and the sheep recover their appetite, a cure may be expected; but if they obtain no relief, & if the pimples are of a deep purple, a fatal issue may be predicted: imposthumes and external gatherings, and the coming out of the wool on the parts where there has been an eruption, are good symptoms. The life of the animals is often saved with the loss of their sight; they are deprived of one or both of their eyes; some of them lose all their wool; the greater part retain indelible scars or marks of the pimples. The bodies of those which die of this disorder putrefy in a short time. Young and vigorous animals resist the disorder best.

This disease is as contagious as a disease can be; a mere nothing communicates it: if a sound flock passes through a place immediately after one which is infected, it is liable to catch the disorder. Yet, in the midst of an epidemic, some individuals are not attacked. It is asserted that a lamb, born before the disease with which its mother is tainted has arrived at a state of suppuration, is not infected with it, and that no foetus has been found carrying the marks of this disease.

When the sheep-pox breaks out in a flock, it may continue some time, because the animals are attacked in succession. It is commonly said to last about three months; yet I have known it to continue six months. The epidemic is sometimes most destructive at its commencement, sometimes in the middle of its career, and sometimes towards its conclusion.

The admirable discovery of vaccination was no sooner justly appreciated, than the thought presented itself that it might be a preventive against the disease under consideration, as well as against the small-pox. In pursuance of this idea, essays have been made in different countries. Some results have misled credulous persons; they have pretended that this disorder also would finally be extirpated by means of vaccination: but experiments, made with all possible care and attention, have unhappily banished all hope; and left only regret at not being able to extend to brutes this benefit which our age has procured for men.

It being impossible to derive any benefits from vaccination, recourse has been had to inoculating with the matter of the

sheep-pox itself; its analogy to the small-pox had long since inspired the desire to make attempts. The author of the veterinary dictionary considers the success of this operation probable, and he points out several precautions to be observed. Mr. *Vitet* thinks it possible; but he doubts its being of any advantage. The abbé *Carlier* rejects it, as dangerous. If credit may be given to two printed letters from Mr. *Anoreux*, it is practised in upper Languedoc, in the villages of Mous, Lappardu, Saint-Hilaire, and in all that part of the country called *Corbieres basses*, in the districts of Narbonne, Carcassone and Alath. Mr. *Thorel*, veterinary professor at Lodeve, in a tract entitled *avis au peuple sur le claveau ou picotte des moutons*, says that Mr. *Venel*, a celebrated physician at Montpellier, has successfully inoculated a flock, and that inoculation has also been practised in Saxony. Lastly, in the *Médecine des chevaux* by Mr. *Charlette* are contained some facts relative to this subject. An opportunity having offered, twenty five years ago, of making the experiment, I thought it right to embrace it, with the view of either opening a new source of information, or of confirming the experiments already made.*

Mr. *Huzard* went from Paris to perform this operation upon the flocks of Mr. *Chaptal* at Canteloup, and upon one belonging to government, at the château de Clermont, near Nantes. In both instances, he preserved the major part of the animals, which would have been attacked by the disease; and diminished the mortality among those which were already infected.—Inoculation has also been practised in the department of Marne, and particularly by Mr. *Allaire* one of the administrators of the forests; many animals have been saved there. Mr. *de Barbangois*, who owns large flocks in the department of Indre, has inoculated a considerable number of sheep. He says that he has met with success; which he thinks due to the care which he has taken to inoculate with matter taken from inoculated animals, the virulency of which was already mitigated. This fact is worth verifying.

When the sheep-pox breaks out in a flock, a great advantage results from inoculating all the sheep which are not evidently infected; since, as has been said, the eruption is thus rendered more mild on such as are already diseased, and the others are preserved. If inoculation were practised upon lambs after they are weaned, without waiting for the appearance of an epidemic, much pains and uneasiness would be avoided: the

* The details of this inoculation are in the Memoirs of the royal medical society, for the year 1786.

flocks might then safely travel from the plains to the mountains, and from the mountains to the plains; they might be conducted from department to department without fear of contracting or of imparting this fatal disease; Virgil's idea would then be verified: *Nec mala vicini pecoris contagia lædent*. Another consideration, still more important, presents itself, the butchers would not so frequently offer for sale meat of a bad quality, as is too often the case, especially in the country; for they there kill sheep which have this disease, and sell the meat, without considering that it may be injurious to the health of those who eat it: so entirely does the desire of gain sometimes stifle the love of humanity !

To inoculate for the sheep-pox, slight incisions are made with a lancet in the armpits and under the thighs, so as just to graze the skin, and cut only the epidermis; the same lancet is then dipped in pimples containing the matter of the disease, which is introduced into the incisions, the finger being held upon them, that the vessels may absorb a greater quantity*: three or four incisions in each limb are sufficient to give the disease. When the virus is taken from animals near to those which are to be inoculated, the operation is more likely to succeed than when it is conveyed from a distance. Yet, if it be good, it may, even in this case, be depended upon. Some precautions are to be observed, which use and habit will teach. I do not doubt that if men of sense and experience direct their attention to this practice, as much benefit may be derived from it to sheep as has been derived to man from vaccination. I know no better preservative.

One precaution is indispensably requisite, if inoculation is not employed; that is, to avoid communication with other flocks; it is therefore prudent, in suspicious places, to let sheep travel only in the morning early, that the infectious matter deposited upon the grass, being wet with the dews of night, may have no power. Neither ought the shepherd of a sound flock to have any communication, direct or indirect, with the shepherd of an infected flock, nor with persons who approach it. Even dogs, if not carefully watched, may introduce the infection.—Clothes, hair, utensils, as well as grass and fodder, are means of communication. I omit the mention of setons, of bleeding, and of different medicines which have been prescribed, some mild and diluting, others tonic, and others antiseptic. Setons, supposing them to be harmless, could not be used upon a nu-

* Attempts have been made to inoculate by means of a needle, but pimples of an ugly nature, terminating in gangrene, where the consequence.

merous flock; by bleeding a whole flock, those sheep would be injured whose fibres are soft and relaxed, as well as those which have a disposition to cachexy. No drinks appear capable of preventing a contagious disease. I have known a method to succeed, which, at first view appears cruel, but which must be acknowledged to be certain. It is to kill in the open fields and to bury deep in the earth the sheep which are first attacked by the disease: care been taken to cut their skins. Many a farmer, by making this sacrifice, has preserved almost the whole of his flock.

If, in defiance of all precautions, or in consequence of too few, the sheep-pox appears in a flock, the sheep must be attentively nursed. Those which are infected should be separated from the rest, and kept in a place by themselves. If it be the summer season, that place should be as airy as possible; if winter, it should be kept at a moderate temperature; the greatest cleanliness should there be observed; every thing that comes from it, dung, dead animals, utensils, all should be put out of the reach of the other animals, in order to prevent the disease from being communicated. The diet of the creatures must be food of a good quality, fresh fodder, if it can be procured, and a mixture of fine bran and oats or pounded pease with water containing a little salt. The strength of such as appear most affected should be supported by making them swallow wine twice a day, each dose being about a quarter of a pint, or an equal dose of a decoction of a root of parsley or lentils, or infusion of some aromatic plant, such as thyme, lavender, sage, wild marjoram, &c. It has sometimes been found serviceable, when the animals could not eat at the rack, to make them swallow bread soaked in wine and passed through a sieve.* If gatherings appear, they must be opened when arrived at maturity, and dressed with a composition of equal parts of spirit of turpentine and yolks of eggs, with the addition of a little brandy. The sheep which have been sick should not be put again with those which are well, before the expiration of two months from the time of their being attacked; care should previously be taken to wash them well, and to cleanse the sheep-houses. See, farther on, the method of purifying those abodes for sheep.

Of the Scab or Itch.

The scab is a disorder of which proprietors have a great dread, because it gives to the sheep which are attacked by it, a hideous appearance, and thus does discredit to their flocks.

* The Sapaniards bruise a small quantity of garlick, and boil it in water, with red pepper; they make each sheep, morning and evening, swallow about the fourth of a wine-bottle of this liquor.

A sheep may be known to have the scab, when some filaments of the wool exceed the others in length, and fall out: if the disorder arrives at a great height, the whole fleece sometimes falls. The animal, itching violently, rubs itself against walls, trees or racks, or the hurdles of the fold, and scratches and bites itself. If there was no other symptom, the matter would be doubtful, because the same thing happens when the sheep are incommoded by beards of grain, thorns or insects, such as lice, ticks, &c. but besides this, in the scab, the wool is stained with mud in the places which the animal can reach. Another sign is said to be, the more rapid drying of the fleece, after rain, in certain spots, in which spots there is scab, for in these places the heat is greater; but this is very uncertain. The surest symptom is when, upon removing the wool from every part where the sheep scratches itself, the skin is there found to be thicker, hard lumps are felt under the fingers, and the skin appears scaly, encrusted or covered with little pimples which, at first, are red and inflamed.

The scab attacks almost every part of the body; it begins upon the rump, near the tail, and upon the back, and afterwards spreads over the sides and the neck: it does not appear upon the lower part of the thighs, the shoulders, nor the udder.

Sheep affected with the scab, eat and ruminates well for a long time, and lose none of their ordinary habits; some even grow fat, if well fed: it is only when the disease arrives at the utmost violence that they cease to take food & that they become lean, and fall into a decline. It is observed that if the scab covers the neck, it becomes less flexible, on account of the callosity which the skin acquires, and that the animal walks without bending. Few proprietors, who are not grossly ignorant or excessively careless, suffer the disease to arrive at this height.

Some naturalists have regarded the scab as the effect of an insect, a species of mite (*acarus scabiei*) which resembles those which grow in cheese, being only a little smaller.

It has been supposed that there are two sorts of itch, the one dry, and the other moist, differing from each other in this respect, that in the latter, when the crusts are taken off, a yellowish water is found underneath, which is sometimes pretty thick, and that frequently small pustules are scattered here and there upon the body of the animal, filled with an acrid serosity: but this distinction appears to me to be useless, and tending to perplex the discovery of the true symptom of the scab, that is,

eruption. These differences depend only upon the greater or less violence of the disease, according to the constitution of the individuals which it attacks, and the period at which it commences ; in fact, these shades of difference are observable in a flock. What happens to men justifies my opinion ; for wounds in some persons, covering themselves over with a crust, are completely cured as soon as it falls, while in other persons several successive scabs are formed, under which matter is often found until it is in a manner exhausted. In general, the scab which is called moist, might be termed *inveterate*.

Upon the skin of sheep an eruption is sometimes seen which causes no itching ; the wool which covers the parts affected is reddish and rough ; it is a species of plica which has not yet been observed.

Merinos are more subject to the scab than other races, on account of the thickness of their fleeces.

They are liable to this disease at all seasons of the year, more particularly in autumn ; the heat of the houses brings it out : sheep of all ages are subject to it. A lamb born of a scabbed mother does not bring this disease with it at its birth ; and even does not take it by sucking. Negligent shepherds, to excuse themselves, attribute the causes of the scab to a multitude of things which have no relation whatever with the disorder ; they unjustly lay the blame of it to hogs and geese coming into the stables, to the dung of fowls and horses, to the urine, &c.

The scab is either spontaneous, or caught by communication. In the first case, it seems to be owing to dust, to a want of litter, to bad weather and to unwholesome food. All flocks which travel far, those which lie upon filth, which are exposed in the fold to sudden showers, to rains and to fogs, which lie on ground too cold, and those which are not well fed, are subject to attacks from this disease. One gives it to another ; so that from a single one it may spread through a flock, and even through whole flocks ; these will infect all the sheep which approach or touch things against which they have rubbed themselves. Yet some individuals pass several times through an epidemic without catching the distemper.

No preservative can be depended upon, without a good shepherd. A proverb says, *what the man is worth, so much the land is worth* ; one may also say, *what the shepherd is worth, so much the flock is worth*. One ought therefore, above all things, to procure a careful and attentive shepherd ;

proprietors who are so fortunate as to find men of this description, have the satisfaction of seeing their flocks always free from scab.

Preservatives against this disease should be particularly attended to ; they are, to avoid, as much as possible, exposing the flocks to bad weather, to feed them well, to let them drink when the weather is hot, not to over fatigue them when they are driven far, and to keep them clean in their houses. A very good precaution, upon the arrival of a flock after a journey, is to wash, when the weater is fine, each animal separately, sponging and rubbing it thoroughly : this precaution, which I have never failed to use when sheep have come to me from Spain, I have always found successful. I have even plunged into the water ewes very big with young, without occasioning any one to miscarry.

To prevent the disease from being introduced by contagion, communication with other flocks should be avoided. If, notwithstanding these precautions, the scab makes its appearance, those which are attacked by it must first be separated from the others, and one or other of the following remedies, according to circumstances, must be employed.

Many have been proposed, which proves how much inquiry the cure of this disease has occasioned. Every person adopts some one, or makes alterations in that which is communicated to him ; each person thinks his own method the best. Some receipts are simple, some are complex ; in some are found useless drugs, or such as destroy the effect of one another ; several are very nearly alike : all may have effected cures, because all contain one or more salutary ingredients. I shall confine myself to a small number ; which I shall select from among those with which I am acquainted, and whose success I have myself witnessed.

It should be observed that the remedies ought generally to vary according as the scab is more or less recent, and according as it is more or less extended. In some instances, scarcely any thing is necessary ; in others, a regular treatment is required ; sometimes violent means must be employed. The receipts to which I confine myself are sufficient for every case.

1. When the scab consists merely of a few pimples, nothing more is necessary than to scrape them away with one's nails, or rather with an instrument, and to apply to the part a small quantity of spittle impregnated with a little common salt melted

in the mouth. This application is to be repeated two or three times, if necessary.

2. Juniper oil (huile de cade)* and spirit of turpentine, one third of the former, and two thirds of the latter.

3. Empyreumatical oil.

4. A mixture of suet, in summer, of mutton-fat, in winter, with spirit of turpentine ; four fifths of suet or fat, and one fifth of the spirit.

5. Flour of sulphur, common salt, gunpowder, in equal portions, mixed with oil of spike.

6. Lie, with which the sheep, after being shorn, are to be washed and rubbed hard.

7. A decoction of hellebore-root, either black or white, or of tobacco leaves ; a pound of either in four pints of water boiled down to three : 2 pounds of salt of tartar or 2 ounces of blue vitriol may be dissolved in it, and, instead of water, vinegar may be employed.

8. After scraping each pimple, a little spirit of turpentine is poured upon the place, if it is necessary to wait some time before shearing. As soon as the shearing is done, the following remedy is applied ; 10 pounds of tobacco-leaves or hellebore-root, boiled in a sufficient quantity of water ; mixed with two pints of spirit of turpentine diluted with yolks of eggs (this is sufficient for a hundred sheep ;) this mixture is thrown into a tub, and the animals plunged into it one by one, and rubbed with a hard brush ; the next day but one and the two following days, they must be washed in running water. After these three washings, they must be again immersed in the tub, and again washed. During this treatment, the flock should be well fed.

9. Arsenic, 3 pounds ; copperas, 20 pounds ; for one hundred sheep. Put these ingredients in a caldron, with about 100 pints of water ; reduce the whole by boiling to two thirds of the original quantity : let as much water then be poured in as has been boiled away ; suffer it to boil a few moments longer ; then take it off and pour it into a tub.

* The *cadier* (*juniperus oxycedrus*,) is a juniper tree of the southern parts of France, whose berries are larger than those of the ordinary juniper.

To apply this remedy, a part of the flock, newly shorn, is placed in a fold made upon bare ground; each sheep is brought in its turn to the tub; three men seize it; one holds its hind-legs, another its fore-legs, and the third prevents the liquid from getting into its ears; it is plunged twice into the tub, and, every part of its body is then rubbed with proper brushes.— This remedy has been employed upon ewes near yeaning, upon such as had yeaned the night before, and upon new-born lambs, without the least ill consequence.

On account of the arsenic which is the base of this composition, it should be used with the greatest care. The proprietor of the seep must himself be present, attend to every thing, and permit not the least negligence; fatal effects might otherwise ensue. The hands of the men should be completely covered with gloves. After the operation, the tub, the gloves and the wooden utensils which were employed must be burnt; the animals must be suffered to remain four and twenty hours upon ground where not a bit of straw is to be found; this ground must afterwards be covered over with fresh earth; and the remains of the wash must be buried.

Either No. 1 or 2 will answer for the lowest degrees of the scab; if it is more extensive, recourse must be had to No. 3, 4 or 5; if it continues some time, No. 6, 7 or 8 should be used; lastly, it is almost indispensably necessary to adopt the 9th remedy, or something equivalent to it, in case of general and inveterate scab. I, as yet, know of no other way: it is the part of those who shall discover other means as efficacious, and not attended with so great inconveniences, to communicate to us their knowledge.

If it be true that the scab is occasioned by insects, it is not surprising that fat substances, irritating matters, and arsenic especially, destroys them. I know that in the museum of natural history, the skins of animals are preserved from insects by means of an arsenical soap.

Whatever remedy be used, the most essential thing is to rub hard all the scabbed parts of the body.

Before readmitting into the sheep-house a flock which has been treated for the scab, the place should be purified by the means pointed out in the article concerning the *purification of sheep houses*. Without this precaution, the sheep would rub themselves against places impregnated with the infectious matter, and thus take the disease again; time, expense and trouble would thus be bestowed in vain.

Although I am convinced that external remedies are almost always sufficient to cure even an in-eterate scab ; yet I should not, in some cases, disapprove of internal remedies employed in aid of external applications. What appears to me most proper and most simple, is a mixture of flour of sulphur with oats, bran and common salt or saltpetre, put into troughs or mangers. The oats, the bran and the salt are to induce the sheep to take the sulphur. A dose for two should consist of sulphur, 1 ounce ; salt or saltpetre, 2 ounces. Some persons recommend for each animal a mixture consisting of one quarter sulphur, one quarter salt, and one half elecampane-root : it has even been proposed to give half a grain of corrosive sublimate during ten days, and a grain the ten following days, in three gills of water for each animal. The last two remedies may be good, but I question the necessity for them ; I prefer the first.

Of Tettors.

Sheep sometimes have tettato ; they are known by small pimples which form ulcers and crusts, from which oozes a fetid humour. The animal appears to suffer much from this disease.

There is a kind of tetter which contains no fluid matter ; it is dry and mealy.

I do not think that tettato are contagious. I have seen some individuals in a flock, very few in number, who had tettato above their hoofs and cheeks ; they had no effect upon the rest of the flock, although they remained with it a long time.

After trying various means, which have all been found useless, it has been thought best to kill the diseased animals, which are troublesome, disagreeable to the view, and unfit for propagating, as the disorder may be hereditary. This perhaps is the wisest plan.

Yet it is advised to separate from the rest those which have tettato, to wash them three times a day with a strong decoction of liquorice-root, in which is dissolved 1 drachm (1 gros) of corrosive sublimate to a pound and a half of the decoction. If this treatment, continued three or four weeks, produces no effect, the tettato may be rubbed twice a day with a mixture of a small portion of nitre with 2 ounces of honey ; or they may be washed with a decoction of 2 ounces of tobacco in two pounds and a half of vinegar, in which has been dissolved 2 ounces of green vitriol. To aid this or other similar treatment, the animals

should be moderately bled, and put on a diet of straw and pure water.

Black muzzle.

This disorder is related to the scab and to the tetter ; its seat is commonly the muzzle of the animal, whence it sometimes extends along the sides of the head, as far as the ears ; it is distinguished by brown crusts or scabs, sometimes larger, sometimes smaller.

It seems to be occasioned by wounds made by the animals on that part of their head as they go among stubble, brambles, thorns or stones ; the filthiness and heat of the stables, lice and scab, contribute also to give it to them. Lambs are subject to it, when the udder of their mothers is covered with dirt.

This disorder is remedied by rubbing the crusts, and anointing them with a composition of one part flour of sulphur, and two parts fat or suet ; it is to be applied in dry weather, care being taken that none gets into their eyes. The sheep which have this disorder should be separated from the rest, that they may not communicate it.

Thrush (Chancre.)

Lambs are often lost by a disorder analogous to that of young children which is called *aphthæ* or *thursh*.

The lambs which are attacked by it have the whole inside of their mouth and their lips covered with small pimples, which torment them a great deal, and render it difficult for them to suck. If the disorder continues some time, they die through want of nourishment.

This disorder cannot be deemed very contagious, for the mothers do not catch it from the lambs which suck while they have it. It may perhaps be communicated from one lamb to another, on account of their similarity in age and weakness. I hazard this idea, as it may suggest salutary precautions.

When a great desire is entertained to preserve the lambs which have this disorder, the milk of each one's mother must be expressed into its mouth several times a day.

A mixture should be made of pepper, salt and vinegar ; and, with a brush of linen dipped into it, the mouth and lips of the lamb should be several times well rubbed. This remedy is sufficient : it commonly effects a cure.

Lameness or Disorders of the foot.

Many things occasion sheep to limp: the fatigue of a long journey often produces this effect; but it does not last long; rest during a few days is sufficient to make it disappear. Other causes produce more lasting effects, which require attention.—These animals sometimes run splinters, bits of stubble of corn or other plants, nails and even pins into their feet*; sometimes they wound themselves by treading on glass or flint-stones; sometimes small stones or lumps of dirt get between the two toes of the foot; lastly, the hoof sometimes grows too long and is bent at the extremity.

Lameness occasioned by the above causes is easily cured, if attended to in the beginning. By examining the lame foot, the cause of the evil may be removed; the part should be washed with simple lotions of Goular water, or have a little spirit of turpentine applied to it. When the length of the hoof impedes the animal's walking, it should be cut shorter.

Lameness has been attributed, in some instances, to a particular disorder called, among other names given to it in France, *foot-rot* (*pourriture des pieds*). I have seen it in the environs of Paris, where it is not unknown. Mr. *Huzard* has met with it in Piémont and in England. Mr. *Chabert* says that it is endemical upon the banks of the Gironde, in bas Médoc, in the Pyrenees, &c. These two intelligent men call it *fouchet*. Mr. *Charles Pictet*, one of the compilers of the *Bibliothèque Britannique*, has given a description of it, having observed it in his flock near Geneva.

This is nearly what *M. Pictet* says: “At first, only a faint redness appears in the cleft, or at most a slight oozing around the hoof; the lame foot is hot; some time after, an ulceration takes place at the junction of the two claws, either on the inside or the outside of the hoof, from which runs a white fetid matter. At this period of the disorder, the animals suffer more: they are feverish†: they not only limp more, but they cannot even support themselves; they lie down; and when they eat they commonly kneel. When the disease has made

* One of my rams, a very fine one, just before the rutting season, fell to limping with one of his fore-feet: on examination, a pin was found there, which was taken out, and a little spirit of turpentine put into the wound. The animal soon recovered, and was fit for service.

† One can never be certain that a sheep has a fever; when examined, even in a state of health, such is its timidity, that its pulse is accelerated.

considerable progress, collections of purulent matter take place under the hoof, which run out at its juncture with the skin.— Sometimes the hoof rots and comes off, and the whole foot becomes one ulcer; the tendons and muscles mortify, and even the bones rot; the fever increases. At other times the matter is collected under the sole, which it consumes.” Mr. *Pictet*, declares that he has known worms to be produced.

A skilful person of Piedmont, mentioned by Mr. *Pictet*, has distinguished three sorts of foot-rot. The first is seated beneath the epidermis, between the two claws of the foot; the second, under the hoof; and the third attacks the bones. In my opinion, this distinction is groundless; the learned Piedmontese appears to me to mistake three degrees of the same disease for as many diseases.

What are the causes of the disease in question? is it confined to certain individuals, or is it epidemical? is it propagated by contagion? The solution of these questions is of much consequence in determining the mode of treatment.

I do not think any proof exists of the foot-rot being occasioned by other causes than those which I have mentioned. Mr. *Chabert*, who has written upon this subject, assigns none; only he judiciously remarks that the foot of a sheep, owing to its particular formation, is more liable to this disease than that of any other quadruped. The disease is sometimes mild & simple; a greater degree of intensity renders it violent and complicated. Thus may be explained the distinctions attempted to be made among several affections of the foot. The foot-rot is not always epidemical; it commonly attacks a part only of the animals. Mr. *Pictet* does not doubt its being contagious; he mentions two facts in attestation of this opinion. In his flock the disease commenced among a small number of animals; in six weeks, it pervaded the whole: some were lame in one foot only, others in two or three, and even in all four. This is the first fact; the second is as follows. Having put ewes which were well under a shed which had served as a shelter to rams attacked by the foot-rot, without removing the litter, they all caught it in a fortnight. But it may be objected that the animals falling sick one after another, even in a place where diseased sheep had been kept, is no sure indication of contagion: they may all have been placed in similar circumstances; for instance, the disorder may have been occasioned in them all by mud or pebbles from the same pasture, or by some other cause. I am far from denying contagion, but it does not seem certain.— When doubt exists, it is prudent and it is my advice, to use as

much precaution as if the disorder was proved to be contagious.

From these reflections it follows, that when a flock is received, it should be kept separate for some time; that as soon as any one of the sheep limps, its foot should be examined; that if several limp, still greater attention should be given.

I cannot imagine why the foot-rot has been supposed to be occasioned by the abode of the sheep in places where hogs have been kept; I have seen flocks attacked by it that had had no communication with those animals.

The treatment must be more or less active, according to the degree and state of the disorder. If any extraneous substance is in the foot, it must be taken out; this is the first thing to be done. In case the gland of the fork is choaked, it must be extirpated, and the wound dressed with a pledget dipped in Goular water*. For a mere oozing, the same remedy may be applied, previously washing the part gently each time with a sponge. But if the foot is hot, and is very sensible in any part, an abscess is to be expected, either next to the sole or the hoof: in whichever part it is formed, as soon as it is supposed to contain matter, it must be opened and entirely emptied; it is better to hasten than to retard this operation. With a good scalpel or a very sharp penknife, the sole must be cut open; or the hoof must be pared away, beginning at the extremity of the claws, until the abscess is laid bare, which must be well cleansed by lotions of wine, and sprinkled with blue vitriol powdered. If the disease, through negligence or any other cause, has made great progress and eaten into the foot, a new incision should be made, all the gangrenous parts should be taken out; the carious parts of the bones may also be scraped; the part should be seared with fire or a red-hot iron: the rest of the dressing should be done with a mixture of yolks of eggs and turpentine, in equal quantities, adding thereto a little pure brandy or camphorated brandy. There is no danger to be apprehended from taking away parts of the hoof, or even the whole of it, if necessary, because it soon grows again. Every day the bandage should be taken off, the wound cleansed with red wine, and the above mentioned mixture applied, diminishing the quantity as the sore heals. The foot must be wrapped up. It has been proposed to have boots made; but it is easier to make use of linen, which may be changed, and which is pliant; boots, if many animals at

* It is composed of water, extract of Saturn and brandy, in the proportions of one pint of water, one spoonful of the extract, and one of brandy.

once required dressing, would be very expensive, and would not prevent the necessity of linen. It is better to sew the bandage on than to tie it, which, by being too tight, might bring on gangrene; if strings are used, they must not be tied tight. As long as any running continues, the sore will not be completely healed; it is commonly a symptom, at this period of the disorder, of caries in the bones. In order to produce an exfoliation, which is indispensably necessary, a tincture of aloes should be injected into the wound. As soon as an animal is cured, it should be no longer left among the sick ones; but it should at first be put into pastures quite clear of thorns and stones, and should not be driven fast.

During the above treatment, the sick sheep should be fed with after-grass, or a little provender composed of oats or other grain, and fine bran. If they cannot stand on their feet, their food should be put within their reach.

Every time the litter is renewed, what is taken from the place where the sick sheep are kept, should be buried beneath the dunghil: as a precaution against contagion.

The place which contains the sick should be kept very clean. In order to dissipate the infectious smell, fumigations may be made with nitric acid, if the apartment is small.

Mr. *Chabert* ranks among the diseases of the feet of sheep, that which is called *canker*, to which like the horse they are subject. This disease, which within a few years has become common, is not dangerous, and yields easily to the remedies which I have mentioned, as I have myself experienced. It is an ulcer formed upon the hoof itself whose fibres grow soft and run into a fetid matter which is blackish and reddish. The sole is spongy, and the bone of the foot rots. The sheep appears to suffer much. Mr. *Chabert* thinks that this disease happens when the flocks feed upon sandy soils, the sand easily insinuating itself between the scales and the small cracks occasioned by dryness. The treatment is the same as in the foot rot.

The Spider or diseased udder.

Some ewes, when they give suck, and after weaning, have their bag choked. Oftentimes, this is attended with no ill consequence, and the obstruction removes itself: but it sometimes happens that pus is formed; in some cases, the tumour even ends in gangrene, and becomes mortal. The shepherds,

in France, call this disease *spider*, either because they imagine it to be caused by the sting of a spider, or because it extends itself, around the point where it is first formed, over the mamillary glands.

I attribute it to two causes : 1. to uncleanliness in the sheep-houses, or to the hardness of the soil on which the fold is sometimes made ; 2. to the blows which mothers sometimes receive from their lambs while sucking. Lying upon filth and clods of dirt, causes an irritation in the udder, which produces inflammation ; this may be avoided by frequently changing the litter in the sheep-houses, and by smoothing the fields. If the disorder is owing to the second cause, it cannot be prevented but by putting less vigorous lambs to suck these tender ewes. The bags, of the ewes should be examined from time to time, especially of such as appear to have them choked, that the disorder may be taken in hand at once, before it has made any progress.

If there be a collection of matter, the parts where a looseness is felt must be opened ; the animals should be left during several days upon fresh straw, and the sore dressed with a mixture of equal parts of yolks of eggs and turpentine. If gangrene ensues, the part must be scarified and a plaster of ointment of storax applied.

The Anthrax or Carbuncle.

Several kinds of animals are subject to this disease ; viz. horses, horned cattle, hogs and sheep.

It is a gangrenous disorder, commonly fatal. Its progress is very rapid ; the animals attacked by it sometimes die before it is known that they are ill. It is attributed to unwholesome drink, to too hard labour, &c. The anthrax is accompanied with external tumours remarkable for their hardness and the distance to which they spread in a short time ; very soon, if not speedily attended to, they grow black and have a fetid smell, and the animal soon dies.

The anthrax may be communicated by one individual to another, and even from a beast to a man. The whole skin, the wool, hair, blood, saliva, dung, utensils, are all mediums by which contagion may be communicated. Men have died in consequence of having bled, opened or skinned animals that had this disorder. Hardly any thing but rowels applied soon, can preserve animals which are in the neighbourhood of an epidemic of this nature ; they may however be

made to drink a mixture of water, salt and vinegar ; one dose containing a handiul of salt, a glass of vinegar, and six pints of water ; their fodder should be sprinkled with it at the same time. Their ordinary drink should be mixed with fine bran or barley meal, with a little salt and half a glass of vinegar to each pail. When the anthrax decidedly appears, the tumours should be cauterized either with a hot iron or with caustic, so as to stop the gangrene ; afterwards, in order to make the eschar fall off, supurative ointment should be applied.

The Rot.

In Europe many names are given to this disease.

I have observed that a lamb, only six weeks old, whose mother had the rot, contained the seeds of the disorder. I hence conclude that it is transmitted from the mother to her young. In general, it is not communicated from one sheep to another. The same cause acting upon all the sheep in a flock, might give the disorder to the whole of them ; but there are always some which, having a strong constitution, escape it entirely or at least longer than the rest. The seasons in which this malady is most destructive, are the autumn and winter.—When *Gilbert* went to Spain to choose merinos for the French government, he made seven hundred of them winter in Estremadura, the greater part of which took the rot and died. It attacks the greater part of a flock, and the flocks of a whole country, and sometimes every year. It is therefore an endemical disease ; it not only injures proprietors by the loss of capital, but it also affects the quality of the wool, causing it to lose its strength.

The progress of this disease is slow ; by great attention it may be perceived or suspected at its very commencement.—The symptoms are, a languor in the animal's appearance ; all its movements are weak ; it eats less than the others, and does not ruminate as well. At this period of the disease, it should be attended to ; if neglected, these first symptoms grow more violent. Still surer evidences of the disorder may be seen, by examining the eyes and mouth, which are discoloured and pale ; by laying one's hand upon the rump, which sinks ; or by taking hold of the animal by its hind foot, which it suffers to be held without making any resistance : if its wool be pulled, it comes out easily ; for the most part, and especially when the disorder is very far advanced, the animal has, in the evening, a watery swelling under its nether jaw, which disappears in the morning, because during the night its head is not, as in the day,

hanging down towards the earth. This is one of the most striking symptoms, and it almost always announces approaching death. Yet I have known a ram come from Perpignan, where it already had such a swelling, to the neighbourhood of Paris, and live some time. Little by little, the animal falls into a decline, and perishes.

If the body be opened, the flesh generally is found to be livid, the intestines pale, the membranes infiltrated, water collected in the lower belly, in the chest and in the head, hydatides in these cavities and on the surface of the lungs and the liver, in the omentum and the mesentery; in the biliary ducts are found liver-flukes (*fasciola hepatica*)*; the liver is pale and in a state of decomposition. This disease is therefore a true cachexy.

This disease may be attributed to the physical constitution of the sheep, as well as to circumstances in which it is placed. Its constitution is not firm, its fibres are lax and not compact, and consequently much disposed to infiltrations. The slowness of the disorder, the symptoms which appear in the course of it, and what is discovered upon opening the bodies after death, all announce that the malady proceeds from a superabundance of aqueous fluid. So that if these animals are made to pasture at all times in meadows naturally wet, or made so by the dew, if they are turned out during fogs, if they are folded on a clayey soil, and if their houses are not situated upon a dry soil, the rot may be expected: they are particularly liable to it if they have been ill fed; for nothing is more conducive to cachexy than want of nourishment, or the use of bad or unsubstantial food. The English have been mistaken with regard to the cause of this disease: their most celebrated agriculturalist, *Bakewell*, thinks that it is occasioned by inundations after the middle of the month of May; that those which happen in winter and in the spring do not give it; that it is never occasioned by spring water, unless it overflows and becomes stagnant. Others of the same nation attribute it to feeding in calcareous grounds, or such as are manured with lime; others, to springs in the meadows. It is not true that certain plants, for example the *marsh ranunculus*, occasion this disease; it should first be proved that sheep feed on it, which I do not believe. The truth is, that these plants growing in marshy situations, an injurious quality is attributed to them which is due only to the moisture. It is neither calcareous earths, nor lime, nor water

* Hardly any sheep, unless they are very young, are without flukes in the liver; but much greater numbers are found in those which have the rot.

overflowing between the month of May and the Autumn, which produces the rot; but water, whether that of places where the marsh ranunculus grows, or that of moist and compact ground, in which is mixed chalk and lime, or that of springs, rivers, or pools, or that of dew, or that which surrounds sheep-houses injudiciously placed. Even in dry countries, the rot has been known to attack some sheep; but these instances are to be attributed to a peculiarity of constitution, or regarded as the consequence of some other disease.

We may therefore conclude that the rot cannot be cured when it is very far advanced, I mean at the stage when a marasmus has taken place or is about to commence, because disorganised viscera cannot be restored; and because it is not possible to reunite with the mass of blood so great a quantity of serosity as escapes and is dispersed and even amassed in certain places; but the mischief may be prevented and its progress stopped, if attended to at its commencement.

The means of preservation consist chiefly in the general care and attention bestowed upon the sheep. Above all things, when one wishes to form a flock, or to augment that which one already possesses, it is necessary to guard against the dishonesty of those venders who, to prevent a latent rot from being discovered by the paleness of the eyes, put vitriol or powdered sugar-candy into them, in order to give them a colour. What has been said upon the nature of pastures, upon the times at which the animals should be turned out, upon the circumstances which render it proper to house them again, upon the manner of feeding them, and upon folding and housing them, all these things should be attended to. And by observing the directions given, without omitting a single article, flocks may be preserved from this disease. There are however situations and kinds of soil where, in spite of all possible care, it would be difficult to guard them against it. In this case, the keeping of sheep should be given up for the raising of other cattle, or one should keep the same set of sheep no longer than one year, selling them annually to the butchers, and replacing them by others.

Upon the first symptoms of a rot, iron should be infused into the drink given to the sheep, or they should be made to drink aromatic decoctions, such as decoctions of sage-leaves, of lavender, of hyssop, of thyme, of juniper-berries, or of an infusion of the ashes of broom, &c. or what is still better, white wine, and if that cannot be procured, red wine, three or four spoonfuls of which should be given at a time. These remedies, continued some time; strengthen the fibres, cause the water to

run off, and restore the animals. It is thought that common salt, given in any way, would answer. I cannot vouch for it; but I think it probable, from the instance of some sheep which feeding habitually near the sea, in the midst of the dashing of salt water, do not get the rot. I think advantage might be derived from the employment of bitters, such as ellicampane, gentian, the lesser centaury and wild succory root in decoction. Besides these remedies, two others have been proposed, which from their ingredients promise to be useful. The first is a dose for each animal composed of 3 decagrammes of pounded juniper berries, 12 decagrammes of oats and as much bran, 4 grammes of sulphate of iron (green copperas.) The juniper berries and the bran are first to be well mixed; the oats are added by degrees, and well stirred in; afterwards the sulphate of iron: the whole is put into the tubs which contain the drink for the sheep; sometimes this mixture is sprinkled upon the fodder.—The bran and oats in this receipt serve as a bait to induce the sheep to take the juniper berries and the sulphate of iron.

For the second remedy, 15 grammes of quinquena,* 3 decagrammes of powdered charcoal passed through a fine sieve, together with a sufficient quantity of honey, should be made up into 30 boluses. The dose is two a day for each animal, making it swallow also a glass of the following decoction; take a handful of bark of the horse-chestnut tree; boil it in red wine a quarter of an hour; add a spoonful of common salt and a little brandy. Mr. Lullin de Châteauvieux has made this remedy known, and borne testimony to its efficacy.

During the above modes of treatment, the animals are to have only dry food, such as hay, pounded pease, beans and the like, middlings, fine bran, oats, &c.

Diarrhœa or Looseness.

In places where vegetation recommences after an intermission, sheep are apt to feed greedily upon the new grass, and, in consequence, to get a looseness which, far from being injurious to them, is a salutary purgation. It is perceived by means of the excrements, which are liquid, stick to the wool, and grow hard around the anus; the shepherd should be careful to clear them away. This is not a disease, but an evacuation, which for the most part ceases of itself, as soon as the grass has acquired more strength, and the stomachs of the sheep get accustomed to it.

* Instead of quinquena, which is expensive, I think the bark of some indigenious tree may be employed.

This looseness however may sometimes be considerable enough to injure sheep, and even to kill those which are weak & aged. This sometimes happens when the animals are suffered to feed suddenly upon green pasture, after having been kept upon dry fodder.

Some diarrhœas are real disorders, or consequences of disorders, sometimes dangerous. I was consulted with Mr. *Vicq-d'Azir* on occasion of one; it had carried off in a short time ten sheep of a flock in the neighbourhood of Etampes: it was not a dysentery; for the animals voided no blood with their excrements; they died in the space of three or four days; on opening their bodies, only a great dilatation of the paunch was perceived, caused by the aliments remaining there, which the animals could not digest, and by the air disengaged from the substances in fermentation. We thought it sufficient, in order to stop the mischief, to direct the shepherd to lead his flock to the elevated parts of the farm, instead of leading it, as he did, to the lower parts. This was done, and the diarrhœa ceased without the aid of any other remedy.

Sheep sometimes have a diarrhœa after the clavau, and die of it: through want of attention, that is to say if they be led to the fields in wet and cold weather, they are apt to get a diarrhœa, which may be prevented by keeping them housed until the weather is fine, by giving them food of easy digestion, by putting iron into their water, and by making them swallow, for some time, half a glass of red wine every day.

The Genestade or Broom-disorder.

This name is given, in the southern part of the Cévennes called the *Ruffes*, to a disorder attributed to the Spanish broom: it is not contagious and attacks only some individuals of a flock.—Every year it makes its appearance in districts where this plant abounds, it prevails most in December, January and February: during those months, the sheep feed among the broom*. This disorder sometimes carries off the fifth part of a flock. It has been observed that the husks of this plant are more injurious than the leaves.

Its chief characteristic is a difficulty to make water, caused by an inflammation of the reins and bladder; it often terminates in mortification. Broom is a warm diuretic, calculated to produce good effects in aqueous cachexies; consequently, its effects

* See the Memoirs of the ancient Agricultural Society of Paris, anno 1785.

must be injurious to strong and vigorous animals, if they eat a great deal of it.

This disorder is cured by means of diluting drinks, such as water with a little meal mixed in it, or a decoction of flaxseed or mallows and other emollient herbs, if there be few animals sick, and if these plants be in abundance: two grammes of nitre per pint should be added. Some drops of spirit of turpentine, mixed with water and injected, have sometimes restored the urinary functions.

The animals are preserved from the disorder by never leaving them long among the broom, or by never putting them there till after they have eaten.

The wood-disease (maladie de bois)

If sheep are carried into the woods at the season when the buds swell, they eat so many as to make themselves sick. It is not a sudden affection, as after having eaten wet grass whence a gas disengages itself capable of killing them suddenly; but this disease acts in a different manner, and affords time to employ means of cure; most of those animals which fall victims to it resist until the eighteenth or twentieth day.*

The first symptoms are a general dryness; the urine is crude and copious, and the excrements hard; the skin is hot; the animals are feverish, they cease to ruminate. According to these symptoms, this disease should be ranked among the inflammatory; this is still more evident if its progress be watched, if its termination be attended to, and if the state of the bodies of the animals which die of it be examined.

The buds which sheep swallow in large quantities while feeding in the woods, fill their stomachs, which cannot get rid of them, because the powers of digestion are overcome; these substances, being of an irritating nature, cause an inflammation which extends itself to the neighbouring parts; the more tender the buds are, the more relishing they are, and the greater is the quantity which the sheep eat.

There is but one preservative, easy to be found and to be employed; it is, not to carry sheep into the woods when the

* If any person wishes to know all that relates to this disease, he should read a memoir by Mr. *Chabert*, director of the veterinary school at Alfort; it forms part of the *Instructions vétérinaires*, of which he is one of the authors.

buds begin to shoot, especially where many oaks are found, all the parts of which are very astringent ; or not to suffer them to remain there long. It has been maintained that sheep which feed in the woods ought sometimes to be bled, to prevent the effects of the leaves and buds which they there eat. I think it is much better to keep them away from the woods.

When the disorder appears, those which are affected with it must be dieted, and it will be sufficient to make them take abundant draughts of clean water, until they are evidently relieved. I would also propose decoctions of emollient herbs ; but these can be employed, as I said in treating of the *Genes-tade*, only when few animals are sick, and where these herbs are very common ; flax-seed, which is neither scarce nor dear, ought to be preferred. When the animals begin to chew the cud again, and no longer appear to suffer, they should be restored, little by little, to their usual food.

Mr. *Chabert* thinks they ought to be bled in the jugular vein, the second or third day. Bleeding, it is true, produces a relaxation, suffers the stomach to extend itself, and diminishes the stricture caused by the buds of trees ; on this principle, bleeding may be useful ; but the fulness of the stomach, which is already weakened, does it not require the exertion of all the strength, and consequently does it not forbid bleeding, which diminishes the strength ? I do not offer this as an objection, but merely as an observation. Mr. *Chabert* is perhaps right ; he prudently advises not to bleed the first two days, nor when the disease is far advanced.

It appears rational to suppose that sheep may be disordered by eating too large a quantity of buds or sprouts of trees. They undoubtedly should be prevented from going into the woods, when the trees begin to shoot out. This is proper on another account ; viz. the preservation of the trees, whose growth they injure. One would suppose acorns likely to produce the same effect ; yet I have seen sheep eat them in great quantities, without any injury to their health ; I have even known a person feed two horses with them for four months, without the least ill consequence : indeed, acorns being ripe fruits and eaten late in the season, they cannot be compared to oak buds browsed at a time when vegetation is in full vigour.

The Blood, Blood-disease (Maladie du Sang.)

This disease suddenly attacks sheep, without giving any known symptoms of its approach. The animal suddenly stops

short, appears giddy, staggers and stumbles; it opens its mouth, foams, and voids blood through the fundament and the urinary canal; it soon falls on its back, pants, rattles in the throat, and dies, sometimes within the space of half an hour, a quarter of an hour, and even of a few minutes. Thick black blood then comes out of its mouth and nostrils; its body soon swells and putrefies. If it be opened, all the vessels of the skin will be found full of blood, and the flesh purple; the spleen is swoln and full, which has occasioned this disease to be called *stroke of the blood* (*coup de sang*), *apoplexy*, *spleen blood* (*sang de rate*). Some farmers have lost by this disease a tenth, and even a fourth of their sheep.

In some flocks, the sheep are liable to this disorder at all times of the year; but it is generally most prevalent in the summer season: for this reason, it is also called, *the heat*. It exerts its greatest violence during the months of July and August; in September it abates. It is common in dry years, it kills the greatest number during very hot days, especially days on which storms happen; the mortality appears to lessen in cool weather and after rain. It attacks sheep of all ages and descriptions; and especially those which have the strongest constitution. In sheep-houses which are kept too warm, sheep sometimes die of this disease during the night.

The causes, besides the constitution of the individual, are, 1. the food which the animals eat, particularly during the time when the disease is most frequent; 2. the dryness and heat of the season when it is most apt to prevail; 3. violent running, in the middle of the day, in summer. I have seen it prevail in a country where sheep are fed five months of the year on fodder and dry grain, and long shut up in places rendered hot by their contracted size and by a quantity of dung heaped up. In that country, they are folded on the open plains, during the months of July and August, without any shelter from the heat of the sun. After harvest, at which time the disease prevails most, they go into fields that have been reaped, to eat what is left by the gleaners.

These causes combined, give to their fibres a stiffness not known to those animals which live a great part of their time upon grass and in green pastures. By increasing the action of the vessels, the blood is dilated; its fluidity is destroyed; or it is made to discharge itself through different organs; or internal collections or extravasations are occasioned.

When a sheep falls with this disease, all remedies are useless ; it has received its death blow, and nothing can save it : but the examination of the body, and the warning given by a first accident, tend to the preservation of the rest. Not a moment is to be lost ; it is proper to bleed without delay all those which by their strength or by the vermilion colour of their eyes, lips and mouth, indicate a sanguine habit. The sheep of this description, being the most vigorous, always go in the front of the flock ; those of a contrary habit should not be bled ; great attention must be paid to this distinction. The practice of the Spaniards and of *Daubenton* is to open the vein under the eye, at the lower part of the cheek, by the root of the fourth jaw-tooth ; because this vein is very apparent. Blood may be taken from the jugular veins, from the tail, or other parts of the body. At the end of some days, if it can be done conveniently, the sheep which have been bled should be bathed several times, but not those whose eyes are dull and whose lips are pale ; drinks made of decoctions of sorrel, sharpened with nitre and common salt, would be proper. If the number of sheep be great, vinegar and water must be substituted, because sufficient sorrel could not be found.

In order to prevent the evil, while yet at a distance, care should be taken to shelter the sheep from the violent heats of summer ; to let them drink frequently during that season, if they are pastured in dry situations ; to give them, in winter, barley in preference to every other grain, and to mix with it watery leaves or roots, such as cabbage, carrots, turnips, jerusalem artichokes, potatoes, beets ; to sprinkle the dry fodder with a little water ; not to keep the sheep too warm while housed ; to let them have green pasture as soon as possible in the spring, and not to turn them into corn stubble, immediately after harvest, without taking care to hinder them from eating much. These directions, which I have sometimes had occasion to give, have not been without success.

Falerre.

The flocks in Roussillon are every year attacked by a disease which kills a great number of sheep*. It is called *falerre*, a Catalonian word signifying *quickness, activity*, on account of the rapidity with which it carries off the animals that are attacked by it. I was directed by Government, some years ago, to go and examine it, and to point out the means which ap-

* This disease, which is an endemic of Rousillon, may possibly exist in other places ; the description of its symptoms and effects will make it known.

peared to me most proper to prevent it; the substance of my observations is as follows.

No symptoms announce the approach of this disease, at least none have as yet been remarked: the inhabitants of the country where it prevails are the proper persons to prosecute this inquiry. Hitherto no symptoms are known, except those which almost immediately precede death.

The animal at first appears in a state of stupefaction; its head hangs down; it staggers and stumbles; sometimes it attempts to make water; its legs are so weak as scarcely to support it; it falls upon its knees; it then rises and reels about still more: if, at this time, the hand be held before its eyes, they do not move; if by a last effort it gets again upon its feet, it throws itself against whatever is near it, even into the midst of dogs, by whose barking it is not terrified; a proof that the senses of seeing and hearing are extinguished; it at length falls, not to rise again: the whole head is violently convulsed, and particularly the eyes, ears and jaws, as well as the legs; the difficulty of breathing becomes extreme; it is accompanied with a gashing of the teeth, which is heard at some distance; from its mouth issues a great quantity of foam of a red tinge, and from the anus, green excrements, oily and almost liquid. During this agony, the belly swells; and, immediately after death, the swelling increases sensibly; much air is discharged from the mouth and the anus.

I have not been able to obtain much light with regard to the cause of this disorder by opening the bodies of the sheep which died of it; I have found no appearance of disease in the skull, the mouth, the oesophagus, the stomachs, the intestines or the trachea; only I have observed some parts of the lungs a little tinged with purple, which effect might have been produced during the last pangs of the animal. Those animals which were young, had the glands of the mesentery voluminous, as they always are in subjects of that age; the liver contained a pretty large number of liver-flukes (*fasciola hepatica*); I have counted ten in an ewe of seven years; the gall-bladder also contained some: hydatides also (or the *taenia visceralis*) appeared in several parts of the chest and of the lower belly, and the ringed *taenia* in the jejunum. These animals had no symptom of the rot: the paunch was very large; the substances which it contained were of a middling consistency; and those in the intestines, liquid. In order to discover the nature of the gas which distended the paunch, I tied the posterior extremity of the oesophage, and the anterior extremity of the duodenum; I then pierced the

paunch, presenting to the opening a lighted candle; the gas took fire and burnt with a crackling flame which was bluish, like that of burning brandy. This appearance was most remarkable in an ewe lamb of a year old, and in a thaive, one examined three hours and the other eight hours after its death, and both kept in a cool place. The sheep which died of the *falerre* exhaled no uncommon smell. Having in like manner examined animals which died of other diseases, or which were killed in a state of perfect health, for the markets, the air which came from their paunch was not inflammable like that from the paunch of animals which died of the *falerre*.

I could not learn, from the proprietors of flocks in the country where this disease prevails, the exact amount of the mischief which it does; I found, however, that it was considerable.

The *falerre* attacks sheep at almost every season of the year, but particularly in the spring and autumn; it is much more common in autumn than in the spring.

Both sexes, of all ages, are equally subject to it.

The part of Roussillon where it most prevails, is Salanque, situated in the vicinity of the sea; there are, however, tracts which are always exempt from it.

The animals purchased in Salanque, when once taken away, are no longer subject to the *falerre*, which appears to result from some sudden cause, inherent in the country, and acting only in particular circumstances.

The *falerre* is not contagious, which is not astonishing, since it is neither of the eruptive nor of the pestilential class of diseases.

The opening of the bodies of animals often leads to useful information concerning the causes of their death, especially when they die suddenly; but it sometimes happens that this mode of investigation is not sufficient, and that it even occasions uncertainty. What perplexes the observer is, when an animal dies of one disease, to find within it the beginning of another.—From what has been said relative to the *falerre*, it appears more easy to say what it is not than what it is. In the first place, it is not an eruptive disorder; this needs no proof: its symptoms do not indicate the *blood*; it is not a phrensy, since there is no injury in the skull, nor in the stomach, nor in the

diaphragm, and since the convulsions in which the animals die are attendant upon several kinds of disease. One would be tempted to think that it is rather the rot, on account of the hyatides in the chest and lower belly, and the liver-flukes: but the rot is slow in its progress; its symptoms precede it a long time; the sheep attacked by it have in the evening a swelling beneath the under jaw, &c. Liver-flukes are not found in all sheep which die of the *falerre*; these worms are found in many creatures which are killed in supposed health. It is probable that those in which I found hydatides and liver-flukes, if they had not died of the *falerre*, would some day have been carried off by the rot, if turned into wet pastures. I can hardly persuade myself that the *ringed tænia*s cause the *falerre*, as they are small, and as they do not kill with the suddenness of an apoplexy the animals which are subject to them. I think it cannot be doubted that the inflammable gas (*carbureted hydrogen*) contained in the paunch is the chief if not the only cause of the *falerre*.

The *falerre* appears in parts of the country which are neither constantly wet nor very dry, but which are occasionally moistened; also, when flocks are inconsiderately led to meadow-lands after rains or heavy dews, before the sun has had time to dry them. It has already been remarked that this disorder prevails more in the spring and autumn, which are the rainy seasons, than during the rest of the year; I may add that it has been observed to prevail most when the sea-breeze blows and scatters moisture through the air and on the plants. This disease therefore seems to bear some relation to that which is called *swelling of the paunch*, although it differs from it in some respects. It is probably owing to the nature of the herbs, which in that country, I suppose, possess qualities which render them liable to spoil, to be decomposed, and in certain circumstances to form carbureted hydrogen gas*.

Until I went to Perpignan, no remedy had been used for the *falerre*; none was known, and indeed none was sought for; because the animals which died of it were sold to the butchers, who bought them at the same price as if they were sold alive; the sheep were of the race of the country. The director of the imperial establishment has tried bleeding, without success; the same ill success attended the making an opening with a knife, either because it was not skilfully done, or because it was done too late, or because it is not proper in this case. It is to be regretted that this operation was not performed with a *tro-*

* The details relative to this disease are to be found in the *Annales de l'agriculture française*: Vol. xiv, p. 103.

car ; it would perhaps not always have been unsuccessful.— It has been found necessary to be content with preventives.— The only ones which I have advised have been, not to lead the flocks out immediately after rain or in the dew, but only when the grass is quite dry, and to give them something to eat in the sheep-houses, that they may not be so hungry as to devour too large a quantity of new or succulent grass when they go into the fields. I have been informed that these precautions have diminished the number of victims to the *falerre*. I have been assured that this disease prevents the increase of sheep in the country where it prevails, as it destroys as many animals as are born.

Sologne disease or Red disease.

The tract of country formerly called Sologne, loses every year, from time immemorial, a great part of its flocks, by a disease there called the *red disease*. I was directed by government, in 1780, to go and examine it upon the spot, that I might give an account of it. I shall here give a short summary of what I observed.

The *red disease* always makes its appearance in the month of May ; it is at its height in the month of June ; it gradually declines towards the end of July and the commencement of August.

The first symptoms are loathing, heaviness, a slow pace.— These symptoms, however, are common to many diseases. The eye waters, is dull and almost shut ; the gums, the lips, the tongue, are whitish or livid ; the nostrils are stopped by a thick matter ; the urine does not flow freely ; the head and fore-legs appear swoln ; the weakness is extreme. The diseased animals seek the shade, as if to protect themselves from the flies, which attack them in swarms, without any effort on their part to drive them away. They either refuse to go with the rest to the fields, or they lose themselves there, and are destroyed by dogs. In the last stages of the disease, a foamy slaver comes from their mouth ; some void with their excrements, or through the nose or nostrils, a light coloured blood, in small quantities. They commonly are very thirsty, and drink copiously ; they utter notes of complaint : and, when near dying, they have an unusual flow of urine.

The continuance of the disease, is six, eight or ten days, sometimes more, and seldom less. None of those recover which have foamed, voided blood, or drunk copiously.

I have remarked that the mortality increases with the increase of cold ; that in warm days, fewer die ; and that the disease abates as the weather grows milder.

It is fatal particularly to animals in their first and second years.

It is not certain whether it be contagious ; it probably is not. Every year the same causes exist and produce the same effects.

In a number of bodies which I opened I found no signs of inflammation: the belly was relaxed, instead of being distended, as in the blood-disease or the swollen paunch ; no smell was exhaled, even when the body was kept three days in the month of July ; all the flesh was white and infiltrated ; the blood-vessels empty, except the hemorrhoidal vessels ; the pituitary membrane of those subjects which had bled at the nose was bloody ; the glands of the mesentery were voluminous ; in the chest and lower belly, appeared an effusion of reddish serosity, and some hydatides ; in the liver were some flukes ; it was large, and the gall-bladder was filled with bile ; the first two stomachs contained much alimentary matter ; that in the *manyplics* was dry, and in the *red*, fluid ; there was none in the intestines : the bladder was either empty, or contained bloody urine ; the reins were in a very good state.

Is this a simple or a complex disorder ? It is certain that it bears some symptoms and marks of the *blood-disease*, and others of the *rot*. Those which it has in common with the former, are coloured evacuations, great thirst, and internal effusions of a reddish liquid. The season in which it makes its appearance is also that in which the blood-disease does most mischief. On the other hand, the slowness of the animal's motions, the paleness of the nostrils, lips and gums, the infiltration of the flesh, the hydatides, the liver-flukes, &c. are indications of the *rot* : there is, indeed, no swelling below the nether jaw ; but all those which have died of the *rot* have not had this symptom. After having weighed all circumstances and compared what happens in the red disease with the appearances in the blood-disease and the *rot*, I am rather inclined to refer it to the latter.*

The red disease is to be attributed to the manner in which sheep are managed in Sologne. They are led to the fields the

* All the details into which I have entered on the subject of this disease may be seen in a work entitled *Observations sur plusieurs maladies des bestiaux*, &c. printed in 1782.

whole year round, in all kinds of weather, even when there is nothing to eat; they are not fed while housed, or they have so little given to them, that they frequently suffer from hunger; the lambs are born in a state of debility, and do not find milk enough in their mother's bag to strengthen them. In the month of May, the ewes begin to be milked, by which means, the nourishment of the lambs is rendered still more scanty.— How is it possible for animals reared with so little food to have a good constitution? and is it not to be expected that many should die during the first or second years of their life? The country, besides, is extremely moist; the sheep-houses are low, the plants watery, which also contributes to render the sheep liable to every kind of debility.

Bleeding, and cooling remedies have not succeeded, and success was not to be expected from them, as the symptoms of the diseases indicate a total loss of strength: setons, strengthening remedies and tonics have been found serviceable; I have also found advantage in merely putting the animals upon a regimen of dry herbs, and especially of broom.* I have prescribed, with effect, several glasses full, for some days successively, of a decoction of alkekengi berries or winter-cherries, or of the middle bark of elder, or of sage, or hyssop, or pennyroyal, or of any other aromatic plant, adding to it 4 or 8 grammes of nitre for each pint of water. Notwithstanding the cures which have been effected by these remedies, they must not be relied upon, if the disease is far advanced; they are to be used with confidence only at its commencement: probably, the sheep which I treated were in the first stage of the disorder.

Preventives are principally to be depended upon. The extent of the mischief, the loss it occasions, the little skill which country people possess in the administering of remedies, the carelessness and extreme negligence of the greater part of them, the expensiveness of drugs, and the care required; all these circumstances demand that we should give directions how to keep off, as much as possible, the red disease.

Mortality among sheep may be avoided, 1. by stocking farms with none but animals raised in parts that are known, and

* By a natural instinct, sheep in Sologne eagerly attack the broom, particularly for the sake of the pods filled with seed. When they can do this, the red disease ceases. Would it cease without this food? I will not assert it, for I believe the broom is very serviceable if used with moderation. It is an aperient and tonic plant. I know that in some countries they carefully gather the pods of the broom, to give them to sheep in winter, and that they are found beneficial.

not suspected of engendering the red disease ; 2. by not suffering the sheep to go out in bad, that is to say, in wet weather ; 3. by feeding well the ewes that are with lamb or that give suck, and their young ones, while housed ; 4. by never milking them ; 5. by not leading the young lambs to meadows from which their mothers are sometimes kept ; because they are liable at an early period to lay the foundation of a rot ; 6. by hanging within their reach bags of salt for them to lick ; 7. by not folding, or only during the greatest heats ; taking care to bring home and house the flocks at the approach of rain or storms ; 8. lastly, by keeping the sheep-houses dry.

The most essential object of care is to feed the sheep well while housed.

Of Colds.

Some sheep are more liable to take cold than others ; sudden changes from hot to cold ; rains ; the coolness of the night air when they are folded ; these things occasion colds among sheep. If the complaint is only a thickening of the humour which covers the pituitary membrane, the nostrils are stopped, or a mucus more or less fluid runs from them, the animals snort frequently, and raise their head in order to breathe more easily through their mouth.

If the complaint extends to the wind-pipe and lungs, the animals cough and appear to suffer more.

When the disorder is light, no remedy is necessary ; it cures itself. But a cold is sometimes so violent as to require nursing : the sick sheep should be put by themselves in some place kept moderately warm ; they should be fumigated with boiling water, either pure or infused with aromatic plants, in order to give tone to the enfeebled organs ; good food should be given to them, and they should not be led to the fold again until the stoppage or the cough has ceased.

The precautions proper to prevent colds, may be found under the article that treats of *Folds and Folding*.

Of the Tetanus.

Young sheep are sometimes attacked by a *tetanus* or species of convulsion, which sometimes kills them ; it is either a symptom of some other disease or a disease itself.

If the tetanus is symptomatic, it is cured with the disease which it accompanies ; if it is not, it requires a particular treatment.

A sheep may have convulsions occasioned by the pain of an operation ; when the pain ceases, the convulsion abates and finally ceases of itself.

I have seen several lambs seized with involuntary movements, especially in the legs and head ; the legs were distorted, and remained in that condition some time ; nor did they in every instance recover ; the head was agitated and drawn back.— Some recovered without the assistance of any remedy ; others, and they were the most numerous, died after languishing some time. They would not suck, nor could they be made to swallow milk, on account of the jaws and gullet being closed.

This disease is, in some parts of the country, called *cords* (*cordes*), in Ardèche for instance, because of the stiffness of the convulsed parts. It has been imagined that by cutting a nerve the disorder might be cured : this is not impossible ; but which nerve is to be cut ? It appears to me that if the lambs affected by the tetanus are of a sanguine habit, it would be of use to take a little blood from their heads. However, I offer this merely as a conjecture ; for, as yet, I know no remedy upon which reliance may be placed.

Of Convulsions (Maladie convulsive) or Madness (Maladie folle.)

Both these names are given to a disorder which has symptoms common to some others. The animal attacked by it has, from time to time, extraordinary motions ; it goes as chance directs ; totters, as in the falerie and the staggers ; it falls, and its limbs are convulsed, as in epileptic fits : if it be taken hold of, it is found not to support itself, and seems to have no more strength. I have never had an opportunity of seeing instances of this disorder. From all I can learn concerning it, it appears to me to be related to what is called *St. Vitus's dance*. Animals in this state are rather burdensome than profitable. Farmers dispose of their flocks when they see them seized by this disorder, which terminates in death ; some, after having at different times sustained losses from it, have been deterred from keeping any more flocks.

I regret that I cannot explain the causes of this disorder. Some persons have attributed it to the soil and the fodder ; but

in Beauce, where it has within a few years prevailed very much, the soil is the same now that it always has been; yet this disease has not been known many years. It would be easy to determine whether a change of food would have the desired effect.

If the animals are of a sanguine habit, there is no risk in bleeding them in the jugular vein, once or twice, with the intermission of a few days. It would perhaps be beneficial to throw cold water upon their heads. These however are mere conjectures upon which I insist the less, as the disease is not known to me, and as I have read no description of it.

Of Vertigo, Dizziness or Staggers.

This is one of the diseases which at present engages most attention. The reason is easy to be conjectured. Many means are known of preventing the sheep-pox, the rot, the blood disease, the scab, the swelled paunch and others; but hitherto none is known for preventing the vertigo. From all quarters I have heard complaints on this subject, which merit much attention.

It has been thought that the vertigo is most prevalent in a season which succeeds a wet and mild winter, in farms exposed to the overflowing of some river, and in low sheep houses. In order to render this opinion, which may be just, worthy of implicit confidence, it ought to be confirmed by observations continued several years.

It is unfortunate that the symptoms of vertigo do not appear before the last stages of the disorder. If shepherds paid more attention to it, they might perhaps discover earlier symptoms: yet, in truth, this is hardly to be expected from men of so little information, who, besides, having many sheep to attend to at once, are not able to distinguish those which are unhealthy, before the disease has made great progress. It would be necessary for the proprietors themselves to be, in some measure, the shepherds of their own flocks, or at least to see them so often as to know each individual, and to examine them in every state.

Mr. Huzard does not consider the vertigo as a disease,* but as a symptom of several affections. His opinion will appear well founded if it be recollected that in fact there are different

* Seen an interesting letter from *Mr. Huzard* to *M. C. Pictet* of Geneva. Vol XXII of the *Annales de l'Agriculture Française*.

disorders in which the animals behave as in the vertigo : but it is more than a symptom when it is occasioned by tenias within the skull ; in this case, it is what is called in medicine a *pathognomonic* symptom. The opinion of *Mr. Huzard*, however, may be the most correct, and does not at all contradict what I have to say respecting the vertigo.

The following symptoms usually attend the vertigo ; the animal, in its walk, is irregular and staggering ; it sometimes is ahead of the flock and sometimes remains behind ; it goes off and loses itself ; its head is heavy ; it turns round towards one side only, sometimes for a considerable while ; raises its head in the air ; falls and rises frequently. It then strays in the fields and eats nothing, either because it cannot see, or because the disease takes away its appetite ; it lies senseless and stupified ; it gradually wastes away and dies. The progress of the disease is generally very slow ; sometimes however it is rapid.

Mr. Yvart, professor of agriculture at Alfort, says that having, in winter, given tansy to his sheep, he had less vertigo than usual among them that year. This may easily be tried, as tansy is very common ; and, at any rate, other bitter herbs may be used in its stead.

The cause of vertigo is not to be sought for in the chest, nor in the lower belly ; these cavities present no other appearances than they do in cases of cachexy. The state of the head has induced a belief that it is to be found within the skull. In fact, if it is opened after the animals death, one or more hydatides are commonly found, sometimes united, sometimes separate, formed by pretty thick membranes, which contain globular *tœnias*, having four suckers, and swimming in a limpid liquor. I have seen some which contained nearly a glass-full of liquid, and which occupied much room in the head. Sometimes the bone becomes thin in the places against which the hydatides press ; in this case, it almost always happens that an abundant serosity is interposed between the lobes of the brain, and fills the ventricles. A closer inspection would probably discover other particulars.

It is the general belief that vertigo attacks sheep only during their second year. Some also, it is said, have it during their first year. I have been assured that sheep of three or more years old have been known to turn ; this may have been owing to some other cause.

Some farmers are of opinion that the vertigo is occasioned by a stroke of the sun while the animal is at pasture. Its head,

as is known, is constantly held low ; but, in this position, as the sun shines directly upon the occiput, which is hard, thick and covered with wool, especially in the merino, it can scarcely hurt the inside of the head. Those races whose head is without wool, would be more exposed to the vertigo than the Spanish sheep ; it would be more frequent in the south than in the north, which is contrary to experience. Disease occasioned by strokes of the sun are inflammatory, but the vertigo is not of this class.

Others think this disease attributable to a deficiency of nourishment, and imagine that the young animals which have not sucked long enough, or which have not had sufficient pasture nor fodder, are more subject to it than others. But I have known flocks violently attacked by it, although the lambs were weaned late, their spring and summer pastures were good, and each one, when housed, had every day a sufficient portion of after-grass and some handfuls of good provender.

This disorder has also been attributed to the folding of lambs late in the season, when rains are frequent and the nights long. They may indeed suffer from this cause ; but vertigo does not result from it : my flock never suffered from this disease before the year 1807, yet my lambs are always folded until the 11th of November.

A distinguished veterinary,* who superintends one of the government establishments, is of opinion that the cutting of the jaw teeth contributes much to it ; but he offers no evidence. If the vertigo was merely a convulsion, a spasmodic disease, one might be disposed to think that it is occasioned by the difficulty which these teeth find in making their way. Although I do not think his opinion well founded, yet I have advised him to pursue his inquiry, and to observe attentively all that happens at this period of the animal's life. *Mr. Voisin*, a physician at Versailles, attributes the vertigo to a serous obstruction of the brain ; he regards the formation of hydatides only as a consequence of that state, which he compares to the *hydrocephalus* of children. This likewise is no more than conjecture.

According to some German authors, a too great heat in the sheep-houses, by weakening the young lambs, produces vertigo. Yet I have seen this disorder fatal to many that had been reared in very airy places, rather cold than warm ; a great proportion of them were apparently vigorous.

* *Mr. Schneider*, director of the imperial establishment of la Sarre-

Mr. Frédéric-Charles-Gustave Gerike, a Westphalian, published, in 1805, in German, a treatise on the nature and cure of the vertigo in sheep, which has been translated into French. This writer, after examining and discussing all the opinions hitherto offered, embraces one which is peculiar to himself.— He maintains that the vertigo is occasioned by violent blows on the head which the animals frequently give themselves, either in frisking about, or in butting one another. During their tender age, their skull is thinner than when they are above two years old. These concussions wound some one of the numerous glands contained in the mass of the brain. The secretion of this gland being interrupted, lymph is collected, which extends it so as to form a sack or vesicle, whose volume continually augments; such is his account. This theory would appear more probable than the others, if the author had told us how tœnias are formed in these vesicles, and what the glands are of which he speaks; no glands in the brain being known beside the brain itself; and, in the last place, why rams, whose blows are more violent than those of the ewes, are not more subject than the females to vertigo.

No sure nor even probable means have been fallen upon as preventives against the vertigo; means of cure only have been attempted. The following are those with which I am acquainted.

Instead of entirely shearing the lambs, the wool has been left upon their heads until they are eighteen months old. This precaution has been found useless; several proprietors have never remarked so much vertigo among their young animals as when the wool has been left upon their heads a year.

Mr. Voisin has given to sheep, in this disorder, several doses of a decoction of madder-root; his example has been followed by several persons; particularly by the superintendant of the imperial establishment at Arles; some have been successful, others have not. The insufficiency of this remedy has occasioned it to be abandoned; *Mr. Voisin* himself, who frankly owned that he considered it rather as a preservative than as a curative, has not thought proper to insist upon its efficacy.— Since, however, it has effected some cures, this remedy is good in certain cases which ought to be well understood*.

* The receipt is; boil an ounce of madder-root, for a quarter of an hour, in three pints of water, and make the animal drink that quantity each day, in five or six doses, at nearly equal intervals of time.

Recourse has also been had to trepanning. This operation, which is easily performed, has been practised upon sheep in many countries. As the hydatide is commonly on the surface of the brain, it appears as soon as the piece of bone is cut out, and it may be removed whole. I have witnessed this operation a number of times, but have never known it to effect a cure. Some of the animals lived eight days after being trepanned. *Mr. Charles Pictet*, a year ago, said that he had in his flock a sheep upon which *Mr. Mannoir*, a surgeon of Geneva, had operated more than a year before: this is a rare instance; the animal commonly dies two or three days after. No dependence therefore is to be placed upon an operation which always or almost always fails.

In consequence of accounts which have been received, that in Germany they could cure the vertigo, inquiries have been made with a view of discovering the means. The method employed is to pierce the skull, not with a trepan, which takes away too large pieces of the bone, uncovers too great a surface of the brain, and tears the skull, but with an instrument which is much more easily managed; the accounts received were those of the first attempts made by Messrs. *Riem* and *Reuter* in 1791. The following is a description of the instrument, and of the manner of operating, from a Memoir read by *Mr. Morel de Vindé* before the agricultural society of the department of *Seine-et-Oise*.

It is composed of two pieces: one is a pointed rod of steel, about two inches and a half long, with a handle at one end, shaped like a pear, and at the other end terminating in a triangular point. This rod is near two lines in diameter; and tapers a little towards the handle.

The other piece is a syringe, about 4 inches and a half long and 1 inch diameter, terminated by a pipe screwed on, 2 inches long, comprehending its collar, and arranged so that the collar is of 6 lines, and the stem 2 inches.

The inside of this pipe is made of the same diameter with the rod, in such a manner that when the latter is put into the pipe, the collar of the pipe covers 6 lines of the handle, only letting the point of the rod project 4 or 5 lines, to which the extremity of the pipe is exactly fitted on every side; this projection of the point of the rod beyond the pipe, which embraces 6 lines of the handle of the rod, prevents the pipe from retreating any more.

The greatest difficulty of the operation is to discover the place where it ought to be made. The shepherd ought to examine well the sick animal ; to observe towards which side it turns ; to try, by shaking its head, if he can hear in what part the collection of water is situated ; to feel with his thumb whether some part of the skull does not yield to the touch ; to employ, in short, all possible means for discovering the place where the puncture should be made.

If the disease has continued long, and the water is on the surface, the place is more easily discovered, on account of the thinness of the skull.

When the place is discovered, the shepherd must prepare three or four plasters of strong pitch well softened and spread upon bits of skin 8 or 9 lines in diameter ; he must then examine whether the syringe is in good order and screws tight into the pipe.

He then must shear the animal's head, from the foretop to the ears, as close as possible ; then unscrewing the pipe of the syringe, and introducing into it the rod, so that its point may project 5 or 6 lines beyond the extremity of the pipe, he must pierce the skull of the sheep, and push in the rod so far that the extremity of the pipe may enter with it into the skull ; then he must withdraw the rod, leaving the pipe sticking in the skull.

If the place has been fortunately chosen, a little water will immediately come out, which may be seen in the pipe ; then the syringe is to be quickly screwed upon the pipe remaining in the skull, and the water to be gently pumped out.

In drawing the piston, some resistance is to be expected ; it is commonly occasioned by the sack which endeavours to come out ; then the syringe and the stem are to be taken gently and with the greatest care from the skull, and the sack which follows the stem may be taken hold of by the fingers, and the hydatid completely removed.

The syringe and its pipe may be applied several times, if one is confident of having found exactly the place of the sack, and of being able to draw it out.

When the operation is ended, one of the plasters is applied, after warming it, so that it may take firm hold and completely stop the wound.

If unfortunately the proper place is not hit upon the first time, the operation is to be repeated, until the right place is discovered: each of the holes is to be covered with a plaster of pitch.

The animal must then be kept upon good food, not too abundant, and consisting of green fodder, if it can be had, if not, of the tenderest dry fodder, with a little provender every day, until a cure is effected.

The shepherd, after the operation, must carefully wash and clean the different parts of his instrument, wiping and drying them with a warm cloth, and taking particular care to preserve the point of the instrument from rusting.

Mr. Gerike's method differs from the one which I have just described; as he does not employ the syringe, but prefers a simple puncture, through fear lest the piston should draw out parts of the brain itself.

He advises, after introducing the trocar covered by the pipe, to draw it out, and leave the pipe in the skull; then, without screwing on the syringe, merely to incline the head of the animal, and let the water run out without being pumped. He thinks that piercing the sack by the trocar, and merely suffering the water to run out, is sufficient to effect a cure. He then advises to pour into the wound some drops of a tincture of myrrh, and lastly, as in the other method, to apply a pitch plaster.

Mr. Valois, a veterinary at Versailles, has successfully tried *Mr. Gerike's* method, and appears to prefer it to every other.

Mr. Yvart is one of those who have made the most attempts to cure the vertigo, without trepanning; he has varied the manner of making the puncture; at first using the trocar, and afterwards a simple pricker or awl. His theory of the disease, and that which he has taught to his scholars, agree with the theory of all those who have reflected upon it. After many trials with the trocar, he has concluded that the awl makes a neater puncture, and may be made to penetrate more or less, as the operator pleases. *Mr. Yvart*, his brother, his son, and *Mr. Rappolt*, have agreed among themselves to perform operations, and to make observations. The instrument which they use is 4 inches long, including the handle, the iron is 15 lines. It is as thick as a goose-quill, is round, and tapers off to a point; its point is not too sharp, that it may not break, and that it may slide easily over the blood-vessels and nerves which it may meet with.

Whether the trocar or the awl be employed, the first thing is, to be certain of the spot which must be pierced, in order to find the hydatide or hydatide, which are commonly in the cerebrum : if they were between the cerebrum and the cerebellum, they could not be reached without killing the animal.

Mr. Rappolt, in order to point out as clearly as possible the parts which may be pricked, supposes a rectangular figure formed on the head of the animal by lines drawn from one eye to the other, from one ear to the other, and from each eye to the ear on the same side of the head with it ; which figure would be divided into two equal parts by a line passing from the top of the head at right angles to the line connecting the ears and to that connecting the eyes. Within one of these rectangles the operation should be performed. In order to render the directions still plainer, he supposes two triangles, one on each side of the head ; the base being a line drawn from the eye to the ear, and the two sides being drawn, one from the eye, the other from the ear, and meeting in the middle of the head at the centre line before described. Within these triangles, punctures may be made without any risk ; in this way, the middle of the head would be preserved, which must not be opened, because the animal would inevitably perish. In rams which have horns, the puncture should be made a little behind and above the horns ; it would be just the place pointed out in the supposed rectangles and triangles.

The trocar possesses over *Mr. Yvart's* instrument the advantage of piercing only to a certain depth, and of being manageable by persons of little experience ; but the hole which it makes is much larger, and consequently it may be more injurious. It is true that *Mr. Yvart's* instrument requires a steady hand ; I should however prefer it to the trocar : when it is employed, no incision in the skin is necessary, which must not be drawn, that the opening in it may correspond with that in the skull, in order to facilitate the discharge of the water. The operator, holding the instrument firmly between his thumb and his fore and middle fingers, so as not to suffer it to penetrate deeper than he wishes, places the other two fingers upon the animal's head, that his hand may be steady, which is absolutely necessary. Too much force should not be applied ; it is better, if the instrument does not penetrate deep enough the first time, to insert it again. The skull being pierced, the instrument is gently pressed through ; 6 or 8 lines are commonly sufficient, and often more than sufficient, when the skull is flexible and thin. The instrument is quickly drawn out, and is followed by the hydatide, either full or empty ; it is carefully extracted, either with a pin

or with the fingers ; the head is turned down, to let as much water as possible run out, which is accelerated by putting a finger in the animal's mouth to make him move his jaw. Sometimes neither hydatide nor water comes out ; in this case, the instrument is again gently introduced without stirring it about, in order to pierce or loosen the hydatide. It is not necessary always to draw out the pellicle of the hydatide, it is sufficient to have pierced it.

Messrs. Yvart and Rappolt, both before and after the operation, content themselves with keeping the diseased animals separate from the rest, with no other regimen than good nourishment in small quantities ; they put nothing upon the wound, except some drops of spirit of turpentine ; washing it with wine would be sufficient. The wound must be kept clean ; every other day it should be opened, during a week, either by taking off the scab, or by inserting the awl, in order to let out the water which may be collected ; for the whole of it is not always discharged at the time of the operation. *Messrs. Yvart and Rappolt*, object to the syringe for drawing out the water and the vesicle, because by employing this instrument the brain is disturbed, and even small portions of it taken away, and because the nerves and blood-vessels are torn, by which means the animals may be killed ; they think that simply discharging the water is sufficient to effect a cure : in this they agree with *Mr. Gerike*. The frequency of the punctures does not prevent the animal from getting well.

This operation succeeds with difficulty upon rams, on account of their horns.

A great proportion of the animals operated upon by *Messrs. Yvart and Rappolt*, have been saved ; a great number not radically cured, have lived longer than they would have done had the disease been neglected. *Mr. Yvart* deems it an indispensable condition that the operation be performed only in dry weather, and that the animals be kept in a dry place.

In short, if only a few individuals of a flock may be saved by this operation, it is so easy and occasions so little expence, that it is well worth attempting ; it is unfortunately proved by experience that an animal attacked by the vertigo, if not attended to, always dies. The oftener the operation is repeated, the greater will be the perfection and certainty to which it may be brought. *Mr. Yvart* has already performed many cures : *Mr. Valois*, a veterinary at Versailles, is said to have been successful, as well as *Mr. Petit* and *Mr. Louchard*, both

veterinaries, one, of the department of la Somme, the other, at Lonjumeau. This last, as I have been informed by *Mr. de Neuvery* mayor of Bievre, operated last year, for the mayor, upon four thaives, which have since brought fine lambs, & are in good health. A month ago, he performed the same operation upon a male lamb, which is now well. In short, out of twenty operations which he has performed within eighteen months, nine have been completely successful. He has hitherto employed the trocar.

In the month of April 1808, at my house in Paris, *Mr. Huzard* with *Mr. Desplas* operated, in my presence, upon one of my thaives, which recovered completely. *Mr. Huzard* made use of a trocar, but smaller than that employed for men.

I advise proprietors of merinos to make the experiment whenever they have an opportunity, particularly with the awl, that its advantages may be ascertained; and to keep an account of the results, that they may become generally known.

The success already obtained promises more; and there is room to hope that a disease which sometimes makes havoc in fine flocks, will henceforward do comparatively little injury.— I have dwelled upon this disease longer than on the rest, because it can be attacked only by mechanical means, and because the part whence the evil is to be extirpated is very delicate.

It often happens that a sheep holds its head towards one side, appears stupid, and is restless, without having the vertigo.— This may be occasioned by a stoppage in the head; or by worms, called *oestres*, in the nostrils or in the frontal or ethmoidal sinuses: I shall speak of this farther on. The animal, in this case, sneezes and snorts frequently; a thick matter runs from the nose. Unless attentively observed, these movements of sheep may be mistaken for a real vertigo.

In other disorders which have their seat in the head, or which affect that part by sympathy, the animals have the appearance of vertigo; as in the *tetanus*, *madness*, *dropsy in the brain*, &c.: but, by attending to all the symptoms, there is not much risk of making a mistake.

Hoving or Sudden swelling of the paunch.

It sometimes happens that sheep have their paunch suddenly swollen. The common French name for this disease is *empansement*, and signifies that the evil is seated in the paunch.

The cause of it is not doubtful ; it proceeds from a superabundance of food, or of some gas produced by the fermentation of the matters contained in this stomach. When a flock, after having lived for some time upon dried fodder, is suffered to remain too long in a pasture whose grass is tender and relishing, indigestions are apt to be caused in those sheep which eat more than the rest, or whose stomachs are weak. An excess of grain would be productive of the same consequences. In some situations, the same thing happens without any excess of food ; it may be caused by turning them into a pasture of clover or luzerne, or even into a field of oats or wheat, wet by rain or dew : the humidity disposes the aliments to a sudden fermentation ; gases are disengaged which distend the paunch, suspend respiration and the circulation of the blood, and commonly kill the animal in a short time. It is remarkable that sheep have *hoved* in consequence of having remained an hour, in winter, during frost, in a field of luzerne. I have experienced this in my own flock.

It has been supposed that the gas which causes the inflation possesses a deleterious quality, and for this reason causes death. This is possible ; but a rapid distention is sufficient, by mechanical causes alone, to produce great disorder and to suffocate the animal.

Some persons have attributed this complaint to the nature of the grass, pretending that luzerne and clover in particular are most apt to produce it. It is more probable that the inflation is caused by these grasses only because they ferment quickly ; for the same thing would happen if they were suffered freely to feed in fields of green wheat, oats, barley, pease, lentils, lupins, vetches, &c. In the *ci-devant* pays de Caux, cows (for they also are liable to this disorder) are tied to stakes in patches of clover, the only kind of meadow in the country ; so that they can only eat a certain quantity. They are removed to different places, several times a day, and great care is taken to let them have no more than is proper for them. They are fed in this way only during fine weather ; and they are seldom attacked by the disorder in question.

The symptoms of this disease are, a sensible augmentation in the volume of the belly, on the left side ; a sluggishness in walking ; diminution or loss of strength ; stumbling ; difficulty of respiration ; the animal opens its mouth as if it wished to throw up the food or the gas by which it is oppressed. When violently attacked, it struggles with the disorder but a few minutes, and falls down dead. If the body be opened, the

paunch is found to be full of alimentary matter, or the gas which is there formed rushes out with impetuosity.

Sheep may be preserved from hoving, 1. by taking care not to let them eat too much ; the quantity of food proper for them, as well while housed as when at pasture, may to a certain degree be determined ; (see what has been said under the articles *Foddering* and *Pasturing*) 2. by not turning them into meadows of young grass, when wet ; or by not suffering them to remain there long, but only to pass through quickly, so that they may eat only the ends of the grass ; it is better that they take but very little, and be made to pass through several times, that they may have time to digest a part of what they eat, and that the paunch may not be suddenly distended. It is customary in some places, as has been mentioned, to cut clover or luzerne, or young pease or vetches, and to give them to the sheep while housed, or to put them in racks carried to the fields where the plants grow ; but what is given to the sheep is mowed the preceding day, that it may begin to be dry before the animals eat of it. This wise precaution has been dictated by fear of the sheep being hoved.

When a sheep has its belly swoln, nothing should be given to it to eat ; its mouth should be kept open by means of a gag ; it should be forced to run ; its back and belly should be rubbed, in order to drive the gas out of its paunch : in many instances, nothing more is necessary. *Gilbert* advises to throw it into the water : I am not certain that this advice is good. If the disorder is very violent, recourse is to be had to alkaline substances, such as lie, soap-water, potash, lime-water, or, which is still better, liquid ammonia. Whichever of these substances is at hand, it should be given in the following doses ; viz. of lie or lime-water, 2 decilitres ; soap-water, one glass ; liquid ammonia, from 20 to 25 drops, which the animal must be made to swallow. The dose is to be repeated once or twice, as may be needful ; some injections should also be given ; but if the symptoms are very threatening, the paunch must be opened with a knife ; and a tube, made of reed or elder of the size of one's finger, introduced into the wound. The trocar would be much preferable to a knife, which cannot be so well directed. By plunging it with force, rather in a perpendicular than in a horizontal direction, into the middle of the left flank, at an equal distance from the last rib, the haunches and that part of the spine called lumbar vertebræ, the paunch is opened. The tube is to be pushed in, and the trocar drawn out ; the air immediately makes it escape, sometimes carrying with it matters that stop the tube, which may be cleared by means of a long probe with

a button on the end. The tube must be left in some time, to facilitate the escape of the gases which continue to be formed, until no more come out. The circumference of the wound is then cleaned with warm wine, and it is covered with a pledget of turpentine. As a trocar cannot always be procured, it is better to make use of a knife than to let the animals die.

In the mean time, to chirurgical means may be added medical and dietetic treatment; and alkalies may be administered, as has been prescribed, and injections somewhat acidulous: the animals should be led out and made to walk; they should be lightly rubbed with a wisp of straw.

I have had sent to me from England a tube made of iron wire covered with skin, and terminated by an oval bit of pewter, pierced with several holes communicating with the tube. The person by whom it was sent says that, by inserting the instrument into the paunch through the mouth and the cesophagus, it enables the air to disengage itself and to escape. I gave it to a veterinary, who has assured me that he could make no advantageous use of it: indeed it appears to me difficult to introduce it; I believe it would even oppose the escape of the air, by stopping the orifice of the stomach.

In the department of Ardèche, it is said, a hoved sheep has been cured by drawing the air from the intestines through the anus, by means of a syringe. If this is true, and if the attempt is renewed with success, this last remedy would be preferable to every other, on account of its extreme facility; syringes may be had almost every where. It is to be hoped that this experiment may be repeated, and an attempt made even to draw the air through the mouth.

No food should be given to the animal before its paunch is emptied, and its excrements have some consistence: its food may be gradually increased in quantity; at first, it should be straw, after-grass, fine bran; that is to say, aliments which will not ferment.

It has been advised to give to sheep that are hoved a cold decoction of aromatic plants, such as balm, with 2 grammes of sulphuric ether. I do not know whether this remedy has been found successful.

Worms and Insects which infest sheep.

Several species of worms and insects infest sheep. The most remarkable worms are the tœnias; among which may be

distinguished that which in French is called *hydatigène*, because it is enveloped in a hydatide or sack containing an aqueous humour. It is also called *cerebral tœnia*, globular or vesicular tœnia: it has been mentioned under the article vertigo. This worm is found in various parts of the body, particularly in the head; it appears also in the chest and the lower belly, even enchased in the viscera. Another sort of tœnia, that which is annular and shaped like a ribbon, is found in the intestines. The operations already mentioned are the only possible means of destroying the worms in the head: as to the annular worm in the intestines, it can be attacked only by vermifuge medicines, either taken through the mouth or injected; but the symptoms which indicate it should be well known. The only case in which these remedies ought to be employed, is when these worms have been found in the bodies of several sheep that have died, and it is thence presumed that the others likewise have them. One year at Rambouillet, we gave to lambs among which we suspected that some were attacked by these worms, soot mixed with milk. We cannot say with certainty that those which took the remedy had worms; but none of them fell sick; several died before this remedy was employed. If injections are thought adviseable, decoctions of bitter herbs and oily substances, that kill worms, should be used.

A species of worms is produced and grows in the nose of sheep; it is hatched from an egg deposited there by a fly.— This worm buries itself in the nose, and increases in size, to the great annoyance of the sheep. It may be discovered by the efforts which the animal makes to get rid of it; it holds down its head, raises it again, shakes it, snorts from time to time, and sometimes turns round as if it had worms in its brain: people are very apt to be deceived. These worms are short, round, entirely white, except the head, on which is a brown spot.— Sometimes sheep get rid of them by sneezing. In order to make them come out more easily, or to kill them, the sheep which are infested by them are exposed to the fumes of sulphur, or rather, of spirit of turpentine, or some other essential oil. When this method is employed, it is necessary to present the fumes to the animal's nose only at intervals, and for a few moments at a time, that it may have an opportunity of breathing, and not be suffocated. The worms may die in the nose, and not be able to come out. In this case, inflammations ensue, which are attended by ill consequences. The trepan, which is of little use in the vertigo, is often successful when employed to extract the worms from the nasal cavities, because the skull, in this case, is not touched.

Flies sometimes deposit eggs in the vulva of ewes ; or in the wounds which rams get, in fighting, at the roots of their horns ; or in those occasioned by bites of dogs. A little spirit of turpentine destroys the worms hatched from the eggs.

We have not the same resources against the flukes which live in the biliary pores of the liver, and even in the gall-bladder ; nor against the crinodes (*filiaria equi*) which are found in the tracheal artery and the bronchia. These worms are filaceous ; they are three or four inches long. The presence of the former may be conjectured when symptoms of the rot appear, and the latter are indicated by a violent and frequent cough. The worms can be attacked by no particular remedy ; they are connected with disorders which favour their multiplication. By preventing the disorder, the production of the worms is hindered.

It remains to speak of two insects ; the tick (*acarus*) and the louse (*pediculus ovis*). The former is most common in woodland countries ; it sticks to dogs and sheep ; it clings to them with its feet ; it cannot be removed without drawing blood from the place where it fixes itself. Lice infest the different parts of the body ; cause itchings, when they are in great numbers ; torment and fatigue the animal, and make it sensibly grow lean. The latter insects are destroyed by applying some fat substance to them ; they cannot resist the impression even of the air, for the day after shearing they all disappear from sheep which were full of them. The English employ arsenic and corrosive sublimate. *Mr. Jefferson* has addressed a memoir to the Institute, in which he blames this practise, on account of the dangerous nature of those substances, and proposes a method which appears to be good. Take a common bellows, and adapt to its extremity a tin tube containing bad tobacco, which is set on fire ; let one man hold the sheep between his knees, let another open the different parts of its fleece, and let a third, by means of the bellows, blow the smoke over all the different parts of the animal's body successively ; under its belly ; upon its legs and between its thighs. It is asserted, that in eight hours one hundred and fifty sheep may be cured in this way ; the ticks and lice die in twenty four hours. After the operation, the sheep must be kept some time in the open air, that the tobacco smoke may not injure them*.

I have often suspected that sheep swallow insects together with the leaves of plants ; especially when they go to pasture

* A little snuff, or sweepings of tobacco, put upon the parts containing the insects, are said to answer every purpose.

where spiders have made their webs, and have caught numbers of little cantharides, or other insects likely to corrode the membranes of the stomach. I have often been struck by the great quantities of these spider-webs and of the insects caught in them, especially upon wild-poppies (coquelicots), which are sometimes covered with them, and I have suspected that subsequent mortalities ought to be attributed to them rather than to any noxious quality in the plant. It is also possible that sheep may be injured by eating plants which have been gnawed by insects, without swallowing the insects. I offer these remarks as mere conjectures, which it would be well to examine by observations which I have not yet had an opportunity of making.

Of Tumours, Fractures and Wounds.

A flock which is well fed and well attended, is not very liable to these three kinds of accidents. But when one happens, it must be attended to. Sometimes, at the lower part of the cheeks of sheep, are seen gatherings which may be the consequences of disease. These gatherings are always critical and favourable; all that is necessary, is to discharge the matter which they contain, by means of a scalpel or a pen-knife, to cleanse the wound with warm wine, and afterwards to dress it with spirit of turpentine, yolks of eggs and brandy.

If a sheep breaks its leg, as sometimes happens in leaping a ditch, or by means of a horse or carriage, it is easy to reduce the fracture, although it may have happened some time. For this purpose, take two, three or four small splints of wood; lay them over the junction of the ends of the fractured bone; cover them with soot and whites of eggs beaten together; wrap the whole in tow, sufficiently tight to prevent the splints from moving, but taking care not to bind it round too tight, as it might occasion a mortification. The animal must be put by itself, on good litter; and fodder should be given to it upon the ground or in a low manger: if treated thus, it will soon recover and walk.

By means of little boots, the legs of lambs that were bowed have been straightened.

For simple wounds nothing is necessary, if they happen when nothing is apprehended from the heat of the weather; in summer they should be attended to, on account of the flies, which may be kept off by putting upon the wound a little spirit of turpentine. Wounds occasioned by blows or bites demand more care: they should be washed with some brisk liquor, as lavender brandy, arquebusade-water, red water (l'eau rouge) &c. For the wounds made by shearers, see article *Shearing*.

For other swellings, see articles *Anthrax* and *Spider*,

Of purifying Sheep-houses.

During a pestilential and contagious disease among sheep, it is beneficial to keep the sheep-houses clean, to make the air circulate freely through them, and to renew the litter in them.— When the sickness has ceased, it is proper to purify the houses before sheep are put there again.

Confidence had long been placed in aromatic fumigations, such as the burning of juniper-branches or berries, or resinous substances : but, in the present case, it is not required merely to substitute an agreeable for a disagreeable smell. Fumigations, unless they destroy the power of the deleterious gases, and the activity of the destructive miasmata, are of no service. The inutility of such fumigations have at length been discovered, and vaporisations of vinegar employed in their stead ; these have not been found more efficacious.

The true means are the following: begin by removing all the dung; open the doors and windows; wash with boiling water the racks, the mangers and the walls, to the height of three feet; take away the ground of the floor, to the depth of 2 inches, and put new earth in its stead.

After this, in order to obtain completely the end proposed, the following process should be employed; we are indebted for it to *Mr. Guyton de Morveau*, and it has been attended with the happiest effects.

Place upon a chafing-dish of live coals a broad earthen pan containing 12 grammes of common salt a little moistened; carry this apparatus into the sheep-room, and pour upon the salt 9 grammes of oil of vitriol: shut the doors and windows, and leave the place immediately, so as not to breathe the suffocating vapour, which will fill the whole building: keep all shut until the fumes are entirely dispersed ; the sheep may then enter with safety.

Ægagropila.

This name is given to substances sometimes round, sometimes of an oblong shape, found in the fourth stomach of sheep as well as of other ruminating animals. They are covered with a greyish crust, and have an excrementitious smell. If one of these substances be opened, a mass of filaments will be

found wrapped together, composed of bits of wool swallowed by the sheep when they lick themselves, or when they take from each other's backs ears of grain or parcels of fodder, or when they browse the leaves of bushes to which flocks of wool adhere. Some persons imagine that these masses are a mixture of wool, which makes the chief part, and of a very small quantity of vegetable matter, particularly eglantine. But they are found in the stomachs of animals which live where eglantine does not grow.*

These substances found in the stomach have been the occasion, more than once, of consequences nearly fatal to suspected persons; and of much embarrassment to the judges. Some farmers have insisted that malicious persons, with a view of injuring them, made these balls and threw them in the way of the flocks which swallowed them. Men have been unjustly punished upon suspicion of this crime. It is to be hoped that the courts of justice will hereafter show more understanding in their decisions, and not attribute to malice the operations of nature. These lumps of wool are made round by the pressure of the sides of the stomach; and the juice of the stomach covers them with a crust which has been mistaken for pitch.

It is not certain what effect these substances may have upon the health of the sheep in which they are found.

The veterinaries deem them harmless. They are found in the major part of the sheep killed by the butchers, which are apparently in full health. Others say that the *ægagropilæ* may be fatal; they draw this inference from the quantity of them found in the bodies of several sheep which died after being in a state of debility and oppression; from ten to sixteen have been found in one stomach; it must be confessed that, however small they may be, so great a number in the fourth stomach, which is not large, must greatly impede its functions; and although the animals, upon being opened, showed no other unhealthy symptoms, it cannot be denied that their death might have been occasioned by these substances. Admitting that *ægagropilæ* cause sickness, the only way of preventing them is to keep the flocks away from bushes, and to place the racks in so erect a position that the fodder may not fall upon the fleeces. I do not think any medicines can reach the fourth stomach, and dissolve such compact masses of wool. These medicines would be lost among the substances contained in the three

* Sometimes, lambs, when their mothers have wool around their teats, swallow some of it. The shepherds should be careful to remove it.

other stomachs, or they might occasion disorders worse than the original evil.

In order to know every thing relative to *ægagropilæ*, consult a very good tract by *Mr. Chabert* in the *Instructions vétérinaires*. This subject has several times been treated in the *Annales de l'agriculture française*, particularly in vols. XXIII, XXVII and XXXIX.

Of Shepherds and Dogs.

I shall terminate this work by an article which might as well have been placed at the beginning.

Good shepherds are so necessary, that unless they can be procured, fine flocks are not to be hoped for.

Those who judge only from appearances, think that shepherds have nothing to do; because they see them wandering slowly about the country with their flocks. In some parts of the country, the shepherds knit; but they would do better to give up all such occupations as may withdraw their attention, which ought to be incessantly bent towards their flocks.— Besides, all their labour does not consist in leading the sheep to the fields and tending them while there. The following details will show that they have much to do in the course of the year, and that even those moments are not lost in which they are supposed to be entirely idle.

Shepherds are divided into *travelling* and *sedentary*; some duties are common to both, and some peculiar to each. In several parts of France, the travelling shepherds conduct their flocks, in the summer, to the mountains, and bring them back, to pass the other seasons either on the farms of their owners, who house them and feed them with fodder laid up for the purpose, or in parts where the grass grows, such as la Crau d'Arles, the sea-coast in the department of Var, &c. These latter flocks remain in the open air all the year round. The travelling shepherds, being almost continually at a distance from their employers, have opportunities of committing great frauds, Care should therefore be bestowed in the choice of these men, and it would be proper for the master to go from time to time to the place where they are stationed, to overlook them, and make them render and account of themselves; it would be desirable even to have a confidential person constantly with them. The business of shepherds, during their journies and their abode on the mountains and in the low country, has been already described.

It is customary, in many places, to give the shepherds very trifling or no wages, but to permit them to have in the flock a certain number of sheep maintained at the cost of the master : the increase of these sheep and their wool belong to the shepherds, who do not even pay for the shearing. This custom is attended with many ill effects : men should never be put in situations where they may cheat with ease and impunity.— The shepherd's sheep are always in good condition, their wool is the handsomest and most abundant ; they seldom die ; the dogs, to whom they are well known, suffer them to feed in the richest pastures, and often in forbidden places ; the shepherds themselves carry to them into the fields bread from the house ; in the sheep house, the best fodder is always given to them.— Lastly, there is danger that, if the shepherds lose any of their own sheep, they may replace them by others which may introduce some disease into the flock. In some places, proprietors permit, not only shepherds, but all their other servants to have sheep among their flocks. No greater abuse exists, as may be easily imagined. Proprietors of fine flocks no longer suffer such mixtures and prefer giving to their shepherds and other servants good wages and presents.

A shepherd should never kill a sheep without the order of his employer, nor be permitted to have the skins of those which die, nor should he be employed to buy or sell sheep, unless his integrity is well approved.

Since merinos have come into high repute, it has been discovered that shepherds, during the season of folding, sometimes lend out, in the night, the rams, to cover sheep in the neighbourhood ; that they exchange full blooded animals for such as are mixed ; that others sell lambs just yeaned, under pretence that the ewes had cast their young, or that the lambs had died.

It is desirable for a shepherd to know how to read and write ; that he may make memorandums, and examine, from time to time, the number of sheep in his flock. If he cannot read and write, his memory must supply the deficiency. Some shepherds not only know the mothers of all the lambs, but the qualities of each remaining individual, and those of their ancestors, whether sold or dead. The marks by which they are able thus to distinguish them, are peculiarity of shape, different shades in the colour of the wool, spots, differences in the thickness of the wool, the size, the manner of walking, the sound of the voice. I have known a shepherd who, when his flock returned from the fields towards evening, could take the lambs, when they were weary and perplexed, and give them to their several mo-

thers, without any hesitation. I knew another who, in the morning, before entering the sheep-house, if he heard an ewe bleat as if she had lambed during the night, could tell which one it was, without seeing her. Habit even teaches to know the age of a sheep by merely looking at it. If, however, it be requisite that a sheep should not be confounded with the rest, the shepherd marks it, either in its ear or on some other part of its body.

A good shepherd is distinguished particularly by his management at the time of yeaning ; which is the most interesting period to the owner, because his property is then increased.— During all this time, a shepherd ought not to quit his flock ; he would do well even to sleep in the sheep-house.

When an ewe lambs with difficulty, he should assist her :— for the most part, it is sufficient that he introduce his fingers, greased with butter or oil, his nails being pared close, between the orifice of the vagina and the head of the fœtus. The mother should be assisted only when she makes efforts to extrude her young one.

At the time of bringing forth, the fœtus presents the end of its muzzle, which projects, like a wedge, from the opening of the matrix ; the two fore feet are under the muzzle, and the hind ones folded under the belly ; they stretch back as the lamb comes out : such is the natural position. Sometimes lambing is difficult and even impossible. Three wrong positions render it difficult: 1. when the fœtus presents the top or one of the sides of its head, the muzzle being turned ; 2. when the fore-legs are folded under the neck or stretched out ; 3. when the umbilical cord passes in front of one of the legs. In the first case, the shepherd must push back the head, and draw the muzzle towards the opening of the matrix ; in the second, he must endeavour to find the fore-feet, and to bring them to the opening, or to bring out the head, and to draw after it the two fore-legs, or only one of them, that the shoulders may not present too great an obstacle. In the third case, the cord must be broken, without regard to the placenta, which comes out of itself when the lamb is dropped. After the lamb comes out, if the placenta were not to follow, it would be necessary to draw the cord, in order to detach it ; it should be removed at a distance from the mother, that she may not eat it*. It is very necessary that all the motions of the shepherd be gentle, which unfortunately is seldom the case ; these men are apt to be so violent as frequently to hurt both the mother and her young one.

* Every ewe would not eat her placenta ; but some have this sort of appetite ; they find a taste in it which pleases them.

If the opening at the pubis is not sufficiently large, or if the foetus is of a great size, or if it is still more badly placed than in the three preceding cases, it is impossible for the ewe to lamb; nothing can be done but to cut the foetus and extract it piecemeal, in order to save the mother: but great precaution is necessary, to avoid wounding organs of great delicacy and sensibility.

The shepherd, before he goes to the fields, should examine his ewes, and leave at home such as, by the largeness of their bag and other signs, appear to be near lambing; he should place them in a separate enclosure; and he should do the same at night, if necessary, when he goes his last round. Lambs dropped in the fields in the winter season are liable to be frozen; this must be guarded against as much as possible. The shepherd should be provided with a little pocket, in which to keep from the cold any lamb that may be dropped unexpectedly, until he returns to the house.

Two things may happen, which should be prevented; the lamb of an ewe that is too sick to suckle her young may leave its dam and suck some other ewe, or be entirely neglected in the midst of the flock; or the sick ewe may be sucked by some other lamb that takes advantage of her weakness, so that her own, after it is dropped, finds nothing in her bag: the shepherd must hinder this, by putting into a separate enclosure the ewes which are likely to lamb during the night. This separation is peculiarly necessary when any ewes lamb latter than the rest; for there is then danger that the stronger lambs may deprive those which are just dropped of the milk of their mothers. It is not uncommon to see a lamb suck an ewe which has just lambed, by passing between her hind legs; it becomes so impregnated by the matters that issue from the ewe as to deceive her, and she adopts it either alone or together with her own.—When ewes return wet from the fields, they cannot always distinguish their own lambs; for the little creatures, getting under the fleeces of their mothers, cover themselves with water, which prevents the emanations by which their mothers distinguish them. A good shepherd may prevent the greater part of these evils; he cannot be expected to prevent them all, if the flock is numerous. When a lamb is just dropped it ought to be particularly attended to; as it grows stronger, it can take care of itself.

If an ewe has no milk, or if she dies at the time of lambing or soon after, the shepherd must give her lamb to an other ewe that has lost her young or that is able to suckle two. If an ewe that is feeble brings two lambs at once, he must take one away,

and give it to another ewe, or feed it with milk, by means of a sucking-bottle; or it may be put to a goat: I had a goat which reared four lambs for me.

The cares of a good shepherd, during the time of yeaning and suckling, are not confined to those which I have already mentioned. He must milk the ewes whose bags, in consequence of being choaked, are so painful that they do not permit their lambs to suck; or he must mitigate the tumours by means of emollient applications; he must give the lambs milk to drink, and not restore them to their dams until they are relieved; he must bring the abscesses to suppuration, if any are formed in the bag, and open them when ripe (See the article *Spider*); he must take off the hair around the teats, and clear them of whatever matters obstruct them; he should keep the flock near the house, when a number of ewes are about to lamb, and should give to those which drop their young in the fields time to recover a little, and not remove the rest from them, as this might render them uneasy.

Some ewes not only do not seek their lambs, but even drive them away when they approach to suck: this is either because they are devoid of natural instinct, or because their bag is ticklish. The shepherd, when he perceives this, must put their lambs to them every time they return from the fields, and, if necessary, raise one of their hind-legs, that the young ones may be better able to get at the teats; he may in this way commonly succeed. The same end is answered if the mother and her lamb be left a day or two together in some separate inclosure.

When an ewe does not lick her new-dropped lamb, the shepherd must induce her to do it, by sprinkling salt upon the lamb; if she still refuses, he must whipe it with a little hay.

One of the chief merits of a shepherd is to know how to rear the greatest possible number of lambs from a certain number of ewes. Mine has reared, from one hundred ewes, ninety-six lambs, and none of them twins. Another, from the same number of ewes, has had as many as one hundred and twenty lambs; but many of the ewes yeaned two at a time.

It is proper that the fodder of dried grass be prepared before the sheep go into the house; they are thus prevented from inhaling and swallowing dust, and their fleeces from being dirtied by the stuff which flies about in the air. The shepherd should

leave his flock in the farm-yard while he is filling the racks, if he does it himself ; but it would be better to have every thing done before the return of the flock.

The proprietor must direct the quantity of food which is proper to be given. Shepherds are often lavish of it, with the view of rendering the animals finer, not considering whether the advantage be in proportion to the expense, nor whether this superabundance of food may not be fatal.

We have already given directions with respect to weaning, docking, cutting off the horns, castrating, marking, foddering, tending the sheep, leading them to pasture, folding them, and travelling with them.

A shepherd should know how to shear well, that he may do it when no professed shearers are to be had, or when it is required to take off the wool of sheep that die between one shearing and another, or of such as are sick and begin to drop their wool. He should also be able to skin those which die. In places where it is customary to wash the wool while upon the animal, this operation is performed by the shepherds. If the weather is wet, immediately after shearing, the shepherd must keep his flock for several days in the sheep-house.

When it is inconvenient to keep the rams separate, the shepherd must hinder them from covering the ewes, except at the proper season, by tying a piece of cloth under their bellies, large enough to reach the ground.

In many places, it is usual to fold sheep. This operation demands care on the part of the shepherd : besides being on his guard at night against thieves and wolves, he ought to know how much manure the ground requires. A skilful shepherd knows of what size to make his fold, and how to make the animals dung wherever he pleases.

Although nature has given to sheep, as well as to other animals, an aversion for substances which are injurious to them, yet they may sometimes happen to eat them, either through hunger, or because the noxious substances may be mixed with others which conceal them ; it may also happen that plants, otherwise wholesome, may be injurious when eaten in too great quantity. A shepherd should be careful to know the places where plants of the above descriptions grow, and should regulate his conduct accordingly.

Shepherds generally make their sheep move too fast ; what is but slightly felt by wethers and ewes that are not with lamb, may be a serious distress to such as are, and to the lambs. It is better for the shepherd to go before than to follow his flock.

The implements of a shepherd are a crook, a whip and a stick. The crook is composed of a wooden handle, 5 or 6 feet long, at one end of which is a small iron spade a little hollowed like a spoon, at the other, an iron hook. With the spade the shepherd throws lumps of earth at his dogs or sheep, and may use it to cut sod, with which to make shelters for himself. With the hook he can stop a sheep, by catching one of its hind-legs in it. The whip is necessary, especially in summer and at the time of folding ; in the middle of the night, it awakens the sheep more effectually than the voice of the shepherd or the barking of the dogs. The stick serves as a support and defence ; it should be thick and of hard wood. In the south, the shepherds make use of neither crook nor whip, because they have less to attend to and do not fold their sheep. To the above accoutrements must be added a scrip ; which is a leathern pocket divided into several parts, in which are kept, bread, a lancet and a scalpel for bleeding and opening gatherings, a scraper to take off the scab-pimples, thread and linen for wounds. The above are nearly all the things which a shepherd needs in the fields.

In Normandy, on the sea coast, where showers are frequent and sudden, the shepherds carry upon their backs, by means of a strap, a sort of covering, made of light wood and rye-straw, placed in a sloping position, and descending below the loins : when rain falls, they turn their backs to the wind, and are protected from the wet, which runs off along the straw. The Shepherd can even sit down and rest upon a small board attached to the frame, and which he props up with a stick.

Shepherds who migrate, always sleep in the open air ; they wrap themselves up at night in a cloak or other covering, and stretch themselves upon the ground. Those which are stationary and watch their flocks during the night, rest in huts fixed upon wheels, by means of which they may be moved when the place of the fold is changed ; they must be so near the inclosure that every thing which passes within may be distinguished.

A hut is commonly made 6 feet long, and 3 or 4 feet wide ; it must be as large as this to hold two men. It is roofed so as to keep out the rain ; and it has two doors, one on each side.—

If the shepherd has more than one dog, one sleeps under the hut, the others around the fold.

It is desirable in a shepherd that he understand all the diseases to which sheep are liable, and still more so that he know how to prevent them.

From what has been said, it appears that the business of a shepherd requires intelligence, zeal, some knowledge and great attention. He should also have bodily strength, that he may be able to fodder his sheep, to carry them at times, to remain a long while and even whole nights upon his feet.* It is for the advantage of proprietors that their shepherds be exempt from the usual prejudices which oppose every kind of improvement, and particularly of flocks. Such men are rare, and they must be formed.

Two years ago, agreeably to a report which I addressed to the minister of the interior, he determined that there should be a school for this purpose in each of the establishments belonging to government. As the men engaged in this business perfectly understand every thing relative to the management of sheep, persons sent to these schools will not only imbibe no errors, but will lose their improper prejudices. This is proved by those which have been instructed at Rambouillet; they are the best shepherds in the world. Such is the influence, in this respect, of that justly renowned establishment, that even those shepherds which accompany their employers there, at the time of public sales, return with a disposition to do better, after having seen the manner in which the flocks are there kept.

Dogs are often injurious; they wound and even kill the sheep. The Spaniards make use of tame wethers which, at the sound of the shepherd's voice, lead the whole flock, or divisions of it, in any direction that is required. What hinders the greater part of our shepherds, at least in some seasons, from imitating this practice? The utility of dogs cannot be denied, in countries where the cultivated fields are various and separated, and wherever much activity during the day and great vigilance at night are requisite.

Two kinds of dogs are made use of by shepherds; one kind is large, strong and active, intended to keep off the bears and

* In many parts, the care of flocks is entrusted to children of either sex; and if a person past the age of childhood be chosen, it is commonly one that is fit for nothing. The introduction of merinos should change this practice every where.

wolves; the other, small, but quick, sharp and intelligent; the dogs of this latter species, when ordered, make the sheep move, as a colonel manœuvres a regiment. The former are the guards of the flock against enemies; the latter are the guards of property against the flocks. Instinct alone instructs the large dogs; it is sufficient if they possess courage; the others require a particular education. To get good ones, the first thing is to choose those of a proper race; that, called *shepherd's dog* is the best. At the age of six months their education is begun, and continues till they are a year or fourteen months old.— While they are in training, they should not be permitted to run after the sheep with the other dogs; they would be entirely spoiled. The shepherd must keep them lashed, and send them out by themselves, that they may not be distracted. He must punish them whenever they are disobedient and bite the sheep: oftentimes he finds it necessary to break their fangs. When he practises a dog, he must place himself near the flock, and retire from it by degrees as the dog improves: at length, it learns to run without fail to any distance to which it is ordered.

Dogs, as well as other animals, have different tempers, which must be studied: some require to be caressed; with others nothing can be done without beating. Among the latter, some are sullen; these are good for nothing. The best are those which, after being beaten, fawn upon their masters.

I have seen some which would go only on the right or the left side of the shepherd; this rendered it necessary for the shepherd to place himself in such a situation, with respect to the flock, that the dog might always be on the side to which he was accustomed; this was a fault in the training.

A dog, in countries where are many cultivated fields to be preserved, does not last ten years, because he wears himself out. If the land is smooth, and the pastures extensive and level, he lives longer.

A good dog obeys punctually, is tender of the sheep, vigilant and even cross, when about the fold.

CONCLUSION.

If my object in this work had been to give a complete treatise on sheep, I should have made it much more extensive; I should not have been at a loss for materials; but I have confined myself to what I thought useful; and although some things may have escaped me, I think I have not omitted any thing essential.

I have been prompted to this work by the consideration that I have peculiar advantages to enable me to perform it: I have passed a great part of my life in the country, in the midst of farmers, shepherds and flocks, constantly engaged in inquiries and experiments relating to every branch of agriculture. I have been so circumstanced as to be acquainted with the Rambouillet merinos from the beginning, in the first introduction of which I was engaged; the place which I hold occasions me to have constant communications with the persons who superintend the establishments belonging to government; and, for ten years past, I have paid great attention to a flock of my own, which is not far from the capital, and which has thriven under my care. I therefore have it in my power to establish, upon experience and observation, the precepts which I offer.

With these advantages, I flatter myself that I have contributed something to the information of agriculturalists and proprietors of sheep. If my hope is not fallacious, and if this work proves to be of any use, I shall enjoy the satisfaction of having contributed to the improvement of our rural economy; among the objects of which our flocks are not the least important.

THE END.

APPENDIX.

FEVER.

This disorder, whether putrid or inflammatory, is very dangerous in a flock. Its symptoms are a dryness of the mouth, inflamed eyes and hot feet. If the flock feeds in a dry, open country, strewed with strong-scented herbs, and scorched by the heats of summer, it is subject to inflammatory fevers. It is proper, as soon as the disease manifests itself, to bleed the animal plentifully in the vein under the eye, and to repeat the operation the same day, in the same place; or it may be done by cutting the ears across. No food should be given the first day; and the two succeeding days, moderate quantities of warm water mixed with a little meal, small doses of a decoction of liquorice root, and copious injections of a decoction of mallow-leaves. The sick animal should be kept in some place of shelter, until it is entirely cured. Mild, cooling and emollient herbs are very beneficial; such as the leaves and flowers of mallows, beets, St. John's root, sorrel, groundsel, sow-thistle, chick-weed, succory, lettuce, turnip and beet-leaves.

If the flock, instead of pasturing upon high ground, lives in a rich, shaded and moist country; in this case, bleeding might increase the fever, which, in such situations, is often of a putrid or malignant nature. Bitter and purgative plants, fresh cabbage-leaves, peach-leaves, and those of the plum tree, betony, fumatory, patience, wild succory, are very properly prescribed. In case these remedies cannot be procured, a grain of treacle (thériaque) in half a glass of white wine and as much water, may be substituted. The proper drink is water mixed with honey and a little vinegar or verjuice or sorrel juice, or juice of barberry. The proportions are, the sixteenth part of a pint of vinegar, and one ounce of honey, to ten pints of water.

If a sheep is very thirsty, drinks a great deal, and does not recover from its fever in three or four days, the owner may expect to lose it.

It is said that half a pound of common ashes and two pounds of water make a salutary drink for a sheep. The ashes are left in the water for twenty four hours; the water is then poured off, and given to the sheep.

Lime-water, cautiously given, is also proposed. This is a new idea ; and appears to me to be a very happy one. I believe lime-water may be very serviceable in rich soils, and during very wet seasons, in every country.

Measles (Rougeole)

This is an epidemic disease, which soon manifests itself by boils of a purple colour, whence issues an infecting matter, when they are ripe. The wool is stained by it, and at the time of shearing, flocks which have had the measles may be distinguished. If it breaks out in a flock, it is rare for any of the sheep to escape. The less vigorous sheep, if unattended to, commonly die.

The external remedy is, to wash the pustules with strong vinegar in which rosemary is boiled ; wine may be substituted for vinegar.

The internal remedy should be employed only when the disease is quite confirmed ; as its effect is to drive the humour to the skin, and to hasten suppuration ; which to me appears useless, at least during the first stages of the disease ; but which I think must be very useful when it is seen that the sheep have not internal strength enough to expel to the surface the principle of the disease : this often happens in rainy winters ; especially in wet places. The remedy is as follows. For one hundred sheep, take four ounces of treacle (thériaque) and two large handfuls of betony ; heat them together on hot ashes, for twenty four hours, in two bottles of white wine strengthened with two glasses of brandy making together a quarter of a bottle.—Strain this infusion through a cloth ; and let it be given in doses of three spoonfuls for each ewe or wether, and of two for each lamb. The flock must swallow this strengthener in the morning, fasting, and must eat nothing for twenty four hours after it. During the operation of this medicine, the sheep-house should be kept a little warmer than usual ; the day following, the flock should not be conducted into the fields unless the weather is very fine ; in which case, it should be left two hours in good pasture, and before its return the whole floor of the sheep-house should be spread with abundance of fresh litter ; if the weather is cloudy, rainy or foggy, good hay must be put into the racks for the sheep.

This disease bears a great resemblance to the small-pox among men. Inoculation would be the only way to prevent its ravages.

Apoplexy.

This disorder is of all the most destructive to sheep in Berry ; it prevails at all seasons, but commonly begins its ravages about the middle of summer, when the great heats are about to be succeeded by the damps of autumn. The blood of the sheep becomes thick, in consequence of too much green food, of the dryness of the summer season, of the heat of the sun in a very open country, of violent sweating in close sheep-houses, of want of attention in the inhabitants, who do not send out their shepherds early enough in the morning, nor make them return before the heat of the day, and who are not careful to prevent their flocks from returning to pasture until an hour and a half or two hours before sun set ; in consequence of the pernicious practice of turning the flocks in fields of grain, as soon as the sheaves are taken away ; lastly, in consequence of the want of abundant and pure drink. All these causes contribute to hinder insensible perspiration ; the humours thicken ; the blood becomes adulterated by heterogeneous particles ; its course is impeded ; the apoplectic stroke soon comes, and kills the animal in ten minutes, after violent convulsions and an universal tremor.

This destructive disease does not attack a flock without giving notice by symptoms which an intelligent shepherd may perceive. The sheep appear less and less lively ; they do not play about ; their eyes are not so bright as usual ; their wool looks dull ; and they eat with a kind of indifference. A careful shepherd, when he perceives these symptoms, immediately bleeds the whole flock. He repeats the operation the succeeding day. Once he draws the blood from the tail or foot ; once from the vein under the eye. He bathes the sheep well, in the river or in a tub, every day during a week. He gives them a large quantity of water to drink, which he induces them to swallow by infusing into each pail an ounce of salt, and which he renders more salutary by the mixture of honey and vinegar mentioned under the article *fever*. He thoroughly cleanses the sheep-house, he causes as great a draught of air as possible to pass through it, or he makes his flock lie out in the open air ; he gives the animals but little food, and puts it into the racks, that he may be certain of the quantity and quality. He even makes them fast one day out of three. He employs all means that tend to dilute, to correct and to cool the blood ; and gives to them such herbs as are mild, emollient, watery and affording little nourishment ; they are mentioned in the article which treats of inflammatory fever. It will answer to feed the sheep upon nothing but ryè-straw.

These precautions may be insufficient to save the whole flock ; but they may in some measure check the ravages of the disorder : and when used betimes, and seconded by great vigilance, they may even succeed in entirely keeping off the mischief.

It is easy to imagine why the same remedies may act differently upon different flocks. Apoplexy may in one case be sanguine, in another serous. The serous apoplexy is the most deadly ; it almost always leads to putridness, even if the animal escapes from immediate danger. In this case, bleeding affords no relief ; it would be desirable to excite vomiting, but it seems impossible to accomplish this in ruminating animals ; purging is but a poor substitute ; it should however be tried, and the dose should be composed of a drachm of cream of tartar in a glass of whey sweetened with a little honey ; this dose should be repeated several times a day, as long as it appears to produce a favourable change. Though sheep cannot be made to vomit, they may be made to throw up a great deal of phlegm and slime, by a mixture of equal quantities of vinegar and water, which they swallow without giving much trouble, by means of a little bottle with a long neck.

The quantity of vinegar for each sheep is the two and thirtieth part of a pint, that is, a quarter of what is called a glass throughout this work.

The kind of apoplexy may be conjectured by examining the fibres around the white of the eye. If they are of a bright red, the apoplexy may be considered as sanguine. If they are pale, the apoplexy is almost certainly serous, and bleeding injurious. Purging is proper for both kinds, and the same regimen answers for both.

It is easy to determine why diseases are so often epidemical among sheep. The less animals differ from each other, the more general are the effects produced among them by the same causes. Now what difference ever exists in the habits of the sheep of the same flock ? None ; there is scarcely any in their features. They seem destined to absolute uniformity in their pleasures and their pains.

Another species of mortal apoplexy, but less epidemical than the preceding, is what is generally called in French *le coup de sang du toit*. The heat of the sheep-houses increases the fermentation of the animal's humours, and disposes the blood to rush violently and copiously towards the breast.

When a sheep is attacked by this disorder, its eye is very dim, and its sides very hollow ; it hangs its head, breathes hard, complains much, and dies in a short time, if not speedily relieved. Copious bleeding is the remedy. Every other, unattended by this, is useless ; but this, if immediately employed, is sufficient. I have however observed that the animal is sooner out of danger if, after bleeding it, it is plunged three or four times into very cold water. This accident, which cannot be entirely guarded against, shews that a proprietor ought not to neglect to visit often his sheep houses, to have all his flock washed several times a day, and to observe it attentively when it first quits the houses. The sick sheep should be bled out of the sheep-room, and not suffered to go in, until a perfect cure is accomplished. If the animal remains heavy and disinclined to eat, it should be separated from the flock, and kept two days without food.

Attention to the quantity and quality of the food given to animals should be the principal remedy for their complaints ; and a perfect cure is often effected merely by abstinence. But very powerful must be the influence of a person who can persuade country people to believe this.

Another kind of apoplexy, combined with the effects of indigestion, is called *le coup de sang des champs*. This rapid disease makes the sheep swell and totter. It is very fatal, as well as the kind just described. Bleeding is proper ; but it is not so effectual as in the other apoplexy. I am confirmed in the belief that it is accompanied with an indigestion ; first, because it attacks the animal in the fields, and scarcely ever until it has been there some time ; secondly, because quick motion is beneficial ; thirdly, because the cold bath often succeeds, when bleeding has been found of no service.

In these last two species of apoplexy, it is always a bad symptom when the animal does not bleed freely ; and it is almost a sure sign of recovery if, on coming out of the cold bath, it shakes itself carefully, and voids its excrements.

A too great abundance of blood occasions this disease ; but it is not to be supposed that vigorous sheep are not able a long time to endure this superabundance. A single fact will serve to shew their strength in this respect.

A well informed man went to a farm to purchase rams. He chose one that had very fine wool, that was very tall, with a thin body, and the vein around whose eye indicated an aban-

dance of blood. The farmer acknowledged that it had been lean and dejected for four months. The purchaser said to the farmer, who seemed surprised at his choice ; “ I shall send a cart to morrow ; put into it all the rams which I have chosen ; if this one ceases to eat freely, slit both his ears across without delay ; he seems to be oppressed by blood.” The purchaser received the animal safe. He immediately had it bled freely. The ram recovered his spirits ; yet a fortnight afterwards it had an apoplectic stroke, and was bled more copiously than at first. This ram has since become a very noble one, and has been in perfect health.

Sheep are less liable to a superabundance of blood, if they are made to move a great deal while they eat. This continual exercise facilitates digestion ; and the blood is purified at the same time it is renewed. Sheep would generally be attacked by much fewer diseases, if country-people could be taught how greatly cold and cleanliness contribute to strengthen them ; how necessary it is for them to have a variety of pasture ; and how beneficial exercise is to every thing that breathes.

Indigestion caused by rich Pasture.

It sometimes happens that in the spring of the year sheep eat too greedily of young grass, which sets their blood in such a ferment, that, while in full health, they suddenly stand still, swell prodigiously, fall down, and die in the space of fifteen minutes. One month of May, I had a whole flock attacked by this disorder. I had five or six of them bled under the eye ; which only served to hasten their death. I tried oil and several other remedies. All were of no effect. The danger was urgent, and I expected to lose the whole flock. Fortunately, a workman was present to whom the disease was familiar. He told me that he had known good effects to be produced by bathing all the sick sheep three or four times successively in very cold water, and by making them afterwards move about without intermission until they were tired. My flock was immediately plunged, again and again, into cold spring-water, and forced to run. The disease immediately went off.

We should at all seasons beware of the young grass of pastures where sheep remain a long time stationary through choice, and eat with avidity. We should above all beware of the succulent grass of the month of May. After a long privation, the sheep find themselves invited to enjoyment, and they indulge to excess.

Dysentery.

This disorder seldom attacks sheep except in rich pastures which contain no acid herbs. Their bowels are very loose; which commonly makes them sick, except at the time of the new grass. They sometimes void a little blood; they become weak, feverish, and suffer a great deal. Treacle rendered purgative by a small quantity of flowers of sulphur; water mixed with a little vinegar in the mangers, together with some honey and barberry-leaves as food; and afterwards the use of the preservative juniper powder, which I have promised to describe in the following pages; these things are proper for this disease, which is sometimes epidemical, often mortal, always infectious, produced in autumn, and renewed by moisture.

The Scab or Red Tetter.

Every part of a sheep's body is liable to be attacked by this disease, which may be radically cured, if attended to. It is more obstinate on the lips and nose than any where else, because the animal rubs those parts while eating.

It is occasioned by want of cleanliness, by bad food, by want of care of every kind, and it may be communicated to a whole flock in a very short time*.

Mr. de Chanvalon, author of the *Manuel des champs*, prescribes an ointment composed of oil of hemp-seed, roche-alum and native sulphur; or wine in which antimony has been washed. He moreover proposes, if the disease attacks the whole body of the animal, to wash it with lie, and to wash it afterwards with camphor boiled in olive-oil. The "Gentleman farmer" advises to dip a brush into soap-lees, and to rub the animal with it, and to complete the cure by an ointment composed of equal parts of tar and lard.

* It is possible to cure even the violent lizard-itch (*lézard démangeaison*), which is without exterior pimples, furrows the bodies of sheep, makes their wool fall out, and is catching. But I should think the cure of this kind of itch the most certain in the month of May, and I should advise the following precautions. Shear the sick animals completely, lest any pimples should remain concealed under the wool; let them be then conducted to a dry pasture, or fed with good fodder in the sheep-houses. Every morning two hours before going to the fields, they should be made to eat, for one or two weeks, oats sprinkled with a little saffron and steel filings; and their drink should be water mixed with wheat-flour. As the animals recover, they should be separated from the rest, until the whole are well.

Virgil proposes a composition of olives from which the oil is extracted, silver-dross, pitch, native sulphur and wax, together with the juice of sea-onions, hellebore and black bitumen. He prefers to this ointment, incisions and scarifications in the ulcered parts.

The "Farmer's guide" also advises prepared tar or oil of broom. It also says that another remedy equally effectual is, to take equal parts of tar and vinegar, to heat them together, to stir them until they are completely mixed, and to anoint the sores with this composition.

I neither deny nor affirm the virtue of these remedies, as I have not made use of them; but I should prefer the following remedy, used for horses, and which has never failed to effect a cure. It is composed of two ounces of quick-silver, two ounces of turpentine and two pounds of hog's fat. For horses, four times the quantity of quicksilver is to be used. Once rubbing produces a perfect cure. This ointment is thus prepared for sheep. Mix the quicksilver and turpentine well together.—When the turpentine and quicksilver are completely mixed, and appear of an uniform slate-colour, gradually stir into them the hog's fat, which should previously be melted and suffered nearly to cool. This quantity of ointment may serve for a greater or less number of sheep, according to the extent of the disease; as it is to be rubbed only upon the sore parts. When it is expended, the composition must be again made in the same way.

Powder of the juniper-tree, used as a preservative, is very useful after the red tetter is subdued, or after the scab has disappeared.

A proprietor ought not to offer a flock for sale while it has this disorder; for it may be communicated in the sheep-houses by the slightest rubbing, or even by mere contact.*

In well regulated flocks, the scab ought to be unknown.—Within ten years I have not seen one of my sheep attacked by it.

* It is said in "l'Instruction pour les Bergers" that sheep which live upon low land are much more subject to scab than those which are in elevated situations; while the latter are more frequently attacked by the apoplexy. A remedy for the scab is proposed in the same book. It is, to melt a pound of suet or fat, and to mix with it, near the fire, a quarter of a pound of turpentine.

Phthisic or Consumption.

A pasture that is very poor infallibly gives this disorder to a flock. They gradually lose their strength and liveliness. Their wool falls, and their weakness brings them every day nearer to death ; which commonly happens in the middle of winter, if the rack affords no better nourishment than the pasture. The remedy is easy to be imagined. Gradually feed your sheep better, both with green and with dry food ; and give them, if you can, some grain with its straw, or some nourishing vegetables.

Lambs dropped in the winter season by ewes that are lean and ill-fed, as they bring this disease into the world with them, languish, and soon die.

The Rot.

A rich and wet pasture produces a disease the reverse of consumption. This disease is the *yellow-fat* (*graisse jaune*) and ends in the rot ; it is supposed to be incurable when once confirmed. It seems as though nothing remained, to prevent the loss of the whole flock, but to sell the sound sheep at once to the butcher*.

Shepherds who have none but wet and rich pastures for their flocks which are destined for the market, must by no means neglect to mingle salt or some acid in their drink, and to employ the preservative juniper-powder. Pasture that is wet and poor, also produces rot among sheep, but does not fatten them. The same precautions are in this case indicated by the same danger.

Sheep which live upon rich but dry pastures do not rot, but they grow too fat, of which the ill consequences are well known. It is not adviseable to let them grow old upon grounds of this nature. It may perhaps be proper to bleed them, from time to

* Mr. l'abbé des Pierres has however assured me that, by means, of branches of broom, with which he fills the racks of his sheep-houses, morning and evening, in wet weather during the winter, he has stopped a confirmed rot ; that the mortality ceased, and that the sheep grew fat as soon as it was put upon this regimen. This remedy merits the utmost attention. Broom possesses great qualities ; it is aperitive ; its oil is good for tetter ; the infusion of it kills caterpillars ; the lie made from its ashes is powerful in cases of dropsy ; the ointment made of its compound extract is a sovereign remedy for wounds ; and the testimony of Domignot, abbot of the abbés *des Pierres*, leaves no doubt of its efficacy.

time, in the vein under the eye, and to give them the preservative juniper powder.

Sheep that have the rot languish some time, cease to eat with an appetite, grow out of spirits, stand with difficulty upon their legs, totter, often fall, and at length die without much pain.

After having advised the sale of such flocks as are threatened by this disease, it is but just, for the sake of purchasers, to point out the marks by which it is known in sheep, living as well as dead.

The rot is indicated in a live sheep, by its eye being hollow and of the colour of common suet; by the blood-vessels of the eye, which are of a dull colour, approaching to black; by the paleness of its flesh, the moisture of its skin; by the tarnished colour of its teeth; by its shrunk gums; and by its wool, which comes out if opened, rubbed between the fingers and slightly pulled.

The marks of rot, after death, are the belly filled with water; the fat yellow; small worms, or white pustules, or knots in the liver, or liver which may be broken to pieces in the hand.

Bite of a Snake.

This danger threatens only ewes when they have yeaned.—Snakes attracted by the smell of the milk, and by the warmth, sometimes get into sheep-houses, conceal themselves in the litter or in the holes in the walls, and suck the ewes, giving them deep bites in their bags. These bites are succeeded by inflammation; and the bags often rot away, the ewes being consequently unable to nurse their young. At other times they occasion a general swelling, and the animals die in great pain, and sometimes suddenly.

The first remedy is bleeding followed by scarification of the bag; the second is a poultice of bread and milk or boiled sorrel; the third is the ointment of la mère, melted, and tempered with a little olive oil. The ewe must be thrown on her back, in order to grease with this mixture her bag and the parts bitten.—It is applied by means of a linen cloth, through which the two thighs of the ewe pass, and which is fastened upon her back. The poultice is to be applied in the same manner. The internal remedy is an infusion of elder-flowers and honey.—Instead of scarifying the bag, it may be struck with twigs of a gooseberry bush, or with a branch of barberry.

After all, the preventives are better than the remedies. Examine frequently the lower part of the interior of the walls of the sheep-houses; kill the snakes whenever they are discovered; and keep the sheep, while in the fields, away from grassy thickets.

Heaviness (Lourderie).

This is a cruel and singular disorder which, in Berry, destroys at least a twentieth part of the flocks. It is almost confined to young sheep. A lamb, apparently in full health, when attacked by this disorder, gradually loses its appetite and sleep; it grows lean and out of spirits; its head hangs heavily; it stops short, leaves the flock, turns round several times, sometimes to the right, sometimes to the left, sometimes towards both sides alternately; at length it walks only in a circle, and falls into some ditch or other place, where it dies.

I suspected the cause of this disorder to be white worms, an inch long and of the thickness of the little finger. Curious to ascertain the seat of the mischief, I caused a lamb which had this disorder to be killed and its head to be opened longitudinally. After a long and minute search, I discovered, at the origin of the nose, the worms which I have just described.— This lamb had one on one side and two on the other. I thought the symptoms of the disease might be explained by this discovery. I reasoned thus; if there is but one worm, the lamb suffers less, and turns only towards one side; if there are several worms in the two nostrils, the animal is tormented without any respite, and turns to the right or the left, according to the side on which the worms are most distressing.

In searching for a remedy, I was guided by the following reflection: if the seat of the disorder was invariably the nasal canal, the remedy should be some powder or liquor deadly to the insect and harmless to the lamb.

But since that first examination, other heads of lambs that had this disorder have been opened under my inspection, and no worms found in them. So that the discovery of which I was proud is rendered doubtful; and I am reduced to the conclusion that worms may sometimes be the occasion of the disease, but that in some cases they lodge themselves in parts which are interior and inaccessible to our imperfect search, or which cannot be affected by our uncertain remedies. An injection of oil of turpentine into the nostrils of a lamb that had this disorder, caused it to fall down dead in an instant. A

strong decoction of tobacco or of gunpowder would have been unattended by danger, though it might not have effected a cure.*

This disorder, in some respects, bears a great resemblance to the epilepsy. I suppose this is the reason why they have been confounded, and why no agricultural writer has described the disease in question. I have remarked that it commonly prevails in winter; and, in general, whenever sheep are confined to dry food. Are the eggs of those worms contained in this kind of food? Do the sheep inhale them while at pasture? At what time of the year? My experience does not enable me to answer these questions. A pound of salt each day for fifty lambs, given from time to time, might perhaps be a good preservative against internal worms.

Worms in the foot.

Thick worms, two or three inches long, sometimes get between the claws of a sheep's foot, and occasion it to limp.— This is indicated by the foot being swelled, and by a small hole from which proceed black hairs about an inch long.

The skin of the foot must have an incision made in it; the worm must be dexterously drawn out by its hair; the wound anointed with broom-ointment, or prepared tar, or ointment of la mère; and the foot covered with a bit of skin made like a thumb-stall.

Colds.

Colds are fatal, particularly to lambs. They require to be prevented rather than nursed. A lamb that has a cold in the

* A farmer has assured me that he has cured lambs of this disorder by putting salt and pepper in their ears, which he tied with packthread for some days. I doubt their having had this disorder. A remedy sent from Paris is said to be composed of tobacco and hellebore. Its worth is not very well attested. It is called *emphyreumatic oil*. Many agriculturalists think that this disease is occasioned by the violent blows which lambs give their heads; that gatherings are formed in the head, and that when this gathering breaks the animal dies. I do not think it improbable that this disease may sometimes be caused by worms, and sometimes by gatherings. While writing these notes, I have had the abovementioned oil injected into the nostrils of a lamb attacked by this disorder. It became violently convulsed, and rendered pus through the nose. I repeated the injection, and made it swallow a portion of the liquid. It died while swallowing it. The animal was immediately opened. The right side of the lungs was decayed, and in the head a collection of matter appeared on the same side; this was also the side towards which the animal turned. It is doubtful whether this disorder proceeds from a contusion, whether it is merely a diseased chest, or whether it is caused by a worm.

winter season languishes a long time, and seldom recovers, if its constitution is weak.

The chief thing to be attended to is, to keep the sheep-houses of a moderate and equable temperature. To effect this, they should not be kept too warm while the ewes are there; and when they are away, the doors and windows should be less open, but never quite closed. Without this precaution, the lambs, when their mothers leave them, pass suddenly from summer to winter; and when they return, from winter to summer. It may easily be imagined how much warmth the ewes communicate to these young creatures. When left by their mothers, they gather themselves together in heaps, in order to keep themselves warm: they lie in the sunshine, fall asleep and get suffocated or wake up with violent colds. This danger is avoided by leaving no opening in the building through which the direct rays to the sun can enter while the lambs are asleep, taking care however not to exclude the air and light.

Water and honey kept warm in shallow mangers or flat tubs, and bread made of wheat and fine bran, cannot but be salutary food. A little oil of sweet almonds mixed with a little white wine, is very proper for sheep, in all complaints of the chest. Bleeding cannot hurt lambs that are strong, at the beginning of a cold.

The same causes which produce colds often give colicks to lambs. Oil of sweet almonds, given as a drink and injected, relieves them.

It cannot be too often repeated, that the changes of heat, frost, moisture and cold winds, which the bad management of the country people does not guard against, carry off a third of the lambs in some places.

The Rickets.

This disease of children is common to lambs also. It is caused by bad nourishment as well as a radical defect of conformation. If a lamb remains long ricketty, it is not worth rearing. Ewes and ewe-lambs covered by lambs, are very apt to produce young ones that have this deformity. Warm water increases the disease. Cold salt water may be serviceable as a tonic and dissolvant.

I never saw ricketty lambs dropped by good ewes in the months of March, April or May. It may hence be inferred that winter is not the proper season for yeaning.

Madness.

If a sheep is bitten by a mad dog, burn the wound immediately, or make the sheep swallow, in the course of two days, the eighth of a pint of vinegar, or cut out the bite instantly; these remedies are almost certain. Sheep, however, hardly ever go mad, their wool protects them from the saliva of the dog. The dogs belonging to a flock are much more exposed than the sheep to this dreadful malady. The remedies for them are the same as for sheep and all other animals. The following remedy may however be tried upon dogs. Mix seven grains of turbith-mineral with crumbs of bread sufficient to form a bolus; throw it to the dog before the madness appears; at the same time rub the wound well with mercurial ointment. If one dared to shave the dog entirely, it would be better to rub his whole body. The most prudent way, if the dog cannot be securely confined, is to shoot him.

Poison.

If a sheep swells and is in danger of perishing, in consequence of having eaten some poisonous substances, let it be bled in the lips and ears, or in the vein under the eye, and let this operation be followed by a spoonful of olive-oil, or by an equal dose of white vinegar. This treatment, begun early, never fails of success.

Divers diseases.

Besides the diseases already mentioned, sheep are subject to *diarrhoea*, *obstructions*, *sore eyes*, *dropsy* and *tumours*.

Decoction of oak is a remedy for the *diarrhoea*, which it is dangerous to check too suddenly.

Obstructions are removed by garlic, parsley, tetter-wort, dog's grass, leaves of the *hedera arborea*.

Sore eyes are relieved by plantain water, and frequently by the juice of tetter-wort or by one part of white vinegar in four parts of water. Some kinds of dry fodder in the racks are dangerous to the eyes of sheep.

Dropsy requires tapping; and should serve as a warning to the proprietor to fatten the animal, if it recovers from the first attack of this disease, which is allied to the rot. Wormwood and rue are proper to be used after tapping, and salt is then indispensable.

Tumours require ointment of broom, or some other softening application that promotes suppuration. If the tumours are red and inflammatory, bleeding should precede any application.— Blood is drawn according to circumstances, from the vein under the eye, from the ears, the lips, the foot, or the tail; but provided the blood be drawn freely, it appears to be of little consequence from what part of the animal it is taken. It is however well to choose a spot so as not to disfigure the animal.

PRESERVATIVES AGAINST DISEASES OF SHEEP, AND
EMOLLIENTS FOR THEIR WOUNDS.

The earth of an Ant-Hillock.

The *Manuel des Champs*, advises to take an entire ant-hillock, to dry it in an oven, to reduce it to dust, to sift it, and to distribute it in the mangers of the sheep, with oats and salt. A quarter of a pint of this dust is to be mixed with double the quantity of oats. This preservative is to be given once a week to each sheep. But it may be questioned whether the animals ought to be habituated to any one medicine; and it is not to be expected that country people will give themselves the necessary trouble.

I prefer, in every respect, the following more simple preservative, the virtues of which I have myself witnessed.

Juniper-powder.

Gather berries and buds of the juniper-tree; mash them well; dry them gradually in a oven where bread has been baked; reduce them to a fine powder, and sift it through a silk sieve. Put two drachms of this powder in half a bushel of oats, with four ounces of salt dried over the fire in a shovel and pounded very fine; stir the whole together, that the oats may be well impregnated with the above mentioned substances. Give this quantity of oats to twenty five sheep, in wet weather, or when contagion is to be feared; give it to such as live upon a wet soil; and to such as are threatened with the rot, with obstructions, with jaundice, with any disease, in short, which proceeds from repletion or relaxation. It answers in all countries, in all seasons, and in all circumstances, except in fevers and inflammatory disorders. Almost all the diseases of sheep, whose causes are unknown, appear to me to result from some poison which their organs are not strong enough to get rid of; and that, consequently, what tends to strengthen them greatly must be serviceable.

This remedy is to be used, as a preservative, two or three times a year. Sheep which are well have some repugnance to eat this mixture ; they must be induced to it by making them fast previously: those which are not quite well eat it readily.

This preservative is to be given to sheep before they have eaten any thing else, two days successively at most. These two days, they must have dry fodder; they must not have any drink ; and their houses should be fumagated with juniper. Lambs may safely eat these oats ; the effect of which is to render them lively, and, in the course of a few days, to moderate their eagerness to drink.

This preservative, known to be very salutary in England and France, agrees exactly with the observations of farmers, who have remarked that sheep which feed upon grounds where clumps of juniper-trees are scattered, escape all putrid diseases. The salt and oats of the above mixture contribute, as well as the bitterness of the juniper powder, to keep off these diseases. This medicine is not very expensive, being employed only three or four times a year.

Elm leaves.

Next to the above preservative, leaves of the elm deserve to be mentioned. They should be given rather green than dry, and never when yellow. When they are green, I sprinkle them with brine ; and when they are dry, I scatter salt over them. No rule is necessary for the quantity to be given, they may be eaten without danger. I give some to all my sheep, once a year, when the weather is wet. Those which I give to the lambs are without salt, unless the lambs are feeble.

I think it needless to use many preservatives ; one good one is sufficient ; the same may be said of salves for wounds.

Preparation of Tar.

Melt half a pound of goose-grease, or the grease of any other fowl, or lard that is not salted, or butter. Add a pound of tar, and stir the whole well together.

Broom-ointment.

Into two pints of clear water put two pounds and a half of green ends of twigs of broom, together with leaves, buds and flowers of the same, all cut very fine. Boil the whole gently,

until it acquires the consistence of jelly. Pour upon this jelly half a pint of good brine and a quarter of a pound of melted mutton suet well purified. Stir the whole together, for a minute, with a stick. Pour this mixture into glazed earthen vessels, and cover them with parchment. It may thus be kept the whole year.

The *Farmer's Guide*, whence these remedies have been taken, says that the spring is the only season proper for making this ointment; that it is commonly more salutary than the preparation of tar; that it does not spoil the wool; and that a careful shepherd ought never to let his store of it be expended.

Pommade of Sulphur.

Take a pound of pounded sulphur, two pounds of fresh butter and hog's grease, and two handfuls of powdered slate: melt the hog's grease and butter together; then add the sulphur. Let the mixture boil a good while, and stir it frequently.

The manner of using this ointment, as well as all the preceding, is every day to anoint the wound (which should be previously washed with alum-water, salt-water or vinegar and water) until a perfect cure is effected. The wool about the wound must be cut off, and the ointment warmed before it is applied.



District of New-York, ss :

BE it remembered that on the 30th day of November, in the thirty-fifth year of the Independence of the United States of America.—FRANCIS DURAND of the said District, hath deposited in this Office, the title of a Book the right whereof he claims as Proprietor and Translator, in the words following to wit :

A
COMPLETE TREATISE
ON
MERINOS
AND OTHER SHEEP,

WITH PLATES:

Recently published at Paris, by Order of the Government,
COMPILED BY **Mr. TESSIER,**
Inspector of the Rambouillet Establishment and others,
in France.

CONTAINING

The method of forming *Good-Flocks*, of increasing them, and of treating them properly both when healthy and when diseased.—Followed by documents, extracts, and short explanatory notes, not contained in the original, which were deemed necessary to make this important work complete, and to render it more instructive to the Agriculturalists of the United-States.

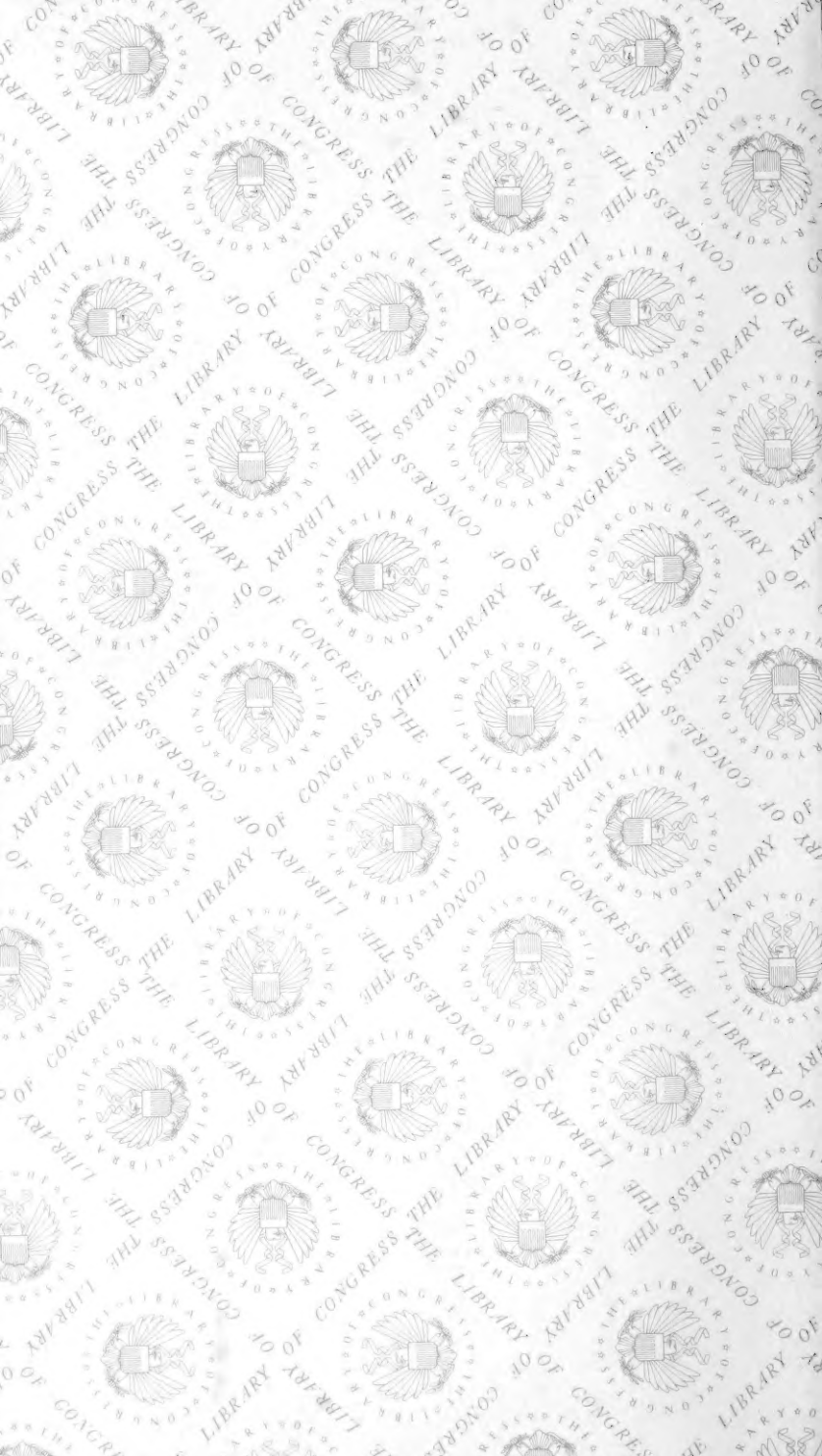
Translated from the French,

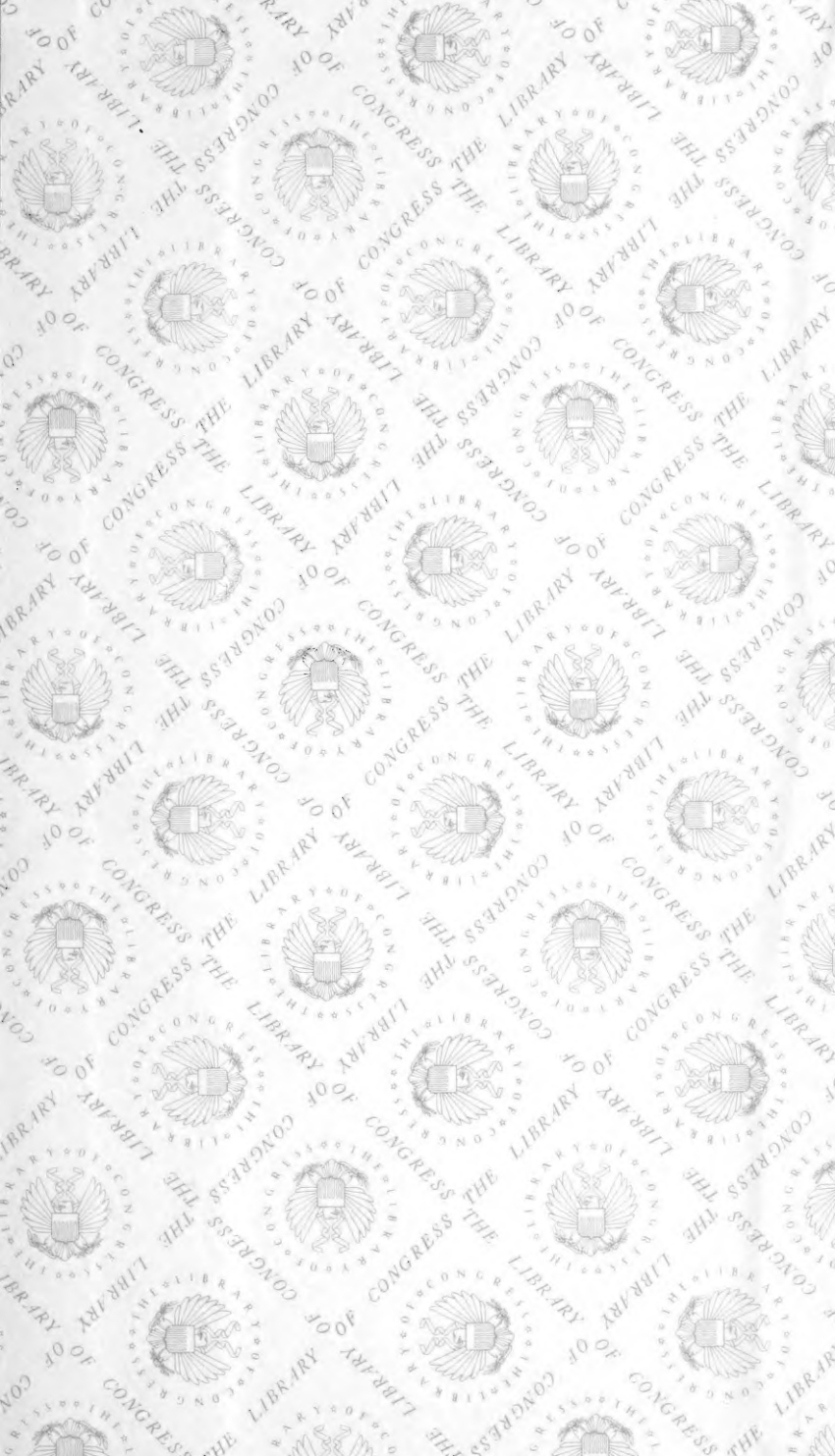
AND DEDICATED TO THE AGRICULTURAL SOCIETIES OF THE UNITED STATES.

IN conformity to the Act of the Congress of the United States, entitled "An Act for the encouragement of Learning, by securing the Copies of Maps, Charts, and Book to the Authors and Proprietors of such copies during the times therein mentioned, and also to an Act entitled an Act Supplementary to an Act entitled an Act for the encouragement of Learning by securing the copies of Maps, Charts and Books to the Authors and Proprietors of such copies during the times therein mentioned, and extending the benefits thereof to the Arts of Designing, Engraving, and Etching, Historical and other Prints."

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