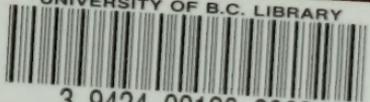


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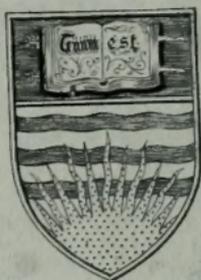
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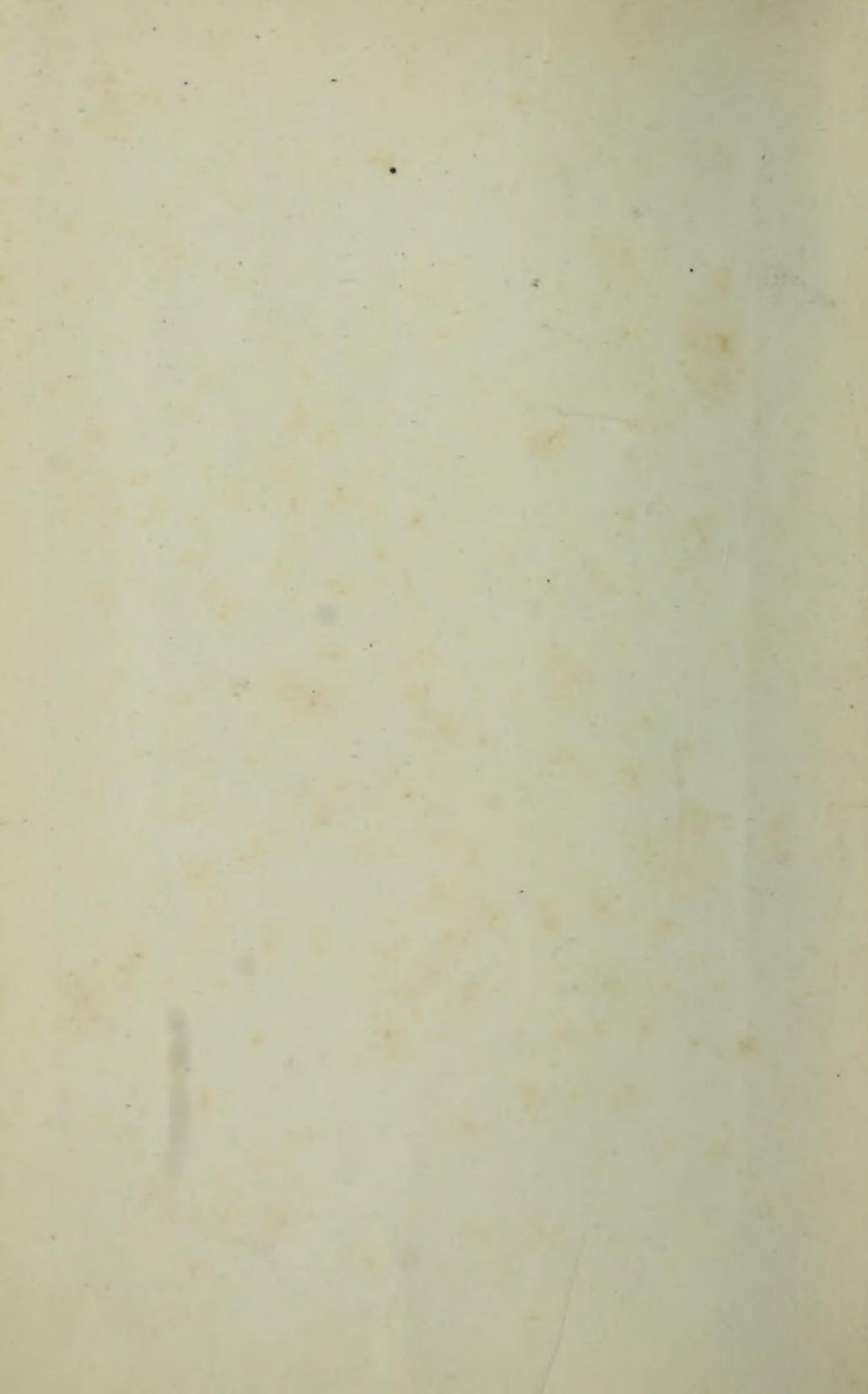
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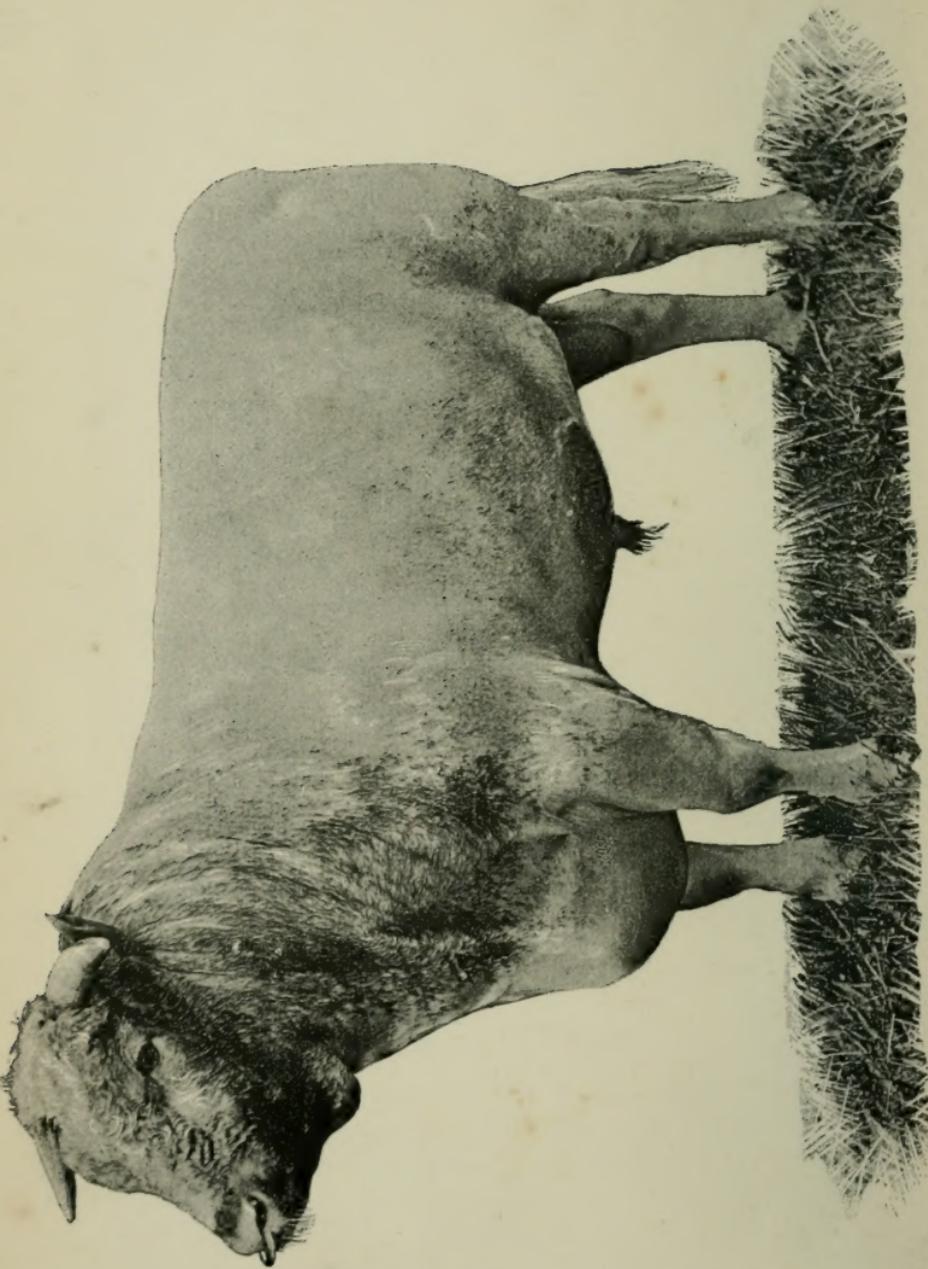
FARM LIVE STOCK

OF

GREAT BRITAIN.



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Champion Shorthorn Bull at the Royal Agricultural Society's Show in 1888.

Bred by W.M. DUTHIE, Collynie, Aberdeenshire.

FARM LIVE STOCK

OF

GREAT BRITAIN.

BY

ROBERT WALLACE, F.L.S., F.R.S.E.,
ETC.,

PROFESSOR OF AGRICULTURE AND RURAL ECONOMY IN THE
UNIVERSITY OF EDINBURGH;

AUTHOR OF "INDIA IN 1887."

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THIS NEW EDITION OF

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IS RESPECTFULLY DEDICATED.

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[ORIGINAL DEDICATION.]

TO

PROFESSOR JOHN WILSON, F.R.S.E., ETC.,

WHO FOR THIRTY-ONE YEARS

MOST ABLY FILLED THE CHAIR OF AGRICULTURE IN THE
UNIVERSITY OF EDINBURGH,

THIS WORK IS INSCRIBED,

AS A TOKEN OF THE AUTHOR'S GRATITUDE TO HIM AS A TEACHER
AND RESPECT AND ESTEEM FOR HIM AS A FRIEND.

[*Emeritus-Professor Wilson died at Tunbridge Wells in March 1888.*]

PREFACE TO THE SECOND EDITION.

IN bringing out the Second Edition of this work it has been necessary to introduce numerous changes which are believed to materially add to the value of it as a Text-book for Students of Agriculture, and at the same time to increase its interest in the hands of the general reader. Besides the addition of numerous electroplates in the body of the letter-press, 100 pages of illustrations have been introduced. These have been executed by Angerer & Göschl of Vienna, and are derived, with only two or three exceptions, from photographs taken from life of picked specimens of the various breeds of live stock in the British Isles. It is true that photographs in some ways fail to do justice to the animals or to the breed: in the specimens of pigs, for example, they are defective on account of the awkward positions the animals usually assume while standing, and the constancy of their motion while they remain on their limbs.

The amount of labour expended in securing 100 photographs of typical animals of the various breeds is more than one could at first imagine, and I must ask to be excused if I have had to accept and repro-

duce photographs which do not represent a number of them in their best light. Photographers do not, as a rule, seem to understand the importance of giving both the hind and forequarters of the beasts an equal prominence; and, again, all lenses are not alike good in maintaining a proper proportion between the dimensions of the limbs and of the body.

Though the plates as they at present stand do not quite come up to the standard which I feel confident can be ultimately obtained by reproducing photographs taken from life, yet a sense of satisfaction is derived from the fact that the pictures do represent real life. Though the balance of parts may be more or less defective, there are present the natural expression and the little differences of form and features which unmistakably distinguish one breed from the other. The eye has been so long educated to look at drawings of animals which have been improved by the pencil of the artist till they are quite unreal and unnatural, that I can easily realize an amount of dissatisfaction being expressed at the method of reproduction adopted in this work. I feel confident, nevertheless, that pictures reproduced as the following have been will grow upon the observer as works of art, and will prove of special value as means of instruction.

The letterpress of the work has been revised and greatly extended. Short sketches of the histories of the various breeds have been added—full enough to give a general interest, and, it is hoped, to encourage

special research into the exhaustive records which are from time to time referred to in footnotes. I have endeavoured to acknowledge in suitable terms the sources of much of my information, but I should also add that I am indebted to the "Stock," "Herd," or "Flock" books relating to the various breeds. I would also refer my readers to the following works, which treat generally of farm stock, and which discuss fully various subjects of interest which could not conveniently be dealt with in an exhaustive manner in the following pages:—

(1.) Youatt's various works on Live Stock. (2.) Coleman's "Cattle, Sheep, and Pigs of Great Britain." (3.) Low's "Domesticated Animals of the British Isles, 1845;" (4.) The same; with a selection of illustrations produced from the collection of 100 oil paintings by W. Shields, R.S.A., belonging to the Agricultural Department of the University of Edinburgh, and presented by the author, who was for over thirty years Professor of Agriculture and Rural Economy in the University. (5.) Pringle's "Live Stock." (6.) Wrightson's work on the same subject; and (7.) Sheldon's "Dairy Farming."

Without naming any, I desire most heartily to thank all who have been good enough to lend me assistance in the accomplishment of the work entailed in the reproduction of this volume. I have, as has always been my wont, discontinued the use of the prefix Mr. I trust that each authority named will fully understand that this is done from no lack of courtesy, but because I believe that in a book of this

sort, it is right and proper to name men as authorities and not as private individuals.

I have every reason to be gratified with the success of the First Edition, and I now leave the fate of the Second in the hands of those who are interested in the subjects with which it deals.

R. W.

THE UNIVERSITY,
EDINBURGH, *April* 1889.

ERRATA.

Page 35, first line of text and fourth line of footnote, *for* "Kirkleavington," *read* "Kirklevington;" and sixth line of footnote, *for* "Ecclesham," *read* "Eccleshall."

Page 45, first and third lines, *for* "John Hewar," *read* "John Hewer."

PREFACE TO THE FIRST EDITION.

THE object of this volume is to lay before the student, in the shortest possible form, the many interesting facts about Farm Stock which ought to be known to every one who takes an interest in Agriculture.

The defect of some text-books on this subject is, that they are too voluminous, so filled up with much unnecessary book-makers' padding that it is often a waste of time to read them. The most skilful farmers are not usually of a literary turn of mind, and consequently much valuable information, the result of years of successful experience, is constantly being lost.

I was struck with the concise, clear, and thoroughly business-like style of "The Chemistry of the Farm," by R. Warington, F.C.S., published in Morton's "Handbook of the Farm" series, and I have endeavoured, as near as possible, to make my production fill the same position on the subject of Farm Stock as has been secured in that of Agricultural Chemistry by the volume in question. The subject matter has been selected and arranged with the main object of making it a students' text-book, containing all that is necessary in this special branch

for the important examinations of The Royal Agricultural College, Cirencester, The Royal Agricultural Society of England, The Highland and Agricultural Society of Scotland, The Royal Agricultural Society of Ireland, and The Surveyors' Institute. [Since the first edition of this work was published, arrangements have been made by which the Edinburgh University now grants a degree of B.Sc. in the Department of Agriculture. The Examinations in connexion with it should also be included in the list.] This accounts for the unusual number of intricate though very necessary calculations which occur here and there, and which will require much close attention and study. It is hoped, however, that all those of the farming community who may think the book worthy of their patronage may find the time taken up in reading it profitably spent, as, besides a record of the many common facts known almost instinctively to many practical men, it contains descriptions of the causes, prevention, and remedies of the common diseases of stock, given in the ordinary language with which a farmer is familiar.

R. W.

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BRITISH ISLES

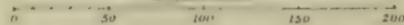
Post-Warrior Form 1914-1918



The Edinburgh Geographical Institute

John Bartholomew & Co

English Miles



*Key to the Figures indicating the Locality of
each Breed of Cattle on Map showing
Orographical Features.*

Name of Breed.

1. Orkney and Shetland.
2. Aberdeen-Angus Black Poll.
3. West Highland.
4. Hamilton, or Cadzow Park Wild White.
5. Ayrshire.
6. Galloway Black Poll.
7. Chillingham Park Wild White.
8. Shorthorn.
9. Somerford Park White Polled.
10. Chartley Park White Polled.
11. North Wales Black, or Anglesey.
12. South Wales Black, or Pembroke.
13. Old Castle Martin White.
14. Glamorganshire.
15. Devon.
16. Hereford.
17. Longhorn.
18. Red Poll.
19. Sussex.
20. Kerry.

FARM LIVE STOCK OF GREAT BRITAIN.

INTRODUCTION.

A proper knowledge of the habits and treatment of the animals of the farm is, without doubt, the most important branch of a farmer's education. It is the one, too, which is found to offer the greatest difficulties to men who take to the profession of farming late in life. In fact, few men who, as boys, have not been intimately associated with animals, can ever hope to attain to the first rank as judges or managers of stock. For the same reason we never find a really first-rate shepherd in a hill district—the place where superior knowledge and intelligence is most wanted—who has not as a boy seen and assisted in all the many little details of the management of a flock. He drinks in the information, as it were, with his mother's milk, and does not know in after life that he was not born with much of the knowledge he possesses.

It is not only a knowledge of animals that a boy gains by associating with them, but an interest in

them. They are the playthings of his youth, and the objects of his affection as he grows in years. A first-rate judge and prize winner—it does not matter in what class of stock—is invariably found to spend many hours of his time gloating over the points of his favourite beasts. It is only in this way, and not from books, that a man can ever master the details of structure and the peculiarities of breed and constitution, the knowledge which alone can lead to victory in the show-ring.

A servant intrusted with the management of stock must make his charge his hobby if he is to be a success. A man is quite as happy in the enjoyment of one hobby as of another, provided it be his own choice; and it is much better for himself on account of his own comfort, as well as of the permanency of his employment and amount of remuneration for the same, if the hobby is that by which he wins his daily bread. One of the weak points in the present education system, so far as agricultural labourers are concerned, is, that no adequate provision is made for their learning, while young (the time when all the deepest and most lasting impressions are formed), the business by which they are to live. Agriculture all round—but more particularly in the stock branch—whether it be the knowledge required by the farmer, or that by the labourer, is not like an ordinary trade or profession, which admits of hard and fast rules being laid down, and of being learnt in so many years, even after a man reaches maturity. It has to be taken in little by little, and through a

long period of time, which must embrace a considerable proportion of the boyish days. The knowledge must come, as it were, instinctively. It cannot be learnt by rote. It would be wrong to deny the necessity of giving every working man in the kingdom a good plain education. Putting aside all considerations of sentiment towards our fellow-man, and the necessity of having everyone educated who is to have a voice in the government of the country, there is an undoubted advantage in having work performed by the aid of that intelligence which accompanies education. But what calls loudly for a protest is the virtual prohibition of boys learning, at the only time when they can do that perfectly, the one branch of their business by which they themselves shall live and in time rear families. The present system is too much one-sided. It is the extreme into which we have fallen after a long period of deficiency in the branch which now receives too much attention. Youth is spent in the acquiring of book-learning solely. Interests and inclinations which must develop are led into channels far away from the employments of the future life. Work, when it has to be done, is performed as a drudgery and with a heavy heart. The frame is not trained, as it is being built up by Nature, to dexterity and efficiency, nor yet is it strengthened and enlarged by that practice which always precedes efficiency. Why should not our educational system provide for the training of our labouring classes in both its branches, manual and mental, when it would

conduce so much to their future happiness and the public good?

In treating the subject, "The Principles of Breeding" will be discussed first, followed by the different branches of stock in order, viz.:—Cattle, pigs, horses, and sheep; and a number of farm stocking and other calculations will be given.

Darwin's work on "Animals and Plants under Domestication" treats of nearly all the trustworthy principles of breeding that have yet been propounded, so that originality in this branch must not be expected to any large extent. The writer, however, avoids reiterating anything which he has not been able to verify in an experience which has extended over more than a quarter of a century.

CHAPTER I.—PRINCIPLES OF BREEDING.

Family Resemblance—Force of Inheritance—Constitutional Weakness—Imagination—Crossing and In-and-in-Breeding—Atavism, in Pure Breeds and in Crosses—Domestication—Barrenness.

THE strong family resemblance which is seen both in the human species and amongst animals related to each other, is a direct consequence of the existence of the first law of breeding, which is not constant in everything, but always holds good as regards general characteristics, viz., that “like begets like.” Other laws are in operation at the same time; consequently, when we come within the immediate sphere of their action, this and various other laws have to be modified so as to harmonize with surrounding conditions. The influence of a parent, as such, in his or her first function, is not always exerted under exactly the same conditions, and consequently we have differences between individuals, alike in many respects, which distinguish them from one another.

To the uneducated eye, every member of a herd of Galloway cattle, or of a flock of Southdown ewes, looks exactly like its neighbour, and a townsman stares when he is told that some shepherds know individually every member of a flock of sheep amounting to perhaps 200 or 300.

The force of inheritance is strongest in old and well-established pure breeds, but even among the best a very inferior animal (as the American "skelly-wag" among cattle) may appear at times. This degenerate specimen should never be allowed to breed. It is by getting rid of all such inferior or even moderately good animals that our breeds are improved. Weeding by the hand of the breeder, or artificial selection, acts much in the same way among domesticated animals as the law of the survival of the fittest does among wild ones. A well bred, though plain looking bull, if he has no deformity or no very objectionable points, usually breeds much better stock than a more handsome one without a good pedigree. In selecting, it is much more important to have the sires than the females good, because, besides the greater potency of the male, one bad one may affect a large number of offspring, whereas an inferior female only has to do with her own young. This becomes a most important matter when taken in connexion with the fact, that "the influence of the first male by which a female produces young may be seen in her future offspring by different sires." Everyone knows, that should his English terrier bitch get lined for the first time by a Dandie Dinmont, she will years after throw puppies with some of the Dandie characters. The same holds, though perhaps not to such a marked degree, with the larger animals. For this, and the other reasons which induce people to keep good stock rather than bad, a mongrel bull should not be

put to good cows. The best bred animals are often far from perfect in some points. It is most important if ever a bull (or sire of any breed) with a special defect has been used, say a hollow or weakness behind the shoulder, that all succeeding sires should be specially strong in the particular point, whatever it was, else there might in time be a general defect established in the whole race of descendants. Males are more variable than females. For instance, say in a mountain breed of sheep, it is much more easy to select a large number of ewe lambs than of ram lambs fit to be exhibited in a show-yard.

Animals with constitutional weaknesses amounting to unsoundness should not be used for breeding. Defects resulting from accidental injuries are sometimes transmitted to the young—more especially when disease follows an injury—and may, or may not, be hurtful. The tendency to bony exostoses on the leg bones of a horse, from the parents contracting these through hard work on the road, would be a case of the first kind. The following is an illustration of the second: A black spaniel bitch, belonging to Commander Harrison, R.N., had the tip of her tail caught in a door; white hairs grew from the injured part, and she bore various puppies with white tipped tails afterwards, never having done so before.

Imagination sometimes comes into play in breeding, especially with regard to colour. The colour of an object at which an animal looks while conceiving sometimes governs the colour of the young. A

perfectly pure bred Ayrshire cow at Auchenbrack, Dumfriesshire, gave birth to a dark dun calf, the same colour as her mate, which was a cross from a Channel Islands cow. The peculiar dun was not an Ayrshire colour. It is recorded of M'Combie, of Tillyfour, that he succeeded in preventing his black polled Anguses from breeding red calves by putting up a high black fence round the field, thus preventing them seeing the red cattle of his neighbours. A well-lighted byre, with whitewashed walls, is supposed to make calves lighter. How far the colour of the sire is transmitted to his offspring by inheritance, and how far by the imagination of the female, we do not pretend to know, but are inclined to believe that inheritance has most sway, especially in some crosses between two distinct breeds.

Certain colours can be, as a rule, depended upon to produce other and altogether different colours in the young; for instance, a black Galloway cow and a pure white shorthorn bull almost constantly throw a very dark roan or blue-gray. A light roan might give the same result; but a dark roan or red bull will get either black or red colours, which are not so much desired. In the same way, when Ayrshire cows are crossed with a shorthorn, a light coloured bull throws more of the shorthorn character into the colours of the calves, which bring better prices, as they are usually wanted for fattening purposes.

CROSSING AND "IN-AND-IN-BREEDING."

Crossing families not related to each other usually gives increase of vigour and larger size, though sometimes the distance between the characters is so great that the result is much like a cross between two distinct breeds. For this reason some object strongly to mixing up the blood of Booth and of Bates short-horns.

Too close "in-and-in-breeding," or pairing of animals related to each other, causes great loss of constitutional vigour, loss of size and fertility, and sometimes malformation—as in the case of a pig at Twiglees, Lockerbie, which had a part of the backbone wanting. Pigs show the bad effects sooner than any other farm animals. Darwin points out that this is perhaps on account of their comparatively solitary habits. Gregarious animals do not suffer so much; they have been more accustomed to it, and Nature has accommodated herself to the circumstances.

Shorthorns are not so much the worse for in-breeding as most other stock. Their distinct type has been stamped upon them by in-breeding. The most prominent advantage of in-and-in-breeding is this stamping of family characters or types, and it cannot well be dispensed with in the formation of new breeds or the improvement of old ones.

Crosses between two distinct breeds mated the proper way make the best fattening animals. The sire, in virtue of his greater potency, should be of

the more improved breed ; for example, the short-horn bull breeds well with cows of milking breeds, or slow maturing sorts, as Kerry, West Highland, Ayrshire, or Galloway. Crossing the reverse way is a failure. Of late years, since the Angus breed has been so much improved, farmers cross shorthorn cows successfully with Angus bulls.

In farm stock it is considered that the male gives the external form, the female more of the vital and internal organs. This does not belie the fact that a calf has often a very strong likeness to its mother.

With a thoroughbred horse on a mare of another breed, the resulting offspring has generally a symmetrical form. The other way, the cross is often stronger and more useful, but plain, usually about the hind quarters and head.

Sheep come under the same rule. Any of the improved varieties of Leicesters or Downs may be used with advantage, under certain conditions, to put to the various mountain breeds.

The first cross between two breeds is intermediate between them ; but after the first cross, it cannot be calculated how the tendency may run.

The first cross is the strongest. After-crosses get smaller and weaker, and all the more so the longer crossing is continued. This necessitates going back now and then to one of the pure breeds for a sire to infuse new vigour. This so far explains the success of crossing mongrel cows with a pure shorthorn bull.

Atavism, or "throwing back," or "reversion," is the reacquiring by an animal of some character

which the immediate parents had not, but which existed in its ancestors.

This may occur in two classes—(1.) In Pure-bred Stock. (2.) In Cross Stock.

1st, Reversion in Pure Breeds.—The aboriginal species of domestic cattle and sheep no doubt had horns for defence and attack; now many are without them. Sometimes, however, a ram of a polled breed, as the Cheviot, has small horns. In cattle this is also the case, as imperfectly formed horns at times appear in both Red and Black Polls.

Sheep, for their better protection when wild, were originally brown or dingy black. Now and then in the best flocks reversion is shown by the appearance of a black sheep; and so frequently is this correlated with poor quality, that it has become proverbial to describe the unfortunate member of a family as the “black sheep.”

2nd, Reversion in Cross Animals.—This is much more common. When two distinct breeds are crossed, the offspring has a strong tendency to revert to one of the pure forms, or rather to an inferior ancestor of one of them; and this lasts for generations. The young often take the colour of one parent, and in time change it for the other. The calf from a black cow by a red bull is often born red or brown, becoming black afterwards; and the mouse coloured foal of a chestnut mare may become chestnut.

“The act of crossing in itself gives an impulse towards reversion,” as seen by characters appearing

in the young that had not been seen in either pure breed for generations. Calves are sometimes produced white with dark ears, like the ancient wild cattle, by a red shorthorn bull on West Highland cows.

Cross-breeds are often wilder than pure-breeds.* This is noticed particularly in cattle and sheep. Cross sheep are not so easily fenced, and a dairy of cross cows is much more difficult to train to stand for milking in the field than pure shorthorns.

Domestication increases the fertility of animals, if properly bred and not overfed. Being in an improving condition at the time of conception increases the number of twins. In a flock of ewes the largest number of twins is got the first few days the ram is out. The first young of most animals run slightly more to the female than to the male side.

Barrenness or uncertainty may be caused by, 1st, Over-feeding in the case of either sex, thus loading the reproductive organs with fat. The remedy is judicious starving, or working in the case of cattle or horses. Some foods cause uncertainty in breeding more readily than others. Sugar, molasses, and linseed are as bad as any, but are nevertheless often used to get beasts up for show or sale, because they give a smooth and glossy skin, as well as lay on fat. These foods would not do damage if given in moderation with hay or straw, but it is when given

* This rule refers to pure breeds possessing the same degree of wildness. If a wild and a docile breed are mated, the progeny will be intermediate in its degree of wildness.

in addition to a full feed of other concentrated food that they do injury. Foods for breeders should be particularly rich in phosphates, and should have more albuminoids to fat-formers than in the case of fattening animals; such foods are—beans, peas, lentils, gram, etc. Fat animals do not come often in season, and consequently settle better and feed faster.

2nd, Too low condition, especially if combined with exposure to cold and wet, as with cattle wintered outside on poor food, or heavy milking cows sucked down by a large calf, or perhaps by two calves. This occurs most frequently in heavy milking breeds when the calves run constantly with their mothers.

3rd, Constitutional weakness from in-breeding.

4th, Being a free-martin or dumb-martin, that is, a heifer born one of a pair of twins, the other being a bull. In this case the external as well as the internal organs of generation are imperfectly formed and contracted. There is usually also a more or less masculine appearance about the head.

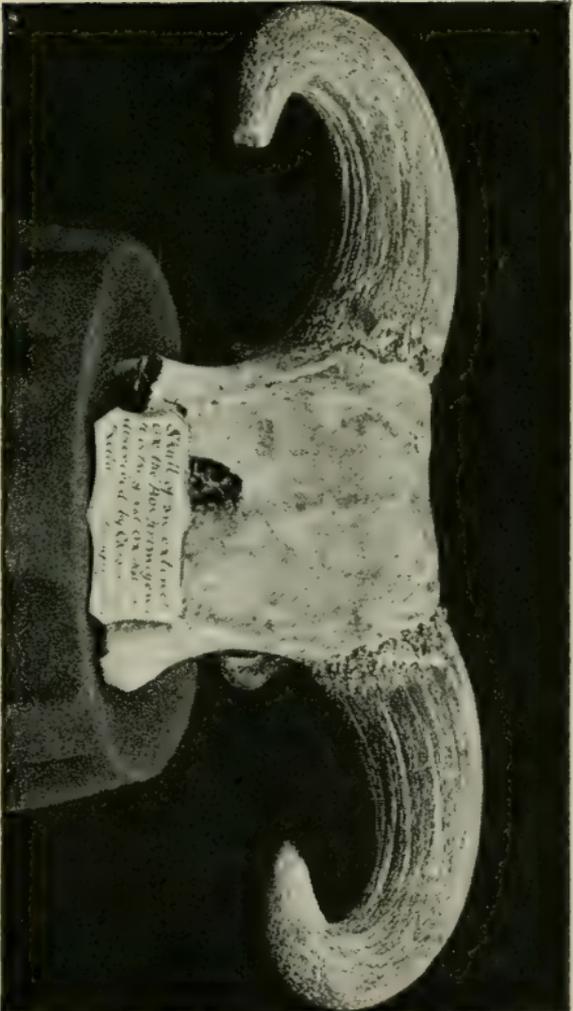
Sheep or horses do not answer to this rule. Twins from a mare are very rarely seen,—because when they occur they are usually born too soon, or die if they do come to full time.

CHAPTER II.—WILD CATTLE.

Aboriginal Cattle of Great Britain—*Bos urus* or *Primigenius*—Another Distinct Species, *Bos longifrons*—Relationship of *Bos urus* to Wild Park Cattle—The Home of the Forest Cattle—Domesticated Animals—The Wild Cattle at Chillingham Park—*Bos scoticus*—The Hamilton or Cadzow Park Cattle—Chillingham Cross—The Chartley Herd.

THE Aboriginal Cattle* of Great Britain, in common with those of the continent of Europe, belonged to the *Bos urus* or, to use the more recent and more common name, the *Bos primigenius*. Although it has been asserted that the original colour of this species was black or mouse coloured, it is now pretty generally believed that the original colour was white, with black or brown points, such as may be seen in the more or less degenerate representatives of the species in the parks at Chillingham, Hamilton, and Chartley—the only places in the United Kingdom where wild cattle exist. In the pristine form it approached to the size of an elephant, as may be gathered from the enormous dimensions of a considerable variety of remains dug up from time to time and preserved.

* For an exhaustive account see *The Wild White Cattle of Great Britain*, by the Rev. John Storer. Cassell, Petter, & Galpin. To this excellent work I am indebted for part of the historical matter I have adopted.



1.—SKULL AND HORN CORES OF THE *Bos wms* OR *pyingentius*, IN DR GRIENSON'S MUSEUM, THORNHILL, DUMFRIESSHIRE.

Width of Skull below the Horns, 12 inches; Width on the Crown, 8 $\frac{3}{4}$ inches;

Length of Horn Cores, 27 inches; Girth close to the Roots, 13 $\frac{3}{4}$.

Another distinct species, the *Bos longifrons*, with small and slender form, short horns, and hair of a dark colour, was found to be the prevailing domesticated bovine animal before and up to the date of the Roman conquest. Their descendants are now to be seen, after crossing to a greater or less extent with the *Bos urus*, in the Scotch West Highland, the Welsh, the Devon, the Sussex, the Kerry, and the old Irish breeds.

There is a strong presumption that the ancient forest cattle, the descendants of the *Bos urus* of Cæsar, were the immediate progenitors of the wild park cattle of the present time, and also of the many herds which in comparatively recent years existed in various parts of the United Kingdom. As population increased and encroached upon the vast forests that covered the surface of the country, the numbers of wild cattle declined with those of wild beasts generally, and to preserve them from extinction, the great lords enclosed and protected the decreasing remainder. The small numbers and the confinement within restricted areas subjected them to an undue amount of in-and-in-breeding, and the large majority of the herds in question have bred themselves out and disappeared; while those that remain, by their diminished size, refined bone, and tendency to barrenness, show that whatever they have gained they have also suffered from close interbreeding.

The home of the forest cattle, at least during the latter period of their freedom, was the north of

England and Scotland, more especially in the dense forests covering the hilly regions. It is supposed that they were all horned and of one race, of a similar colour—white, or at times creamy white, with black or dun points, though some of their descendants are in an unaccountable manner without horns.

Domesticated animals of a similar type were also to be seen, and these were noted for their milking qualities.

The wild cattle in **Chillingham Park**, the property of the Earl of Tankerville, are said to be the most characteristic descendants of the forest breed, though they only differ in minor points of detail from those in Hamilton Park—the only other unmixed representative of the *Bos scoticus*. Storer gives it as his strong opinion that these cattle were not so persistently in-and-in-bred for hundreds of years as is usually supposed; but that until not very long ago fresh blood was brought from other herds, and in this way their existence has been prolonged. Ramage, in “*Drumlanrig, and the Douglasses (1876)*,” quite unintentionally tends to confirm this view by saying “there is a tradition that about 100 years ago the whole stock” (meaning the Drumlanrig herd) “was sold and driven off to Chillingham.”

The presence of a rash (no doubt of a scrofulous character) is one of the visible indications of the close-breeding which has nevertheless taken place. A tendency to barrenness points to the same cause.

THE HISTORY OF THE
ROYAL SOCIETY OF LONDON
AND OF THE
ROYAL SOCIETY OF EDINBURGH
FROM THE YEAR 1660 TO 1800



2.—THE WILD WHITE CATTLE AT CHILLINGHAM PARK, NORTHUMBERLAND.
The Property of the Right Hon. THE EARL OF TANKERVILLE.

The rate of annual increase of the breed is only one in five.

At one period the bulls possessed a mane which developed with maturity, but decreased with old age. It is also noticed that the tendency to show black spots on the skin, most seen, perhaps, about the neck and head (and to a greater degree among the Hamilton than among the Chillingham cattle), also increases with age.* Black or dark brown and white, and also black calves assuming a brown tinge, have from time to time been dropped in both herds named, but these have been destroyed to maintain uniformity. In this is clearly seen the link connecting the white with the allied black or dark breeds. The skins are thin, and under the white hair they are white in colour, and thus differ in a most important characteristic from the black-skinned and white-haired animals belonging to the zebu race or humped cattle of India, the *Bos indicus*.

Storer says: "The tongues of the Chillingham cattle are slate-coloured above, and of a reddish-brown colour on the under side; the teats of the cows, unlike those at Chartley, are white; and although the muzzle is black, *the under lip* is white." And again: "Besides the red ears, a faint line of red hair exists, as if drawn by a pencil, immediately above the dark and hairless muzzle." Quoting from Lord Tankerville, he adds: "In form they are beautifully shaped. They have short legs, straight

* A parallel to this is to be noticed in the dark spots which develop on the ears of Border Leicester ewes as they get old.

back, horns of a very fine texture, thin skin, so that some of the bulls appear of a cream colour; and they have a peculiar cry, more like a wild beast than that of ordinary cattle."

The best bullocks feed to about 40 stones' weight under natural treatment, and the resulting flesh is of specially fine flavour and quality—the lean muscle being mixed or marled with fat. The proportion of offal to carcase is remarkably small.

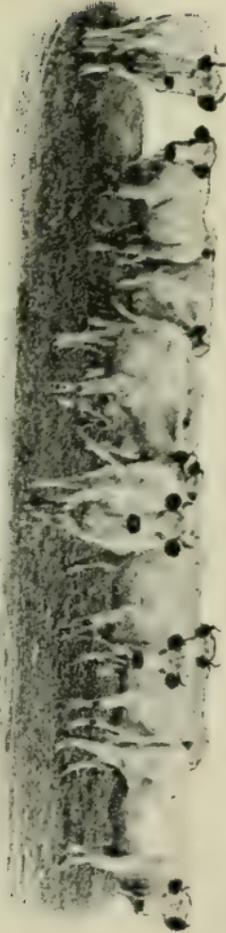
Naturally these cattle are wild and timid, and try to escape from the presence of man. They are, however, extremely ferocious and dangerous when in close quarters and at bay.

Their instincts are essentially those of wild animals. Their keenness of scent, and the habit they possess of hiding their young for a few days after birth, are good illustrations of the fact. Domesticated cattle which have recently been reclaimed from the wild condition, such as West Highlanders and members of the South Wales breed, retain this practice for a time.

The milking tendencies of the early white cattle of the country must have been strong, because in reviewing the history of the formation of our milking breeds it will be seen that they derived their powers of milk-production almost invariably from their wild ancestors. I refer specially to the Ayrshire, the South Wales, the Red-Polled, and the Cumberland non-pedigreed shorthorn breeds.

The Hamilton or Cadzow Park* cattle, which

* Said to be a remnant of the primeval forest of Caledonia.



3.—WILD WHITE COWS -CADZOW FOREST, HAMILTON.
The Property of His Grace THE DUKE OF HAMILTON, K.T.



4.—WILD WHITE BULL CALVES—CADZOW FOREST, HAMILTON.
The Property of His Grace THE DUKE OF HAMILTON, K.T.

numbered 44 in the spring of 1889, are less timid than they were a generation ago, and not nearly so shy as those at Chillingham. Nevertheless, they cannot be driven from one field to another, but have to be trapped within a narrow space shut off by folding gates when they require to be moved. When seriously disturbed they show their nervous excitement by passing fæces of an abnormally liquid character; and, if the cows are suckling calves, by the derangement or death of a number of the calves, due to the heated and poisonous milk produced while under the influence of fear.

When shot (the method adopted in destroying them) they dress to about the same weight as their rivals at Chillingham, both being smaller than an average specimen of the Ayrshire breed. The smaller sized cows killed in their natural condition after breeding weigh as little as 16 stones.

In contrasting the two breeds, it is found that the Hamilton cattle as compared with those at Chillingham stand higher on their legs; their horns are lower set on their heads, and are mostly inclined downwards through a part of their length, lessening the space left between the ear and the horn; and the white hair on the body is purer or less creamy. The jet-black tips of the horns, the eyes, the eyelashes, the black muzzle and surrounding ring of hair, knee-caps, hoofs, and stockings almost reaching the knee in front, give a more definitely marked appearance to the animals than the less prominent and less varied red-brown of the

Chillingham breed. It is well authenticated that till quite recently the Hamilton cattle were without horns. One old servant on the estate recollects that the late Duke Alexander would not allow any calves that tended to grow horns to be preserved. There is sufficient evidence to show that the points and characters of the various herds of wild cattle have been kept constant or altered to suit the wishes of individual owners by artificial selection, viz., by killing those that did not conform to a certain standard. How far the present horned condition or the late polled condition of the Hamilton cattle can be attributed to this interference cannot now be determined. There is a tradition that a West Highland bull broke into the park, and that through his descendants, by selection, the cattle reacquired horns.

The numbers were reduced in 1866 by the Rinderpest to 13 cows and a bull. In breeding up the existing herd, it has been impossible to kill off all animals with imperfect markings, so that in appearance they are not now so uniform in type as it will be possible to make them within a few years. No doubt the herd has also suffered on account of closer in-and-in-breeding than before, due to the reduction of the numbers. This is to be inferred from the low condition they get into during winter in spite of the liberal feeding and care bestowed upon them. The constitution seems to have suffered more in the matter of hardiness suitable to resist the inclemency of the weather than in the powers of breeding, as no



5.—CHARTLEY PARK WILD WHITE CATTLE,
The Property of the Right Hon. SEWALLIS-EDWARD SHURLEY, EARL FERRERS.

fewer than 21 cows out of a total of 27 brought calves in 1888.

Chillingham Cross.—For the purpose of infusing new blood, a Chillingham bull was imported in 1886 and put to a selected number of cows. The products of the cross show some points of great interest to the breeders of stock. Of six calves, the first produce of this connexion, four were almost pure white. In place of the black or red markings seen in their parents, they had extremely small fringes of coloured hairs—not more than $\frac{1}{4}$ in. broad on the tips of the ears—and were in consequence destroyed as unsatisfactory. One of the two remaining was black, and the other was red in its points like the sire. In the following year, 1888, two well-marked bull calves were secured, and it is thought they will in time exercise a salutary influence on the herd. The first cross shows a decided increase in size and also in the amount of hair as compared with the pure-bred cattle of a corresponding age. The horns are also more upright, resembling the horns of the Chillingham herd. There is little doubt but that the step taken at Hamilton is one in the right direction. Storer had, after a careful study of the whole question of breeding, excellent grounds for making the assertion, that he was of opinion “that no wild herd, if imprisoned in a park and interbred for several hundred years without a cross, could be in existence now.”

The Chartley Herd, now (1889) 35 in number, is located in Staffordshire. The cattle in form, sub-

stance, and general appearance strongly resemble the longhorn breed, which, at one time, was largely represented in the English Midlands. The colour of skin and hair, including the udder and the tip of the tail, is white. The teats are black, and so are the points corresponding to those of the Hamilton cattle, but not quite so extended. The horns, which are long, white with brown or dark tips, descend in the manner of the horns of the longhorn breed. From the crown between the horns hangs down a top knot of long white hair.

The herd further resembles that at Hamilton in not being so wild as the herd at Chillingham. The animals, however, exceed those of both northern herds in size and substance. Black calves are at times dropped by cows of this breed, but are destroyed for the reason already stated in connexion with the other breeds of wild cattle, viz., to preserve the characteristic colour markings.

CHAPTER III.—BREEDS OF DOMESTIC CATTLE—THE SHORTHORN.

Points generally applicable to Cattle kept for Beef Production—The Shorthorn—Colour—Horns—Descent from the Old Tees-Water Breed—Milking Qualities—Inferiority of White Specimens—Tradition relating to History—Charles and Robert Colling—Milking Powers lowered by “In-and-in-breeding”—Influence of Change of Country or Locality on Constitution—Two great Branches of Shorthorns, “Booth and Bates”—The Booths—Thomas Bates—Comparison of Booth and Bates Cattle—Commixing of Booth and Bates Blood—Recent Breeders—Aberdeen Shorthorns.

BEFORE describing the distinguishing characteristics of the different breeds of domesticated British cattle and to avoid repetition, the general points applicable to those kept for beef production shall be briefly described.

GENERAL POINTS.

Head broad between the eyes, flat across the *crown* (with a few exceptions in polled breeds) and down the *nose*, which should be neither dished nor Roman, and of medium length; *muzzle* broad, full, distinct, and dewy; *eyes* large, full, and clear; *horns* none, or varying in length, colour, and strength;

according to breed, set on the crest of the head ; *ears* full and sensitive, well covered with hair, and varying slightly in position in the different breeds.

Neck lengthy, full at the "neck vein," or where it joins the body, broad (muscular in the male), but fine, and tapering to the head—to which it should join without thickness or chokiness—and straight from the shoulder tops to the roots of the horns, excepting when it rises into the crest of a bull.

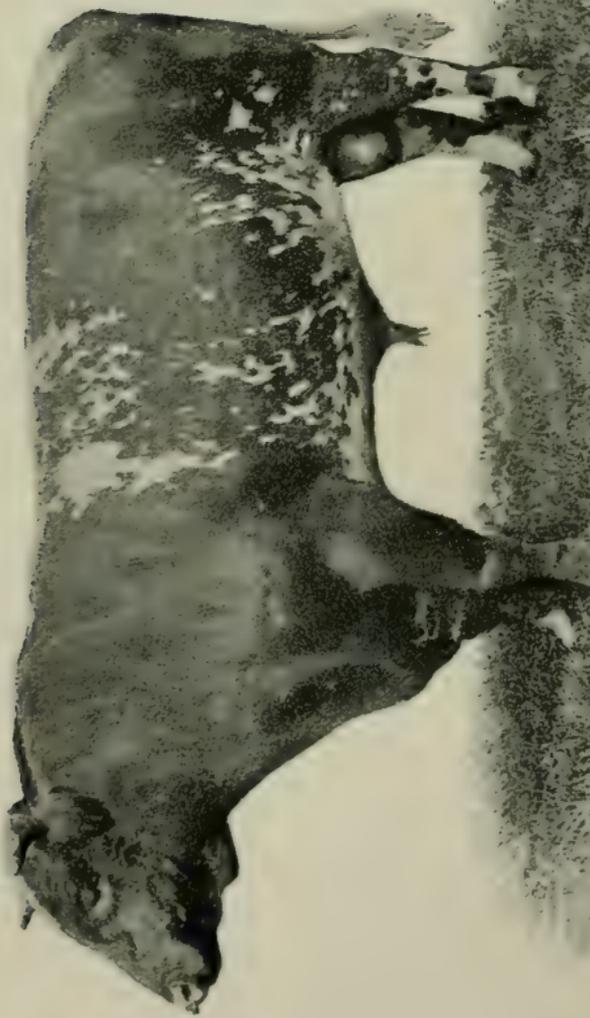
Body long and deep, equally balanced before and behind ; *back* broad throughout its length, and straight from the top of the shoulders to the tail head ; the *frame* well and equally covered with flesh, not patchy on the hooks, tail-head, rump, shoulders, or other parts (when prime, a little pit may be felt on the point of each hook). The *trunk* looked at from any point should resemble as nearly as possible a parallelogram ; the under and upper *lines* straight and parallel ; *brisket* forward and wide, so that the fore legs stand well apart ; *tail* thin, set on well back (but not too high), and falling perpendicularly.

Skin moderately thick (not papery), loose, and mellow or mossy to touch ; *hair* abundant and covering all parts well.

Shoulders laid well back over the ribs, so that the natural depression behind them in the region of the girth line should not be too pronounced ; broad above, between the upper edges of the shoulder blades.

Chest full, wide, and deep.

The Forearm and Leg straight and short ; *muscle* large and broad ; *bone* strong, though fine and flat



6.—BOOTH SHORTHORN BULL, "ROYAL STUART," 40,646.
Bred by Booth, of Warlaby, Northallerton.

(small bone shows tendency to diminished size); *legs* well under; *hoofs* clear and oily.

Hind Quarters full and well packed, lengthy from hook bones (which should not rise above the back level) to tail-head; *thighs* broad, thick, and well down towards the hocks.

Twist or inner thigh full and large.

Ribs well sprung and deep, filling up deficiency behind the shoulder and in front of the hocks.

Fore Flanks and Hind Flanks full and deep.

The Lines of the body flowing, not sharp or abrupt, and a general balance of parts to please the eye.

A Brief Historical Sketch of Breeds mainly valued for Beef Production, together with their Characteristic Points and Qualities.

THE SHORTHORN

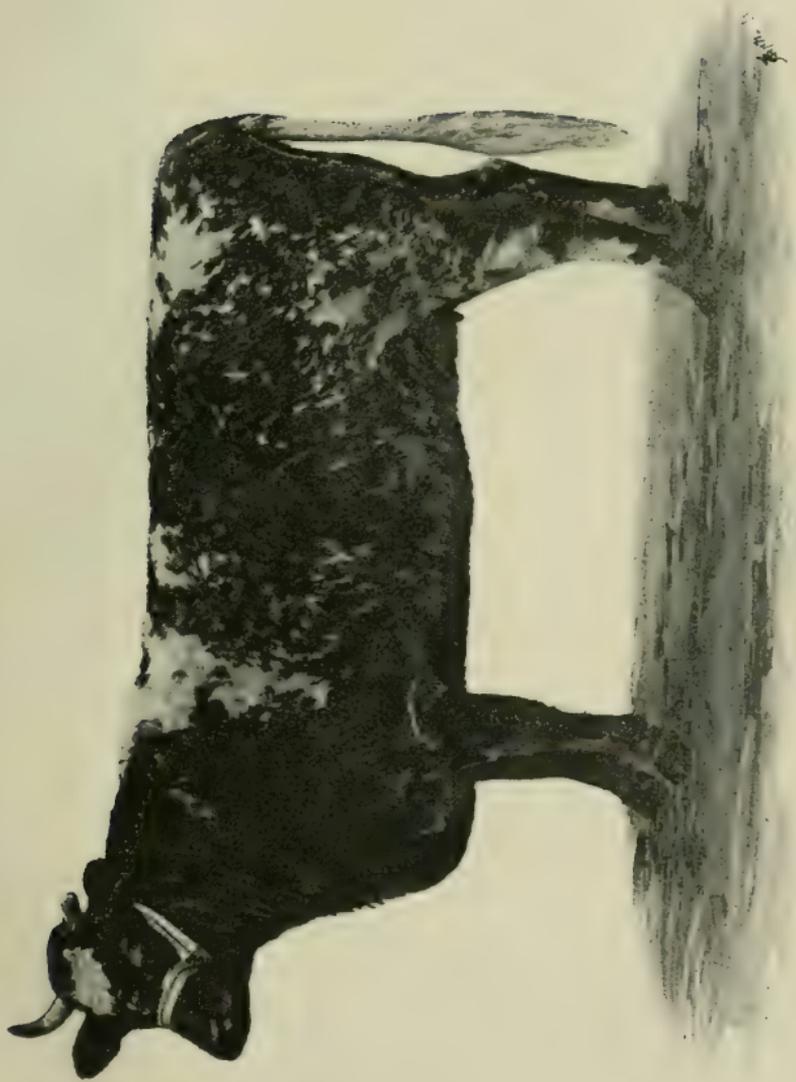
Is the most widely distributed and numerous represented of all British breeds, not only in the United Kingdom and her colonies, but also in the American States. It has among its many good qualities a marvellous power of adaptation to climatic and other local surrounding conditions. In connexion with the form described under the previous heading "general points," the following characteristics are worthy of special notice.

In colour the breed is represented by roans and

reds of various shades, light and dark, and also by red and white as well as wholly white specimens. The latter and also the light or yellowish-light reds are out of fashion, particularly with American buyers, who, on account of their numbers, tend to regulate custom in such things. Brindled colours are not seen in shorthorns, and the same may be said of black, although the latter was at no very distant date a colour possessed by certain of the ancestors of the shorthorn race. The skin, eyelids, and the inner ears are of a creamy yellow. The nose, palate, lips, and eyelids should be flesh-coloured, and free from dark markings; the nose ought not to be bright red, that being held as an indication of delicacy, just as black is now considered to denote impurity,—this, too, in spite of the acknowledged fact that black or dark noses existed in some of the best strains of blood mentioned in the early records of the breed. “Foljambe,” a descendant of the famous bull “Hubback,” had, on the authority of Bates, a dark nose; and another good bull was designated the “black-nosed.” It is also further recorded by Allen that at one time “farm stock was nearly all black-nosed.”

The characteristic **horns** are short and blunt, more or less curved in a downward direction, of a waxy yellow throughout (free from black tips), laterally flattened, and set on wide apart.

It is essential that the special **male** or special **female characters** should be naturally represented in either sex.



7.—BOOTH SHORTHORN HEIFER, "BRACELET," 4930.
The Property of Her Majesty THE QUEEN.

Shorthorns are descended from the old North-East of England breed, variously designated the "Durham," "Tees-Water," "Yorkshire," or "Holder-ness." It was probably originally formed, though perhaps several centuries ago, by crossing the aboriginal British cows with large-framed bulls imported from the Continent—Holland and Denmark. The dark noses referred to were no doubt due to their relationship with the ancient white cattle. Early shorthorns were good milkers, and it may be presumed they in part inherited that quality along with the shortness of horn from their Continental ancestors.

The "**Alloy**" blood, which was represented by 13 animals of good appearance at the retiring sale of Charles Colling, was descended from the produce of the calf (Lady) of a red Galloway cow, repeatedly in-and-in-bred with the best shorthorn bulls. The distinct Galloway characteristics rapidly disappeared in the full flood of shorthorn blood, still the animals retained a roundness of form, roughness of coat, heaviness and uniformity of flesh, and deficiency in their milking powers not usually found in the shorthorns of that time.

The colours of the early shorthorns were much like those now prevailing. Among red varieties the yellowish-red is perhaps waning before the deep or darker red colours. This yellowish tint seems to have been more or less correlated with **good milking** powers possessed by the early shorthorns, and to have disappeared with the increasing tendency in

the breed to produce fat at the expense of milking qualities. The fact that the light red cows with a slightly orange tinge are, as a rule, more highly thought of by dairy people than dark reds, goes to support the accuracy of the views expressed.

The **milking shorthorns** (not pedigreed, though well bred) necessary for the milk supply of Edinburgh are largely drawn from Cumberland. They are excellent milkers, and possess, in many cases in a marked degree, the light red or yellowish-red which is held to be associated with milking powers. Thornton's "Circular" says that in the Lake district "the yellow roan and red were" (in the early part of this century) "looked upon as the pure breed, the dark red being held in no favour." The colour of "Hubback," the famous bull from which all the best shorthorns have been bred, was "yellow-red and white;" and Carr, writing of the first of the strawberry tribe, says they were "of that *yellow-red and white hue*, which, though out of favour at the present day, *was then the prevailing colour* of the shorthorn."

That colour is to some degree an indication of milking qualities is beyond reasonable doubt. A careful inquiry among "town" dairymen, whose cattle are treated by forcing in a manner calculated to try the weak points of all constitutions, shows that it is a pretty widely accepted belief that white shorthorns are not so hardy nor so good as milkers as those of other colours.* The fact that a white

* Storer, in speaking of England, Scotland, and Ireland, says: "The white cow is despised and charged with delicacy."

cow may in a rare and special case be second to none in a whole herd does not interfere with the general belief in the principle laid down. It is a parallel to the old story of the black sheep of a flock being either exceptionally good or exceptionally bad.

This point is of special interest when considered in connexion with a statement in Thornton's "Circular" (1869) in reference to the effects of the Collings' system of breeding, that "in all cases of close affinity there was a tendency to white, with red ears and spots." Is it possible that many of the pale cattle of the present time are suffering not from the effects of close-breeding of recent date, but from the effects of it in the past, in virtue of the relaxation of the intensive accumulation of good qualities which are associated with judicious in-breeding when recently carried out? If this is so, we have one explanation of the decided preference of American and other purchasers for roan or for dark colours. It may be also that light-skinned cattle are more liable than in this country to suffer from sunburning in the United States, where solar influences are more powerful.*

Little is known of the breed, except from the uncertain authority of **tradition**, down to the early part of the eighteenth century, though it is only right to infer that long before this time great care, and even skill, had been bestowed upon it. The earliest records show that purity of breed was fully

* This subject of the importance of the natural colouring of the skins of cattle is exhaustively dealt with in the author's work on "India in 1887."

appreciated, and this important fact could not have been universal without previous experience and attention. Though the first volume of the "Short-horn Herd Book" was not published till 1822, yet, for well-nigh a century, pedigree records, of a more or less imperfect kind, had been kept of a few of the best bulls.

Charles and Robert Colling,* who have been called rather misleadingly "the founders of the shorthorn breed of cattle," did much to improve the quality and to extend the fame of this hitherto local breed by what may be termed Bakewell's† method of breeding, which might be briefly defined as a persistent system of "in-and-in-breeding" with specially selected and carefully mated animals of good blood.

The brothers, although admittedly excellent judges and managers of stock, yet owe their success and the name they have handed down to posterity in a great measure to their methods of bringing their animals to the notice of the public. Two famous beasts—the "Durham Ox," with a live weight of fully $1\frac{1}{2}$ tons, and the "White Heifer that travelled," weighing considerably over 1 ton—were carried about the country for a number of years, and exhibited as marvellous specimens of the wonderful breed with which the name of Colling became familiarly associated. The hiring out of bulls, a common practice of the present day, though

* Charles, born 1750, died 1836; Robert, born 1749, died 1820.

† Robert Bakewell, born 1725, died 1795.

new at their time, kept them in communication with the best breeders, who, no doubt, were satisfied with the results, as regards fattening qualities and form, upon their stock of the cross with the in-and-in-bred Collings' bulls that had acquired, in virtue of consanguinity, an intensified power of impressing their qualities upon the ordinary shorthorn of the country. And, finally, the sales* held by the respective brothers circulated their names and distributed their famous strains of blood among the important breeders of shorthorns.

Though in-and-in-breeding has admittedly done much to raise the standard of the shorthorn breed, there is a strong presumption that close-breeding of itself, apart altogether from its tendency in this case to develop flesh, has to do with the acknowledged lowering of the power of milk production. It is a well-established fact, that persistent in-breeding leads to impotency in the matter of conception. It is true that shorthorns are not so liable to suffer in this way as some other classes of stock; yet Charles Colling must have felt its influence when, after trying his cow "Phoenix" with good bulls without success, it is recorded that as a "last resort" he fell back on a bull which was one-fourth Galloway and three-fourths shorthorn, and attained his end. This was at one with a common custom, viz., that of putting a good country or common bull to a well-bred stock of

* That by Charles at Fulton in 1810, and that by Robert at Brampton Farm in 1818, besides a displeasing sale at the latter place in 1820, after Robert's death.

cows which have through close-breeding become weak in their powers of reproduction. It is admitted that close-breeding lowers the power of animals to produce young. It is not more wonderful to find it also influencing the power of providing sufficient milk to support them should they come into existence. On the other hand, it would be extraordinary if the reproductive system were seriously affected as regards its first functions, and left in a normal condition in the matter of what should follow at a later period.

There were several circumstances in the management of the early shorthorns which made it possible to carry in-breeding to its greatest length with the minimum of bad results. Animals were kept in moderate condition and in a natural state. Their food was mostly grass in summer, and hay or straw in winter. The system of letting out on hire lent renewed vigour of constitution through change of air, food, and general surroundings. The influence of such change as a precaution towards the preservation of health is universally admitted in the human species; and in the matter of consanguinity, it has been shown that the marriage of cousins is not in consequence associated with either mental or physical weakness if the individuals in question have been reared in parts geographically distant from each other. The shipment of cattle to America and other countries, and the return of their progeny, has unquestionably increased their constitutional vigour. The influence is not one which shows itself merely

in the members of a race of descendants, but it is conspicuous in the individual. Numbers of highly-bred barren cattle have been exported to America at low prices, and found to conceive after the change without difficulty.

It may be safely asserted that nearly all the well-bred shorthorns which have become famous within the period of which there is any written history* of the breed, have been descended more or less directly from a few famous bulls, notably "Hubback" (calved about 1775), the father of the improved shorthorn, and his much in-bred descendants, "Favourite" (252) and "Comet" (155).†

In "Animals and Plants under Domestication," Darwin says of "Favourite" (who was himself the offspring of a half-brother and sister from "Foljambe"), that he "was matched with his own daughter, granddaughter, and great-grand-daughter, so that the produce of this last union, or the great-great-grand-daughter, had fifteen-sixteenths, or 93.75 per cent., of the blood of 'Favourite' in her veins."

The two great branches of the shorthorn breed, the "Booth" and the "Bates," had a common origin in "Hubback." This animal had a marvellous power of stamping his special characteristics upon his offspring, and besides was possessed of certain qualities

* George Culley, who wrote on the agriculture of Northumberland, and also "Observations on Live Stock, 1786," is one of the first historians of the breed. He was an intimate friend and adviser of the Collings, and an enthusiastic disciple in the methods of breeding practised by Bakewell.

† These were descended from "Studley bull" (626), calved in 1737.

now highly appreciated among shorthorns, and which were not prominent features of the older shorthorns before his time,—viz., low-legged and compact in form and moderate in size;* a wonderful aptitude for laying on flesh, which, contrary to the usual law of in-breeding, he seems to have inherited from his dam; and a superior quality of skin and hair, exhibited in the matter of touch.

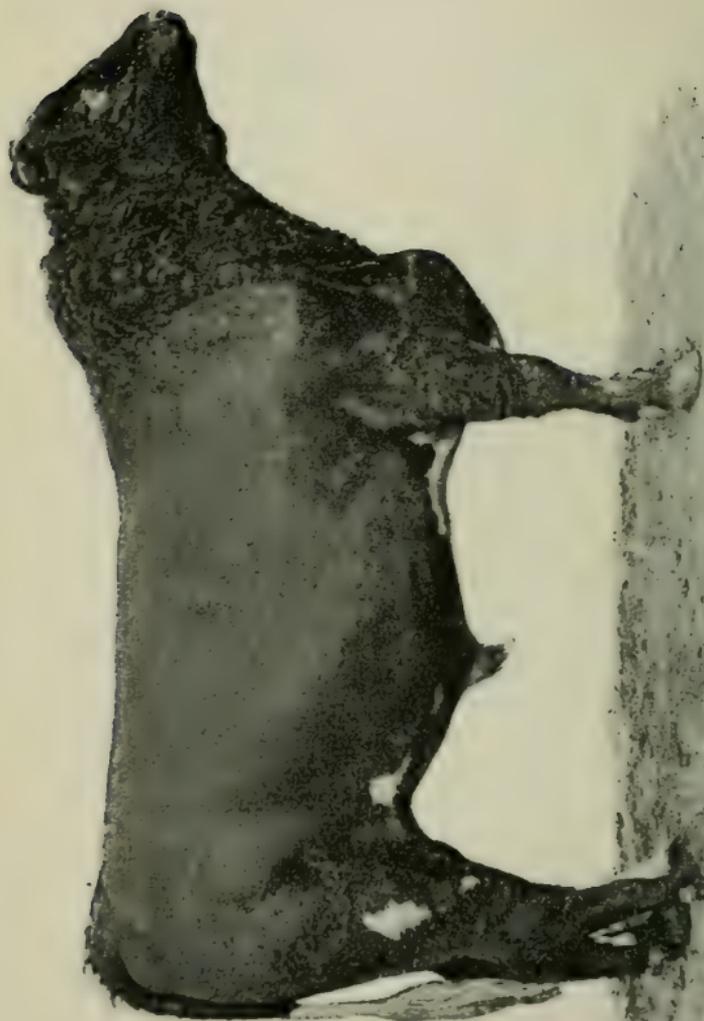
The name of Booth has been associated with the breeding of shorthorns since 1777 in the person and in the descendants of Thomas Booth, the father of Richard and of John Booth, and through the latter grandfather to Thomas C. Booth of Warlaby, North-allerton, and great-grandfather of the present representative in the direct line, Richard Booth.

It was not till some time after the Collings' career that the name assumed the importance which it ultimately attained in the shorthorn world. "Killerby," "Warlaby," and, in earlier times, "Studley," were the centres from which the various members of the Booth family distributed their surplus stock to all quarters of the globe where shorthorns are to be found. The Booths, like the Collings, continued the system of in-and-in-breeding, and also that of letting bulls out on hire for a time to distant parts of the British Isles—that system which has been acknowledged as of so much advantage when close-breeding is practised.

* Various records of the weights of large-boned and coarse-fleshed early shorthorns, prior to the days of high pressure in feeding, put the dressed carcasses at over 150 imperial stones.



S. BATES SHORTHORN COW, "DUCHESS OF LEICESTER II."
Bred by T. HOLLFORD, Castle Hill, Cernie.



9.—BATES SHORTHORN BULL, "DUKE OF BARRINGTON," 15, 52,745.

Bred by H. J. SHELTONS, Brilles, Shipston-on-Stour.

The property of T. HOLFORD, Castle Hill, Ceme.

Thomas Bates (1775 to 1849) of Kirkleavington,* in the Vale of Cleveland, got the progenitors of his best cattle from the Collings.

He was a man of means, and had an education † superior to his farmer neighbours. His cattle breeding was carried out more for his own pleasure, and to establish a distinct breed and name, than for profit. His name is most familiarly associated with the "Duchess" tribe, for which was claimed all the qualities, including that of milk production, which the shorthorn breed possessed. The "Oxford" and "Duchess" tribes are the two important branches of the Bates blood, and most intimately related through frequent intercrossing by bulls taken from the one to the other. Even a more perfect system of in-and-in-breeding was followed by Bates and continued by his successors than in the case of the Colling or of the Booth cattle. The colours of Bates cattle are red, red and white, and roan. It is asserted by Bates breeders that white specimens more rarely appear in this than in the Booth line, so it would seem that the tendency to whiteness through close-breeding is overbalanced in this instance by some other influence—possibly the greater attention of

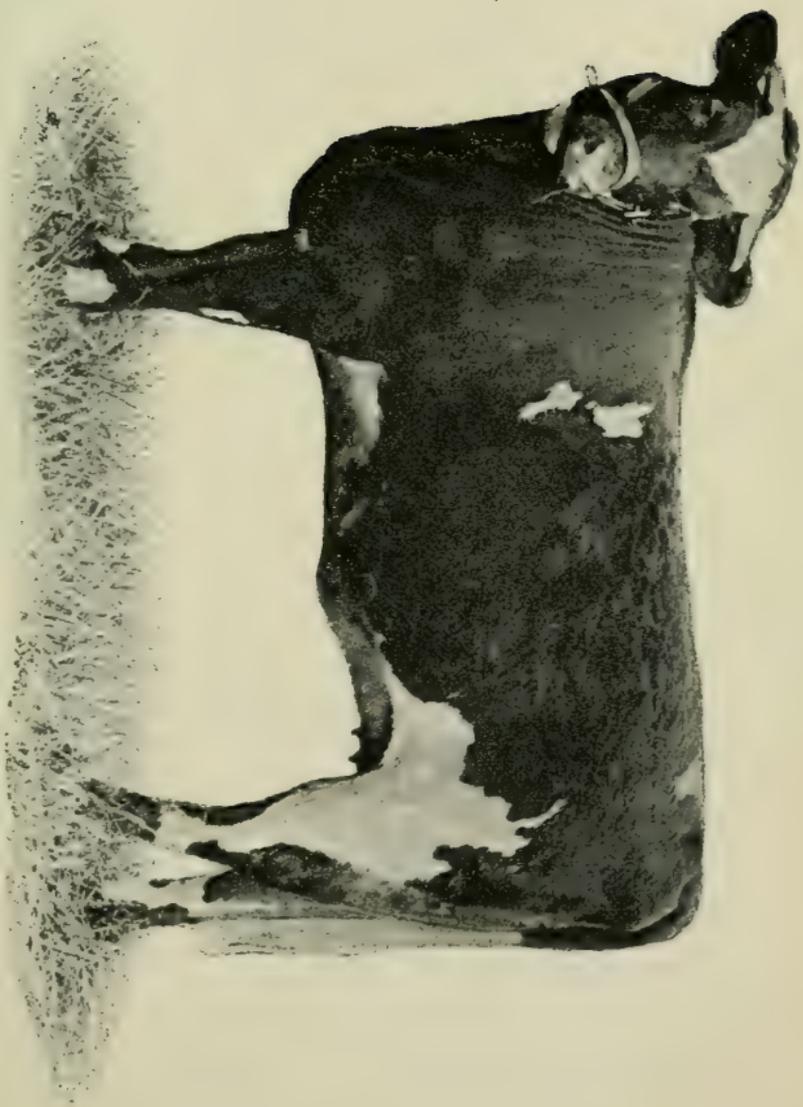
* A rather over-drawn and laudatory account of the cattle bred by him is to be seen in a book published in Newcastle-upon-Tyne, N.E. Farmer Office, and entitled "The History of Improved Shorthorn or Durham Cattle and of the Kirkleavington Herd, from the Notes of the late Thomas Bates, with a Memoir by Thomas Bell of Brochton House, Ecclesham, Staffordshire."

† He spent a number of years at the University of Edinburgh, with the original intention of going in for the Church.

Bates breeders to select dark-coloured bulls for service. The "Stanwick" cow, which was the mother of all the best of the Bates breed, was a yellowish-red roan. Though good milking power has always been considered a point of importance in Bates cattle, the fact that the common non-pedigreed shorthorns surpass them in this particular quality is an indication of the influence of close-breeding on the alimentary part of the organs of reproduction.

In comparing Booth with Bates cattle, we find that the Booth breed exhibits a greater number of light colours—white and light roan; a thicker and less silky skin; a more substantial and massive frame more deeply covered with flesh; the head and neck set on lower, and the style and expression more sombre than in the case of its stately rival. The best specimens of the Bates bulls possess a wonderful presence given by the arched crest and stylish head. The breed is particularly liable to the defect of a hollowness or falling away at the heart girth: this is made all the more apparent by the high neck and the frequently perpendicular shoulder.

Commingleing of Booth and Bates blood is strongly objected to by some on the ground that they are now so distinct that the drawbacks of an ordinary cross with animals of entirely different breeds are liable to appear. It is acknowledged that, where inter-breeding does take place, the most successful match is a Booth bull with a Bates cow. This result implies that Bates cattle have suffered more



10.—MIXED BROTHER AND SISTERS HEIBER, "AUGUSTA IV."

In 1884 First at the Royal Show, and Champion Prize of £50 at the Highland Show for the best Female Shorthorn. Sold to Howe, How Park, Ontario.

from in-and-in-breeding than Booth cattle, because had consanguinity not been carried too far, we should have expected greater potency to remain with the Bates which are most in-bred.

It would be impossible to enumerate all of the many hundreds of breeders who have followed in the lines laid down by the Booths and by Bates, but particularly the former. It is a fact that the Booth cattle are much more widely appreciated in this country than their rivals, in spite of the milking qualities claimed for the latter, and that even in recent years when an increased supply of milk for our large centres of population has been the rage. In America the prices paid for Bates cattle have been quite wonderful.*

A few of the more prominent shorthorn breeders of Booth cattle in the native districts of the shorthorn—in addition to the Booths of Warlaby,† whose herd, though not often represented in the show ring, still maintains the position of excellence to which it was raised by its late owners, Richard and T. C. Booth—are, T. H. Hutchinson, Manor House, Catterick; Thomas Willis, Manor House, Carperby, Bedale;

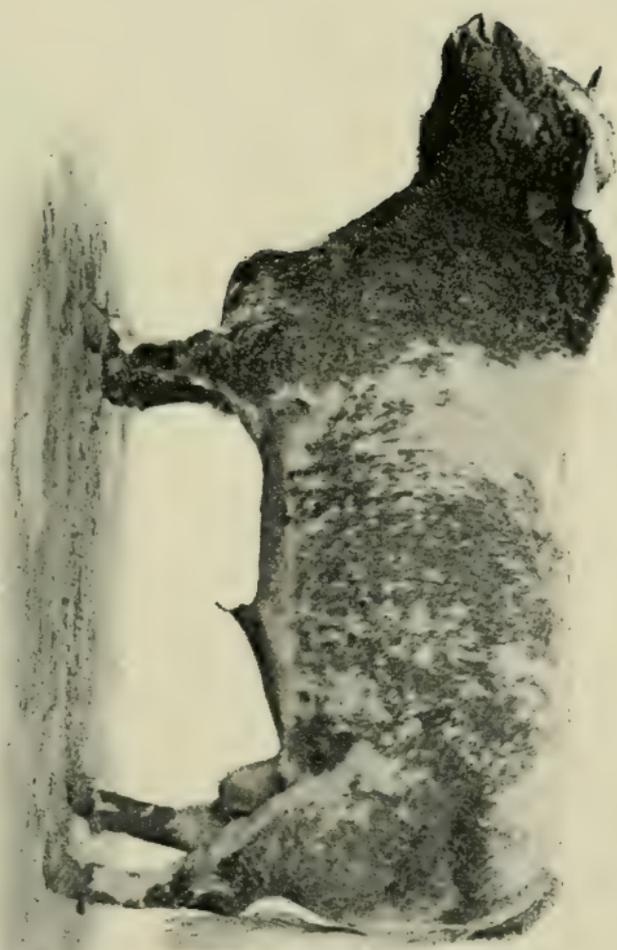
* When in Canada in 1879, the author saw in the possession of M. H. Cochrane, Compton, Prov. Quebec, the famous "Duchess" cow, which at that time had (speaking from memory) bred stock sold at £27,500, and which lived to add over £2500 to that enormous figure.

† The Killerby herd was sold off in October 1886 after the death of its owner, J. B. Booth; and I may be excused for adding, from personal experience, on one of the wildest days of wind and rain that recent years have seen.—R. W.

Geo. Yeats, Studley, Ripon; H. Fawcett, Old Bramhope; and Christopher Cradock,* Hartforth, Richmond. Bates breeders are less numerous, but are well represented by the Earl of Faversham, Duncombe Park, Helmsley, and Col. Gunter, M.P., Wetherby.

The **Aberdeenshire shorthorns**—with which the names of Cruickshank, Sittyton; William Duthie, Collynie; W. S. Marr, Upper Mill; and J. Bruce, Inverquhomery, are intimately associated—have been rapidly growing in the favour of North American importers, and in importance in the show-yard. Though “Mario” (51713), who took the Champion prize at the English Royal Agricultural Society Show in 1888, might not be selected as a typical shorthorn, nor yet meet the touch of a South country breeder with perfect satisfaction, yet he had much of the substance and quality that butchers appreciate. It will be interesting to mark the career of these North country cattle. They have arrived at their present position by another course than that of persistent in-breeding, and it remains to be seen if the constitutional gain is not thereby of greater value than we at present anticipate. Much of the Booth blood has no doubt been from time to time absorbed by the northern breeders, but this does not necessarily imply close-breeding, and, in addition, the animals

* This gentleman has still in his possession the descendants of the old “Cherry” tribe, perhaps the only tribe mutually “recognised” by Booth and Bates breeders.



11.—AIBENDEEN SHORTHORN BULL, "FIELD MARSHAL," 47,870.
The Property of Her Majesty THE QUEEN.

selected had the invigorating influences of the change of climate and surroundings. Cruickshank, writing on this question, makes some remarks well worthy of notice and consideration. He says: "Aberdeenshire breeders have in nearly all cases been tenant farmers who are dependent on their skill and success for their daily bread; their customers have generally been their own neighbours, who are raising cattle for the butcher, and hence the breeders have been pulled up in any course which has been proved to result from an error of judgment by the most imperative of all necessities."

CHAPTER IV. — BREEDS OF DOMESTIC CATTLE—THE LONGHORN, HEREFORD, DEVON, AND SUSSEX.

The Longhorn Breed—Low on its Habitat—Bakewell—General Points—Colour—Distribution of Hereford Cattle—Relationship to other Breeds—Points of Special Interest—Origin of the Colour of the Modern Hereford—Benjamin Tomkins—John Hewart—Herefords poor in Milking Qualities—Herefords as Work Oxen—The Devon Breed: Two Branches—The North Devon—Early History—The Somerset Type—The South Devon—The Sussex Breed—Low's Explanation of their Geographical Position—The Cattle of the Interior—Similar Conditions in India—The Sussex Breed—Size—Influence of Soil and Climate—Bullocks as Work Oxen—Distribution of Breeds in this Country and in India.

THE LONGHORN BREED,

AS now seen in this country, is a remnant of a breed which at one time held a position of considerable importance as a milking breed and as a producer of large carcasses of coarse beef.

Low, in his "Domesticated Animals," says, "The true longhorns seem to have been the inhabitants of the western parts of the British Isles." In early times they were spread not only over Ireland, but throughout the English Midlands and the northern counties, extending in virtue of their hardiness on to the exposed hilly regions. The district of Craven



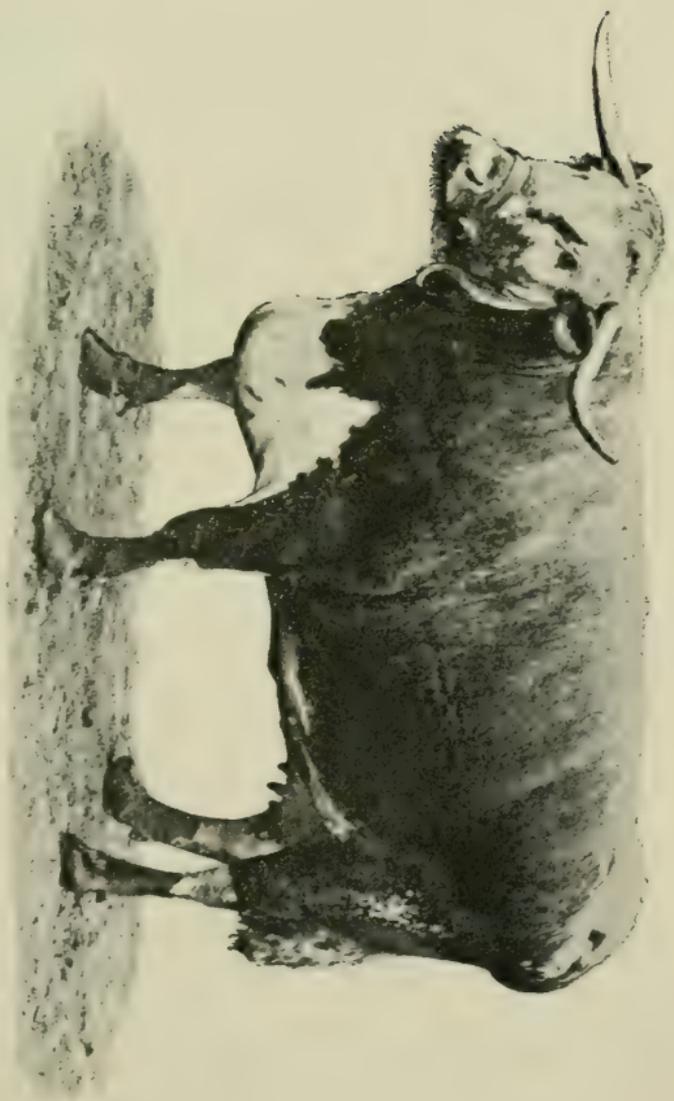
12.—LONGHORN BULL.

Was the Property of His Grace THE LATE DUKE OF BUCKINGHAM AND CHANDOS, S.C.S.I.



13. LONGHORN COW.

Was the Property of His Grace THE LATE DUKE OF BUCKINGHAM AND CHANDOS, S.C.S.I.



14.—LONGHORN COW.

Was the Property of His Grace THE LATE DUKE OF BUCKINGHAM AND CHANDOS, G.C.S.I.

in Yorkshire has been specially mentioned in the records of the early improvement of the breed as noted for the production of good specimens, though Low says "Lancaster was the nursery of the breed."

Robert Bakewell of Dishley, Leicestershire, the great originator of the system of improvement of live stock by in-and-in-breeding, selected the longhorn among cattle upon which to carry out his operations. His object was to increase the rate at which they come to maturity, to improve the quality of flesh, and to reduce the size and coarseness of bone. In this, so far as his own cattle were concerned, he succeeded admirably, but at the expense of the powers of milk production.

He died at the age of 70 in 1795, without transmitting the secrets of his system, or recording the lessons he had learnt from the experiences of his extensive breeding experiments, and consequently the work which he had so successfully begun was not carried to a successful issue. The breed which he made famous has been, since his death, seriously worsted in competition for public favour by its shorthorn rival, which has threatened it with extinction. The unique characters which are peculiar to the longhorn breed will, however, retard or prevent their disappearance by creating a demand for them as more or less fancy animals. The existence of a Herd Book will now also tend to maintain their purity.

In general points, including size, form, and mildness of disposition, they strongly resemble shorthorns.

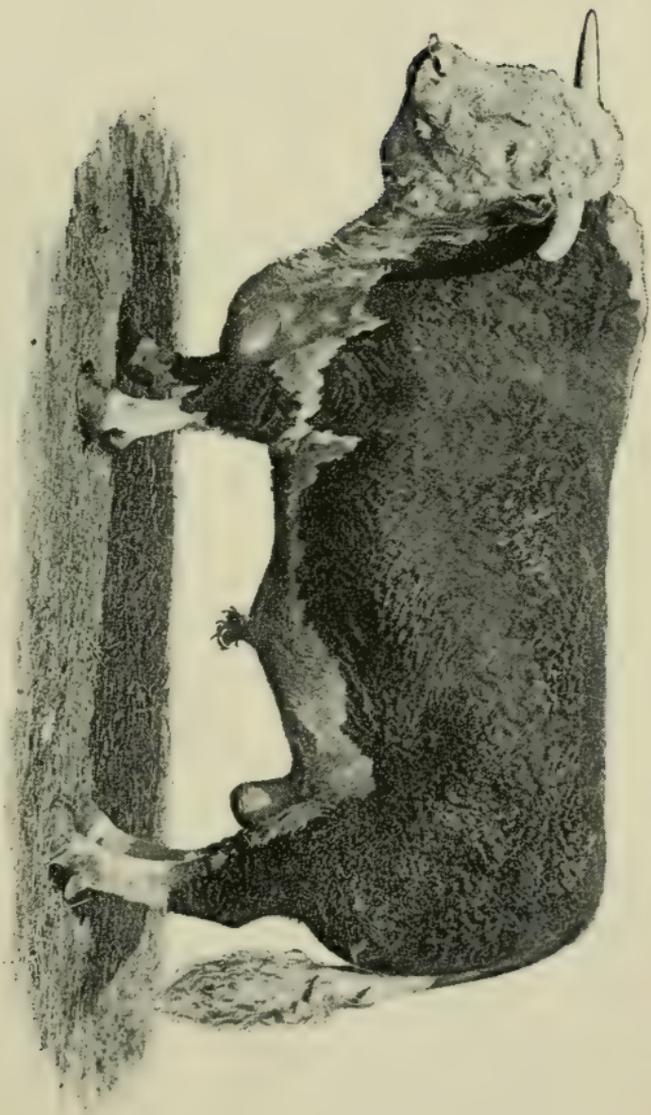
They differ from the latter in being coarser in bone and in the quality of their flesh, in possessing less aptitude to fatten or come to maturity, and in the greater length and strength of horn. The long, irregularly shaped, and sweeping horn forms the most striking difference, and one the origin of which is not easily accounted for or explained. It would seem that the longhorn inherits its horn development from the *Bos primigenius* through its more immediate ancestors, the wild forest cattle, as represented in the Chartley Park breed—probably from a variety with exceptionally long horns. The shorthorn, on the other hand, no doubt derives the characteristic form of horn from its imported European ancestors.

The colours of the longhorn may be said to be those of the shorthorn with “brindles” added. There is also a decided tendency to the appearance of a white ridge up the back.

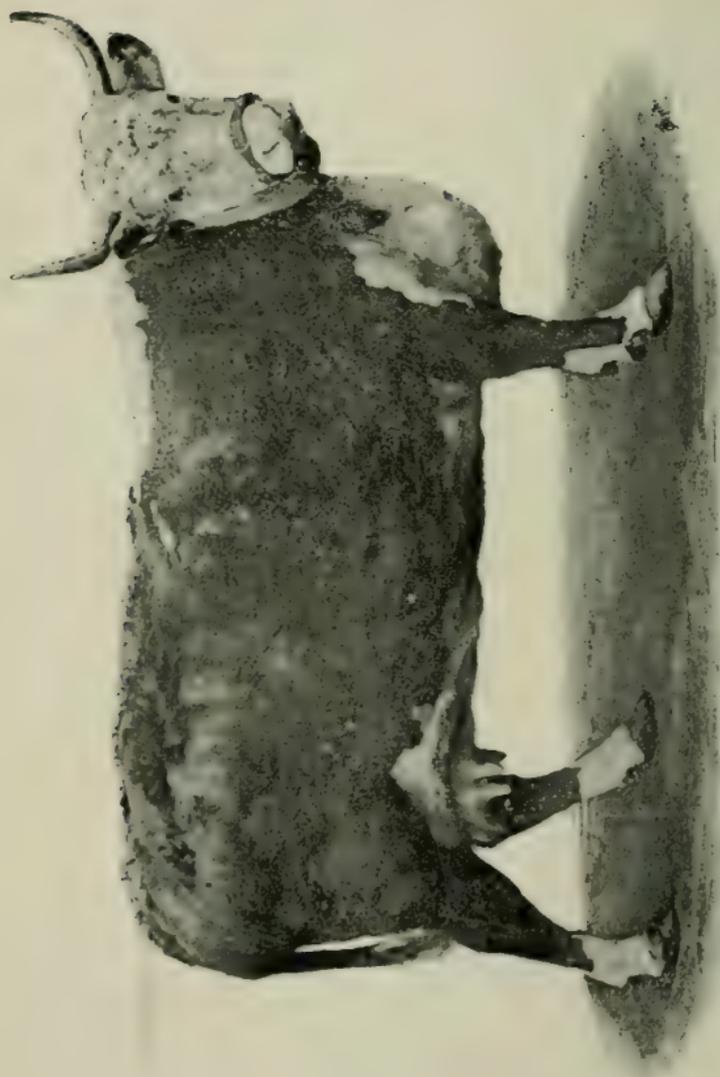
THE HEREFORD BREED*

Is not only one of the most picturesque, but also one of the most valuable, and in a cosmopolitan sense one of the best known British breeds. Although in this country it is distinctly a local breed, yet in America it has become widely distributed and highly and justly appreciated. It appears that all the highest authorities are agreed that on at least one

* All the more interesting points connected with the breed and its history have been focussed in the work on Hereford Cattle by Macdonald and Sinclair. Vinton & Co.



15.—HEREFORD BULL, "RARE SOVEREIGN."
The Property of the Right Hon. THE EARL OF COVENTRY.



16.—HEREFORD COW, "MABELLE," 4028.
The Property of Her Majesty THE QUEEN.

side of its ancestral descent the Hereford breed is closely connected with other British breeds—such as Welsh, Devon, and Sussex—which still possess certain characters in common with that under consideration.

The points of special and peculiar interest in the Hereford are that the face, forward part of the back, also the throat, belly, inside and lower parts of the legs and the tip of the tail are white, the greater part of the body being red or brown, varying from a light to a dark shade. The shoulder is particularly neat and well covered with flesh. The twist is also good. The great defect of the Hereford breed is its want of internal condition in proportion to its external appearances when fat—defective in internal “making-up.” The setting on of the tail is also frequently defective as compared with that of the shorthorn. The muzzle is flesh coloured. The horns are black tipped, of medium length, and in the female they incline slightly upwards.

There is a strong presumption that the original breed was “self” or “whole” coloured, being brown or red, shading off into black on the head and points. A breed (small in numbers) of this description has been associated with Montgomeryshire.*

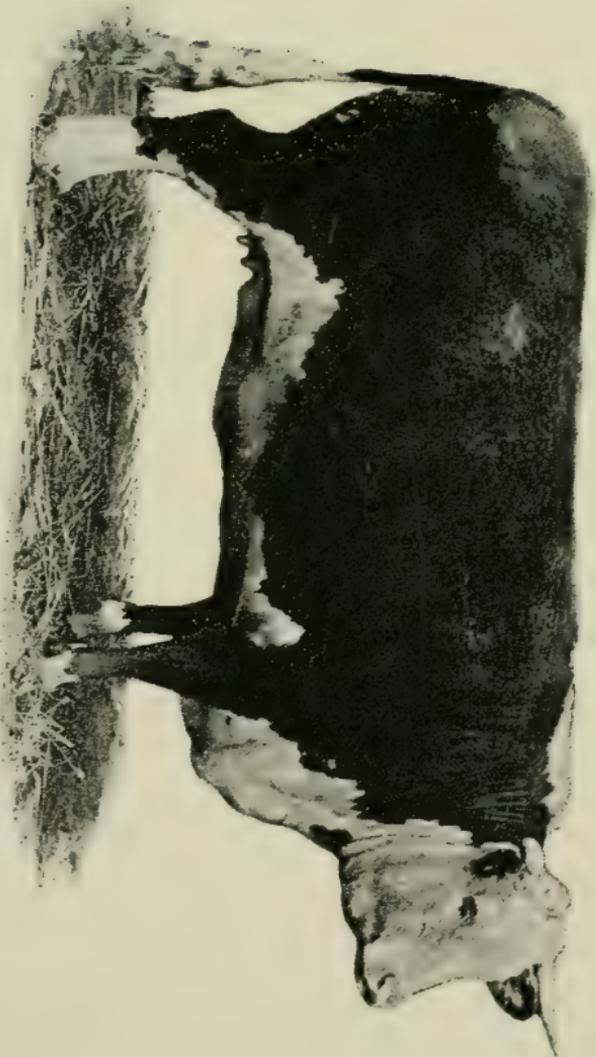
The modern Hereford is also pretty certainly

* A number of these cattle were till recently in the possession of the Aylesbury Dairy Company on the farm near Horsham, but were disposed of for beef at the sale in 1888, to make room for the present Sussex herd. They were handsome animals, and in all respects resembled Herefords, with the exception of the colour of their extremities.

related to the ancient white forest cattle of Wales, from which it originally inherited the tendency to develop and perpetuate the "broken" coloured character exhibited in the white markings. The special form of these markings, according to what seems the best authority on the subject, was given by the introduction from Flanders by Lord Scudamore (who died in 1671), of a number of white-faced cattle of superior size and quality; and also by a red Yorkshire bull with a white face, which was used in the Hereford district soon after 1750. The circumstances which gave rise to these historical records, and also the natural tendency in the original red Hereford to sport back to the white ancestor,—as is even now the case with such decidedly distinct and different breeds as the Scotch polls,—are sufficient to account for the bald head and white underline and extremities of the Hereford.

Benjamin Tomkins (born 1745, died 1815) occupies in the history of the improvement of this breed a corresponding place to that assigned to Bakewell in regard to longhorns, and to the brothers Colling in connexion with shorthorns. Tomkins adopted Bakewell's system of in-breeding, and it is recorded that the best of his famous herd sprang from two cows and one bull.

The name of **Hewar** will be for ever associated with the history of the improvement of Hereford cattle. Macdonald and Sinclair say "that the difficulty is to find a single animal of note in the present day that does not inherit Hewar blood." The refer-



17.—HEREFORD HEIFER, "PRIMROSE,"
Champion Hereford at Birmingham and London, 1888.
The Property of EDWARD CADDOCK, Caradoc, Ross.

ence is made to John Hewar, whose active career as a breeder extended over 70 years, from 1803 to 1873. The influence of the Hewar cattle was exerted upon surrounding breeds by the system of letting out bulls, a practice which had then become prevalent among the owners of superior herds of various breeds.

Herefords as milkers have never been in the first rank. Although an effort is now being made to develop their milking powers, yet as a breed they cannot be classed as dairy cattle, though it is claimed that the milk is of superior quality. The practice of allowing the cows to suckle their calves has prevented the improvement of the breed in the matter of quantity, by the artificial selection of the best milking cows from which to breed bulls.

The main object for which the breed was kept until recent times was the supply of work oxen for land cultivation. The chief object of the present day, viz., beef production, was during last century quite a secondary consideration. In certain parts of Gloucestershire and surrounding district, bullocks (frequently Herefords) are kept as work animals, and used mostly in ploughing and working land, but are also employed in the cart. The Earl of Bathurst still employs some 30 selected Herefords in the working of his home farm near Cirencester. When out of work they form quite a feature of interest in the adjoining park.

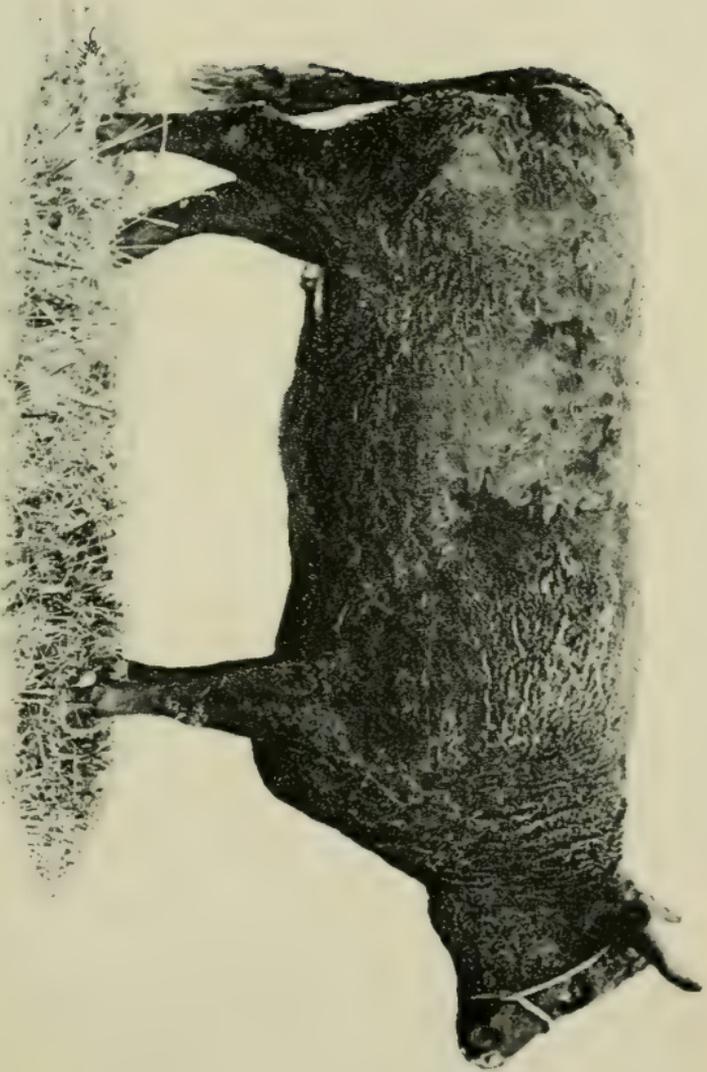
THE DEVON BREED

Is primarily divided into—(1) North, and (2) South Devons.

The North Devon is the original true and hardy type belonging to the elevated region in the north of Devonshire. As represented by the best specimens, this division of the breed is unsurpassed for compactness and symmetry of form. It is smaller than the Hereford or the Sussex, two breeds to which it is allied. The colour of hair is a deep blood-red, and of the skin orange-yellow; inside the ears it is orange-red. The yellow is specially noticeable by its appearance round the eyes and muzzle. A small patch of white hair is a common marking on the belly in front of the udder of the cow or the scrotum of the bull. At times it extends till it reaches the forelegs, and by this it may be recognised as corresponding in a limited extent to the white under-line of the distantly related Hereford. The white hairs, sometimes mixed with the natural red brush of the tail, and also in patches on the body, are further proofs of the tendency to develop white markings. The head is adorned, in the case of the female, with particularly elegant, creamy-white, sharp-pointed, black-tipped horns of medium length, having a good elevation at the junction with the head, and curving upwards. In the bull, as compared with the cow, they are shorter in proportion to thickness, straighter, and less raised. The shoulder is specially neat and well



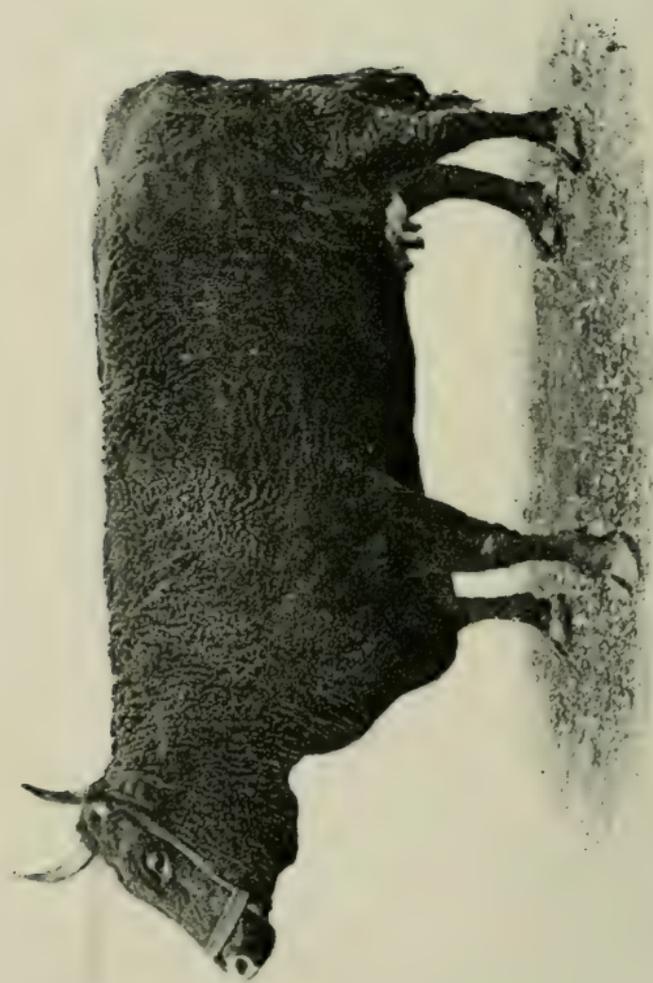
18.—NORTH DEVON BULL, "LORD WOLSELEY," 2063.
First at the Royal Shows at Newcastle in 1867, and Nottingham in 1868.
The Property of the Right Hon. LORD FALMOUTH.



19.—NORTH DEVON HEIFER, "FLOWER II," 9355 D.J.D.H.B.

A Royal Winner in 1888.

The Property of Sir W. R. Williams, Bart., Heanton, Barnstaple, North Devon.



20.—NORTH DEVON COW, "FAIRMAID," 9351 D.D.H.L.

A Royal Winner in 1888.

The Property of Sir W. R. WILLIAMS, Bart., Heanton, Barnstaple, North Devon.

formed, the barrel coming on behind, with scarcely a depression at the region of the heart-girth—a point so defective in many breeds. The quality of the beef is excellent.

The early history of the breed is lost in obscurity. The brothers James and John Quartly, of Molland, North Devon, filled the position in the improvement of this breed which the Collings did in that of the shorthorn. After them may be mentioned John Tanner Davy (the original compiler of the “North Devon Herd Book”), James Davy, and Moggridge of Molland.

The Somerset type of North Devon has in recent years been coming to the front and growing in favour, on account of the increased size due to the richer and deeper soil and better climate which prevails in that region. With an increase of size of this description there is a tendency to coarseness. A parallel example is to be seen in numbers of the Ayrshire breed reared away from their home conditions and highly fed; and Somerset breeders strive to counteract this by using bulls reared in the north of Devonshire. The horns of the Somerset type are more inclined to droop than those of the original North Devon. There is a growing demand for these cattle, not only in America and Australia, but also in our South African colony.

The South Devon, or South Hams division of the breed, differs materially in form from either of the types of North Devon. The members of it are larger, coarser, and not so deeply coloured as the

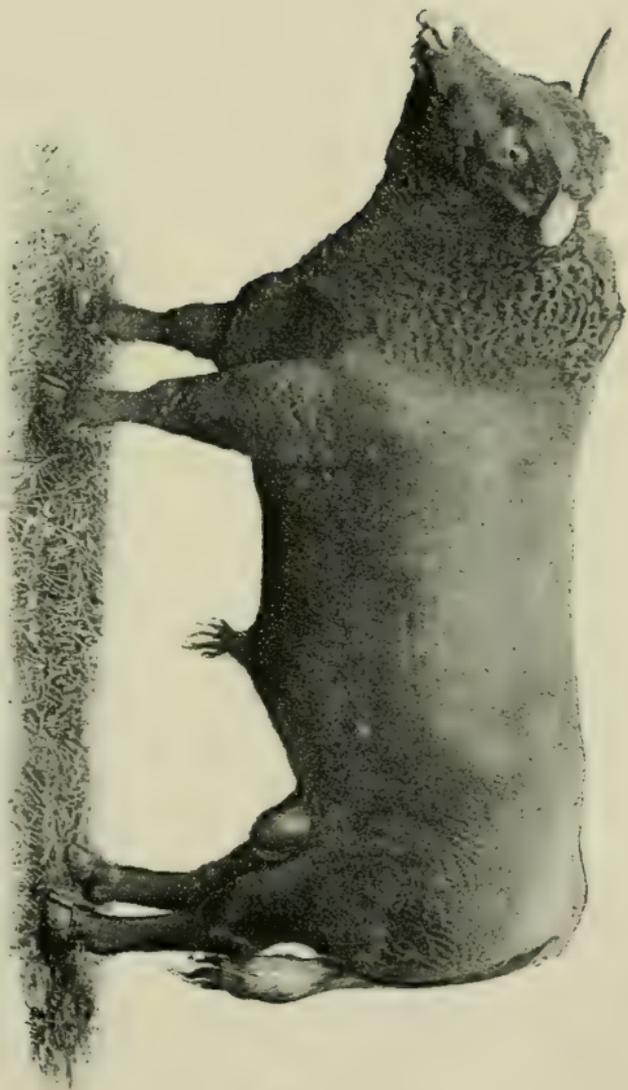
North Devon branch. They acquired these differences and also their greater milking powers by crossing with Channel Islands' cattle.

Being originally a mountain breed, the Devon is hardy, strong, and active. It was long famous for supplying useful oxen for farm work. Their employment in this way is now much restricted.

As a breed for milk production, it has been, and still is inferior. The cows give but a small quantity of rich milk, and tend to go dry early.

THE SUSSEX BREED

Ranks among the largest classes of British cattle. It belongs to the old race which gave origin more or less directly to the West Highland, the various Welsh breeds, the Hereford, and the Devon. To the latter it bears a very striking resemblance, and no doubt it has this in virtue of a collateral descent from the "red cow" that at one time occupied the southern districts of England. The influences of the soil and climate of the weald country has considerably modified the form and character which, it may be presumed, were at one time similar to the Devon. The horns are longer, stronger, and more irregular in form, with a strong similarity to the style of the horns of the longhorn breed. The colour is dark red, though not, as a rule, of so deep a shade as that of the North Devon. The Sussex is also superior to the Devon in size and strength, but with this it sacrifices something of the neatness

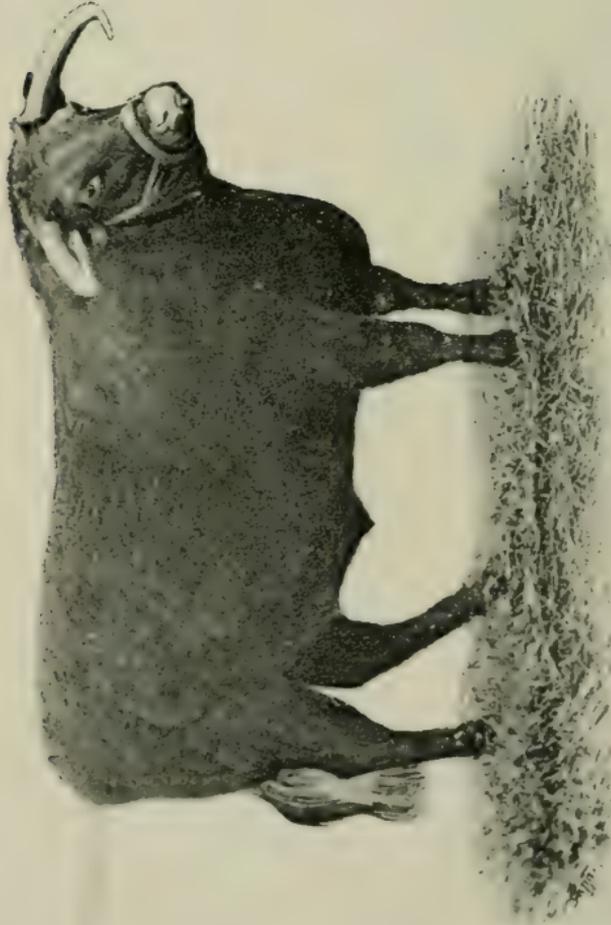


21.—SUSSEX BULL, "GENTLEMAN," 814; SIRE "GOLDSMITH," 391.

First at the B. and W. Show, Newport, 1888.

The Property of W. B. WATERLOW, High Trees, Redhill, Surrey.

Bred by E. & A. STANFORD, Eatons, Ashurst, Sussex.



22. SUSSEX OX, GRANDSIRE, W. S. FORSTER'S FAMOUS BULL, "GOLDSMITH," 391.
Won the Champion Breed Cup at Islington in 1886.
The Property of W. S. FORSTER, Gore Court, Maidstone.



which belongs to the latter. The cows are inferior milkers.

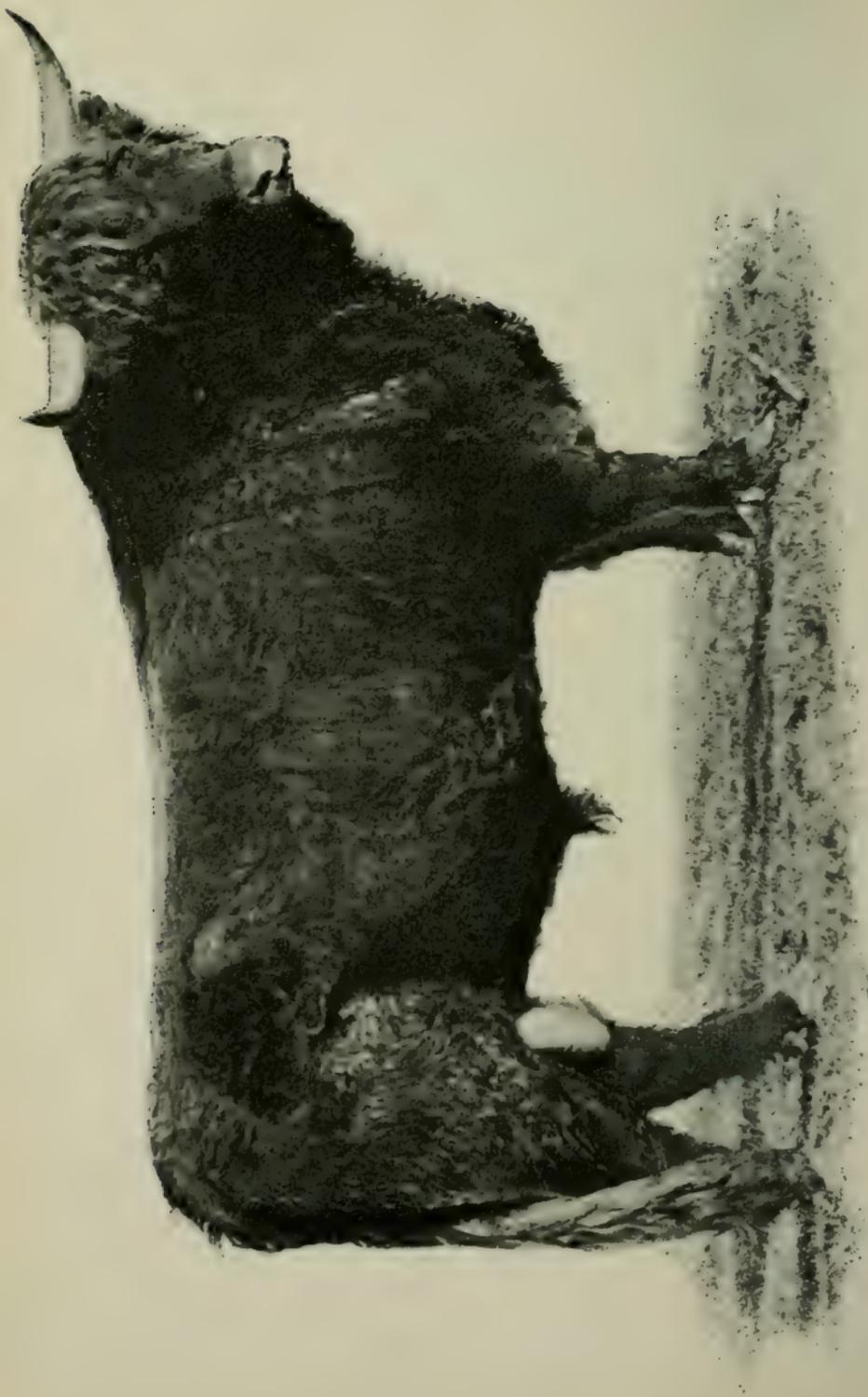
The bullocks of the breed, which combined in a marked degree strength and activity, supplied an excellent class of animals suitable for working the heavy land of the weald on which they exist in Sussex and the adjoining counties. It is not at all certain that it was an improvement in practice to discontinue to the full extent the employment of oxen in favour of horses in working some of the heavier classes of clays. It is quite certain that the land suffers much more from the trampling of horses than from that of work cattle.

Low aptly explains why representatives of the cattle of the ancient Celtic inhabitants of these islands were preserved in certain parts. Wherever the region was difficult of access to the invaders, as in the case of mountainous tracts or large areas of forests, there the original inhabitants found shelter and safety for themselves and their cattle. Thus in the hilly localities we have preserved the Highland Scotch, Welsh, and Devon; and in the instance before us the dense forests of the weald afforded the necessary security.

The cattle of the interior of the country—the accessible parts of it—were either supplanted altogether, or much altered in form and character by imported blood.

In India exactly the same condition of things exists, where the small, dark-haired, and inferior breeds have been driven away into remote and

out of the way corners, and the more valuable tracts of country, the highways of conquering armies, and more recently of trade and commerce, have been supplied, probably repeatedly, by importations of the larger and finer white-haired varieties. The parallel is not quite complete, as in some of the breeds in this country emerging from obscurity (and notably among these is to be found the Sussex) are animals of great size and substance and wealth of constitution.



23.—WEST HIGHLAND BULL, "SEUMAS A GHILINNE," 482.
The Property of the Right Hon. THE EARL OF SOUTHBESK, K.T.

CHAPTER V. — BREEDS OF DOMESTIC CATTLE—THE WEST HIGHLAND, WELSH, AND SHETLAND.

The West Highland—Habitat and Descent—The Bullocks—Points of Form and Colour—The Wild Nature—Crosses—Importance of a Hardy Constitution—Welsh Cattle—Varieties—The South Wales or Pembroke—Points—Feeding and Quality—As Milkers—North Wales or Anglesea—Compared with Castle Martin—Cows as Milkers—The Bullocks—Herd Books—Suitability of Welsh Cattle for America—Old Castle Martin White Breed—The Glamorgan Breed—The Old Gloucester Breed—Orkney and Shetland Cattle.

THE WEST HIGHLAND BREED,

OR, to be more accurate, the South-West Highland breed, belongs to the Western Islands, to Argyleshire and the adjoining counties.

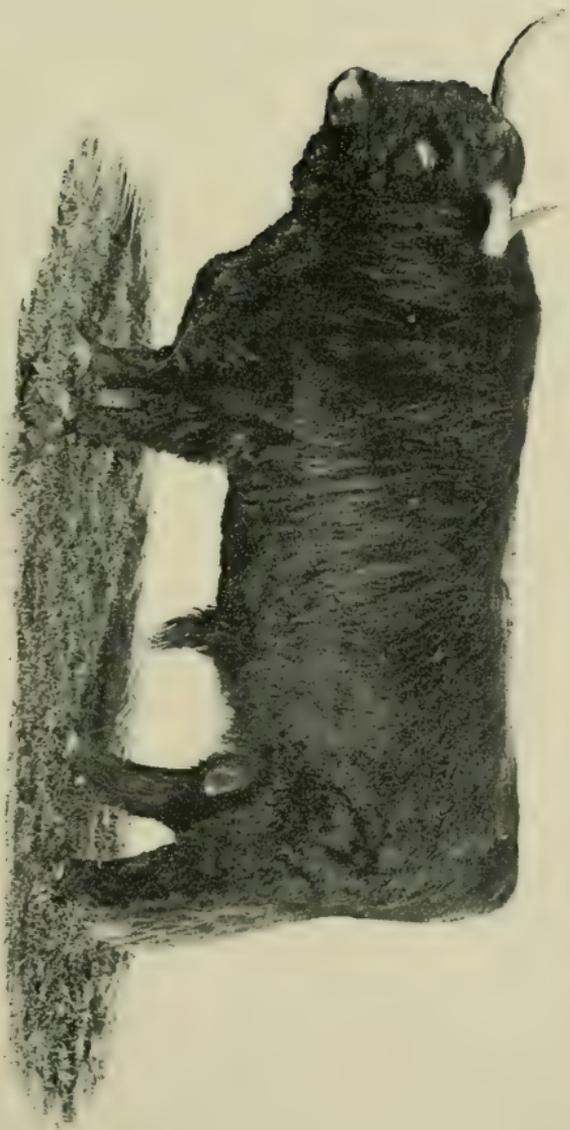
It is the remaining selected representative of the different varieties of Scottish mountain cattle, the semi-domesticated descendants of the ancient breed of the forests. At one time, before the land was stocked with sheep, it occupied the wild pastures of the true Scottish Highlands. The mild or open character of the climate of the extreme west, along with the careful selection in breeding followed by

the Dukes of Argyle, all tended to foster that superiority of quality which has enabled it to successfully supplant the inferior sorts inhabiting the inland uplands. This is the hardiest of all British breeds, and from an artistic point of view, the most picturesque.

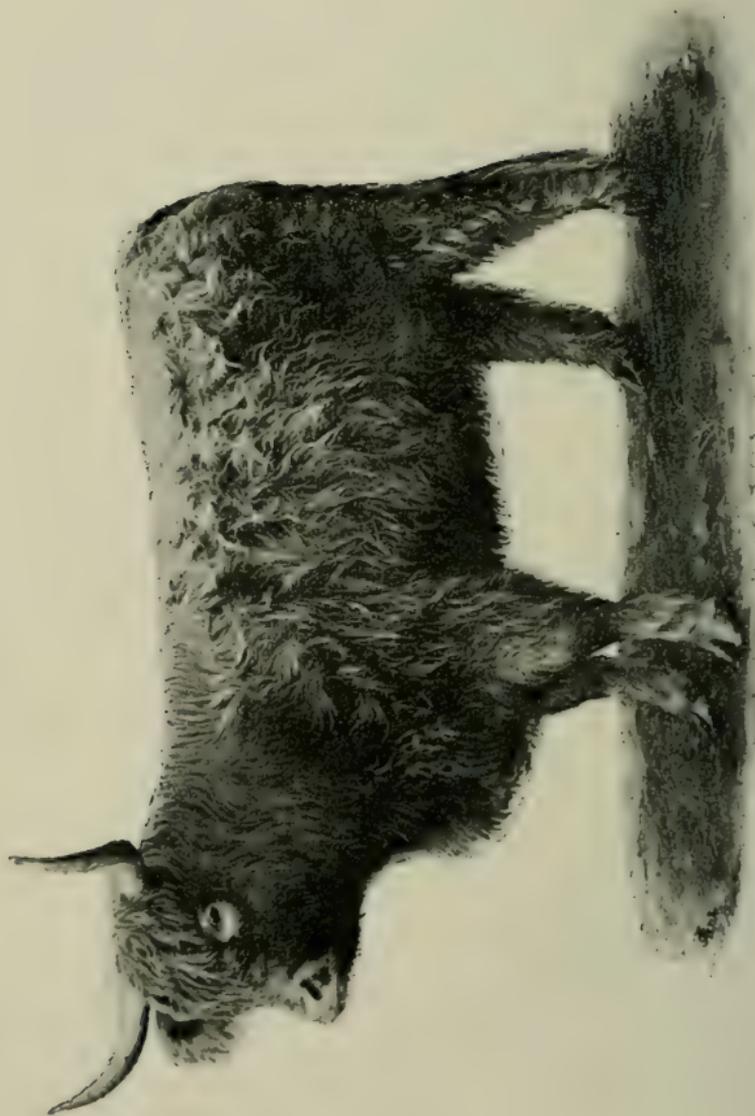
The **bullocks** are, when 3 or 4 years old, highly and justly appreciated as park cattle in all parts of the kingdom, where their long and elegant black-tipped horns, variety of colour of hair, and the long and silky, shaggy, and uncommon appearance of their coats, render them objects of universal interest and admiration. As beef-producers, they are, while young, slow in coming to maturity, but the ultimate product is unsurpassed in the leading markets of the kingdom.

The **body** is massive, well-formed, well-fleshed, and supported on low and powerful limbs. From the under part of neck is suspended a dewlap, and on the top of it is a hairy fringe or mane. The colour varies from black to a creamy-yellow or white through all shades of dun, red, brown, and at times brindles. Black has been thought to indicate hardiness, though some of the lighter-coloured animals with the tendency to an orange tint of skin feed better under artificial treatment.

The **calves** are allowed to follow their mothers, and are not handled or trained to close contact with man. They consequently develop wild instincts and practices. The cows do not excel as large producers of milk, although the quality of it is good.



24.—WEST HIGHLAND BULL, "CAITIN KINNACH."
Champion at the Highland Centenary Show in 1884, and other Prizes.
Bred by His Grace THE DUKE OF ARHOLD, K. T., the Property of the Right Hon. LORD KINNAIRD.



25.—WEST HIGHLAND HEIFER, "LADY FLORA."
The Property of the Right Hon. THE EARL OF SOUTHESK, K.T.

When milked by hand, the flow does not continue late in the season.

West Highland cows cross admirably with bulls of the finer breeds. Full advantage can thus be had of all the good qualities of the breed, even under the system of early maturity, without necessitating the sacrifice of the native hardiness of constitution, so invaluable in a mountain country, in the endeavour to induce early maturity in the pure breed. Unless the constitution is maintained, advantage cannot be taken of the supply of natural food, which costs little, and cannot be utilized except as food for such animals. The cost of producing a four-year old Highland bullock on his natural food is very much less than the cost of producing an animal of the same weight at two years old, because the food of the latter is expensive to grow, and expensive to buy.

To substitute the early maturity animal, either by importation or refinement induced by in-and-in-breeding of the existing breed, for the real Highland ox in his home quarters, would lead to a loss of profit to the farmer, and the loss of the natural food produce of the district to the community.

WELSH CATTLE,

Although usually spoken of as consisting of a number of distinct breeds, are yet closely allied to each other, and interbred without the results of cross-breeding appearing. The two best known breeds,

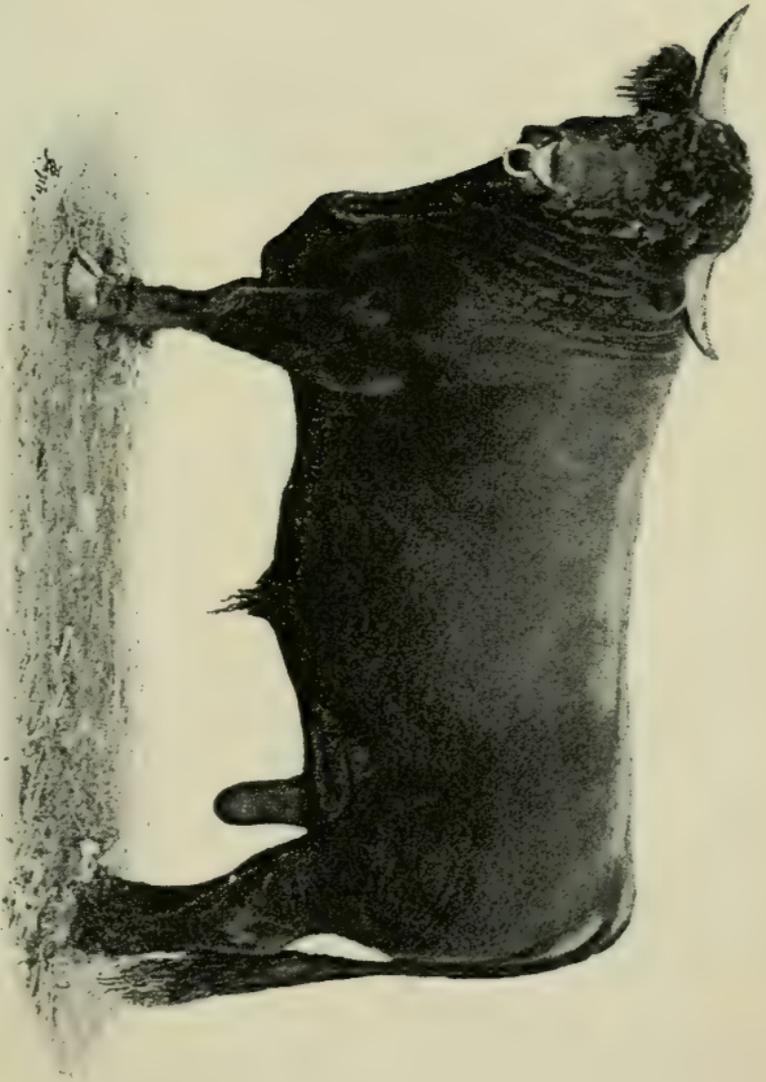
each with a Herd Book of its own, are—(1), *The South Wales, Pembroke, or Castle Martin black* breed ; and (2), *The North Wales or Anglesea black* breed. In addition to these, are (3), *The Glamorgan* breed ; and (4), *The Old Castle Martin* white breed.

The South Wales black breed is sometimes subdivided into—(a) *Castle Martin*, and (b) *Dewsland* breeds.

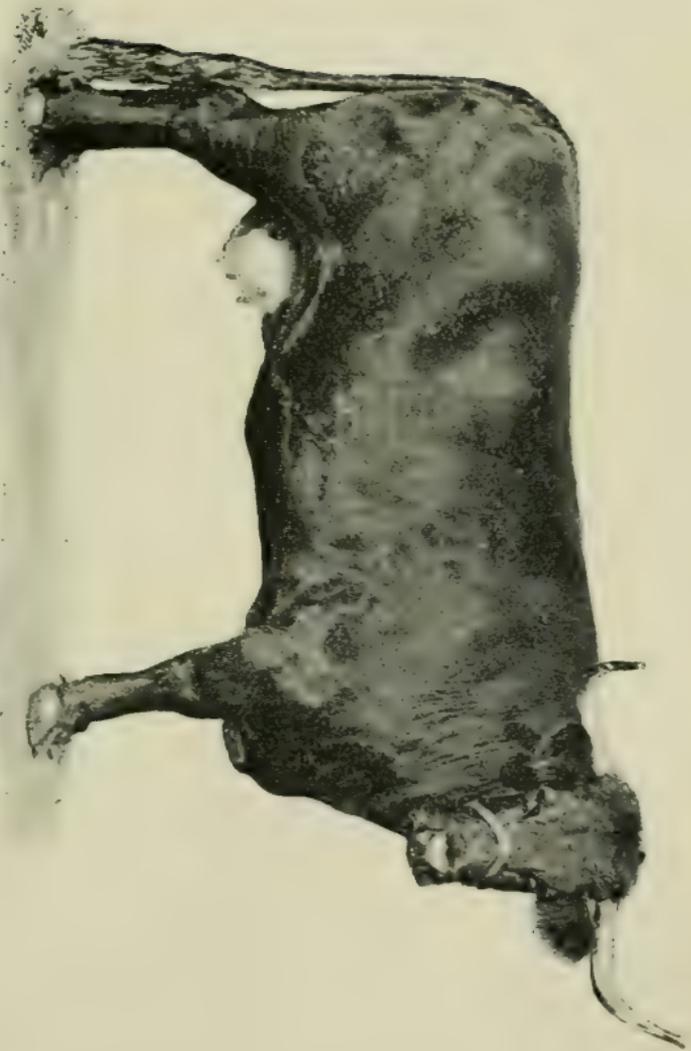
Points.—Although the prevailing colour is black, white markings on the belly or white hairs in the brush of the tail or other parts of the body now and then appear. A russet, chocolate, or brown-black colour is considered good.

The horns are long, yellow, and black-tipped. As in many instances already noticed, the horns of the male are not only lower set, but they are stronger and shorter than in the female. South Wales cattle have wonderfully hardy constitutions. In this and in their long, though straight, coats of hair and their hardiness of constitution they strongly resemble West Highlanders. As ought naturally to follow under the circumstances, they have no great aptitude to fatten at an early age. When allowed to come to maturity they finish admirably, both as regards internal fat and external condition.

As milkers they are superior dairy cattle. This quality they possess by descent from the white forest cattle of Wales, in common with the instinctive practice of hiding their young. Calves are, as a rule, only left with their mothers for a few days, or in special cases two or three weeks, then they are



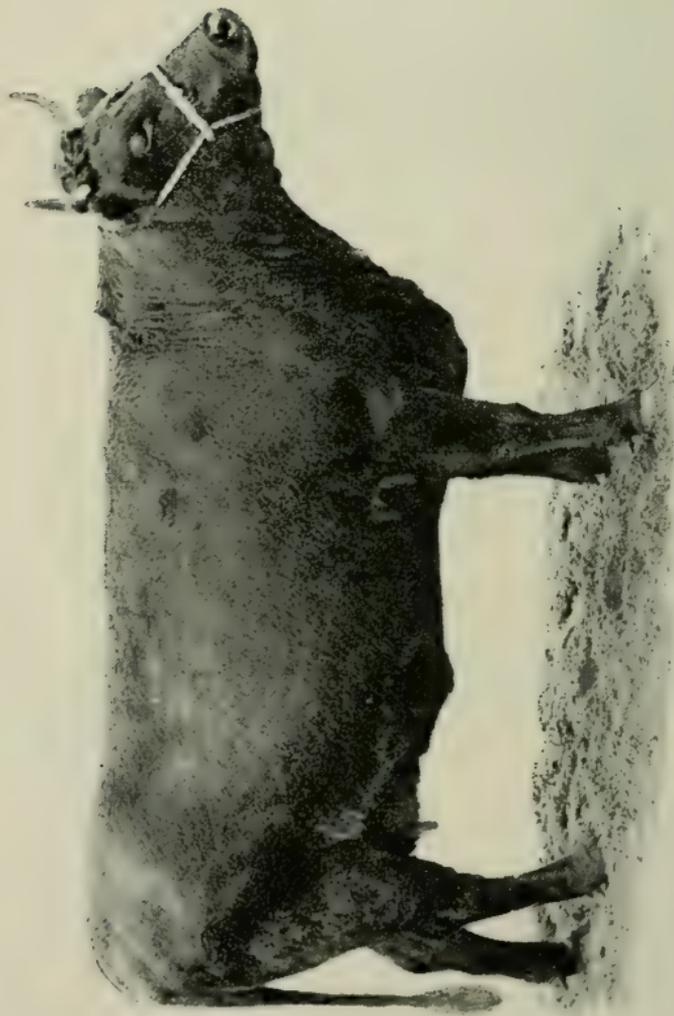
26.—BLACK SOUTH WALES BULL, "ZULU," No. 129. Vol. IV.
At one time in the Herd of the Right Hon. THE EARL OF CAWDORE, Stackpole Court,
Pembroke, South Wales.



27.—BLACK SOUTH WALES COW, "JENORA I," 245. Vol. III.
At one time in the Herd of the Right Hon. THE EARL OF CAWDORE, Stackpole Court,
Pembroke, South Wales.



28.—NORTH WALES BULL, "TOM."
The Property of Captain J. C. Best, Vivod, Llangollen.



29.—BLACK NORTH WALES COW.
The Property of Colonel PLATE, Haufairfechan, North Wales.

weaned and reared on skim milk with some additional food to raise the standard of feeding.

North Wales or Anglesea black cattle resemble in many respects the South Wales breed. From Anglesea they extend southward along the coast till they meet and mingle with the black South Wales breed. From the latter they differ in being smaller, and having shorter legs, heavier heads, thicker necks (denoting good constitution), thicker, shorter, and whiter horns, finer and more silky coats of wavy hair (neither curly nor bristly), thinner skins, and a better touch. In colour they are appreciated when as black as possible, though there is a greater tendency to white markings. They are not so inclined to be wild, but resemble more the shorthorn in disposition.

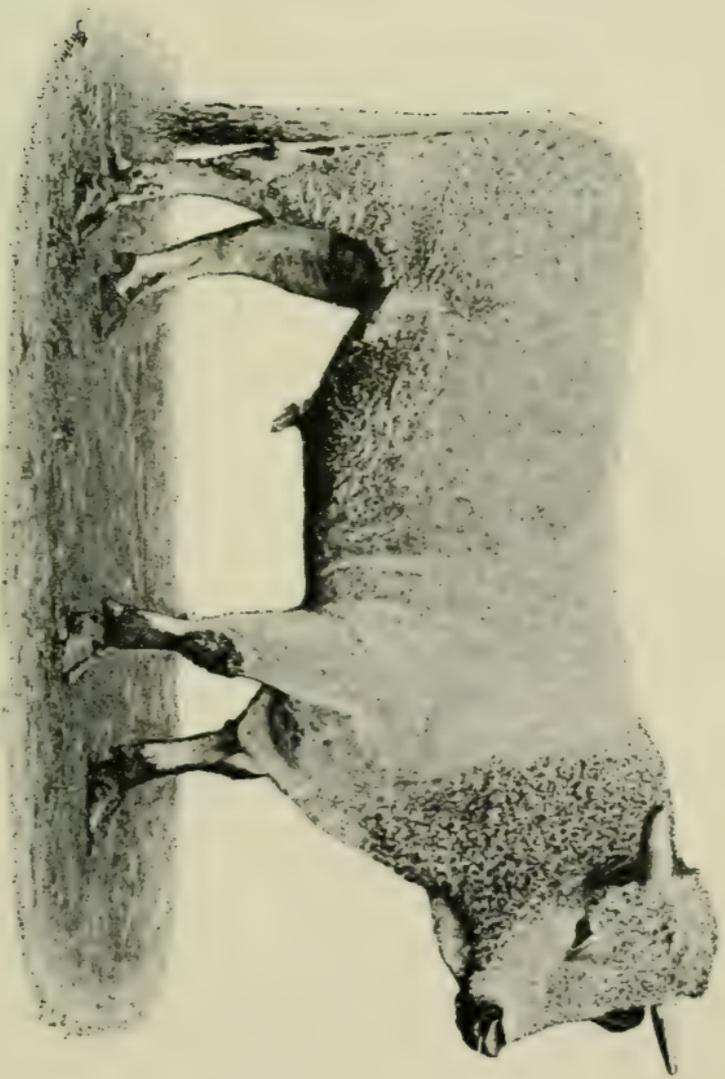
The cows are good milkers, but not quite equal to the Pembrokes. As beef producers they are the better of the two, having broader backs and better flanks and thighs. There is a tendency in the breed to be high at the rump and tail head and slack at the loins, but these defects are being gradually eliminated by selection.

The bullocks have been long and highly appreciated as grazing cattle in the English Midlands under the name of "Welsh Runts." They weigh at 4 years old 50 to 60 stones of dressed beef, which ranks in the London market with the best Scotch. Heifers have also been sent in considerable numbers to graze in Kent, Leicester, and Northampton. Each of the breeds has a Herd Book, and the

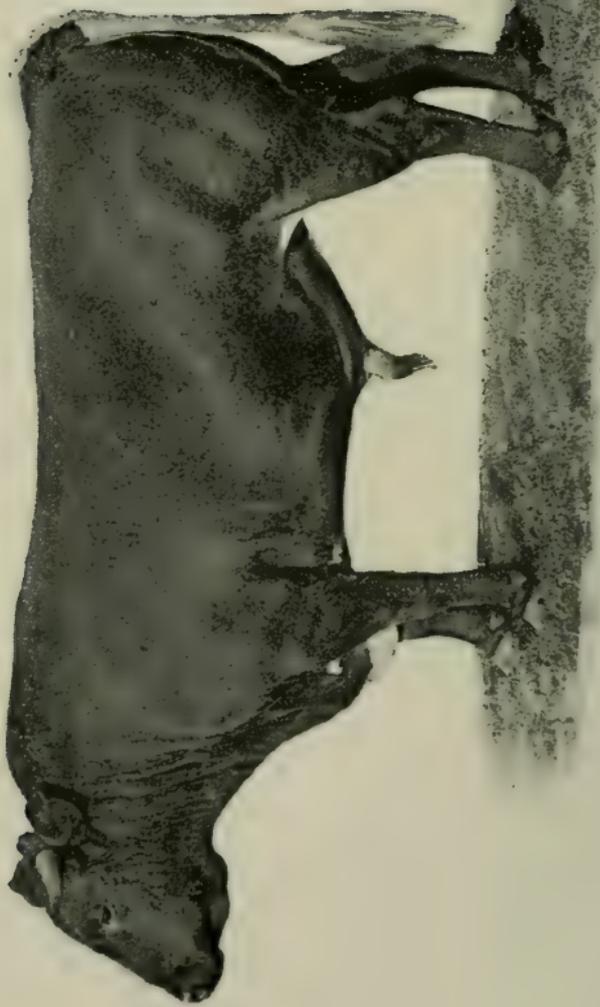
cattle are improving rapidly under the greater care devoted to their selection. They have begun to be appreciated in America, and on account of their wealth of constitution will, no doubt, grow in favour. American ranchers have had a severe lesson, showing the absurdity of breeding stock too fine and too soft on the exposed prairies of the far West. Had they been fortunate enough to select black Welsh or Highland cattle, and been contented to manufacture beef at a slower but surer rate, they might have saved themselves the serious consequences of disaster.

The Old Castle Martin white breed is now being rehabilitated by selecting and mating together those specimens of the South Wales breed which have "thrown back" in the matter of colour to their white forest ancestors. In every other respect they are distinctly Pembroke cattle. Their colour is chiefly white, but there are, frequently, black spots over the body. The muzzles, ears, and eyelashes are black, and the feet and fetlocks should also be black, though this detail is not yet quite fixed. Charles Mathias of Lamphey Court, to whom the bull shown in the accompanying Plate belongs, is endeavouring to raise this off-shoot of the South Wales breed to a position of importance.

The Glamorgan breed has narrowly escaped extinction by the encroachments of the early maturity shorthorns, Devons, and Herefords. It is one of the most ancient in the country, and is supposed to have been formed from the old Welsh breed by crossing with imported Normandy cattle. The cows



30.—OLD CASTLEMARTIN WHITE BREED,
The Property of CHARLES MATTHIAS, Lamphey Court, South Wales.



31.—GLAMORGAN BULL.
The Property of J. T. DAVIES, Tyla Gwyn, Pontlanfraith, Mon.

are good milkers, but the fattening properties of the breed are defective. In colour the bulls are black, with a white belly and a line or ridge of white along the full length of the back. The cows are similarly marked with white, but on the body they vary from black to a deep brown or red. The tail-head is liable to be too high, like that of the Welsh breed.

The only remaining herd of the Old Gloucester breed of cattle, belonging to the Duke of Beaufort at Badminton, are identical in their special points with the Glamorgan breed. This fact leaves no reasonable doubt but that the two breeds had a common ancestry.

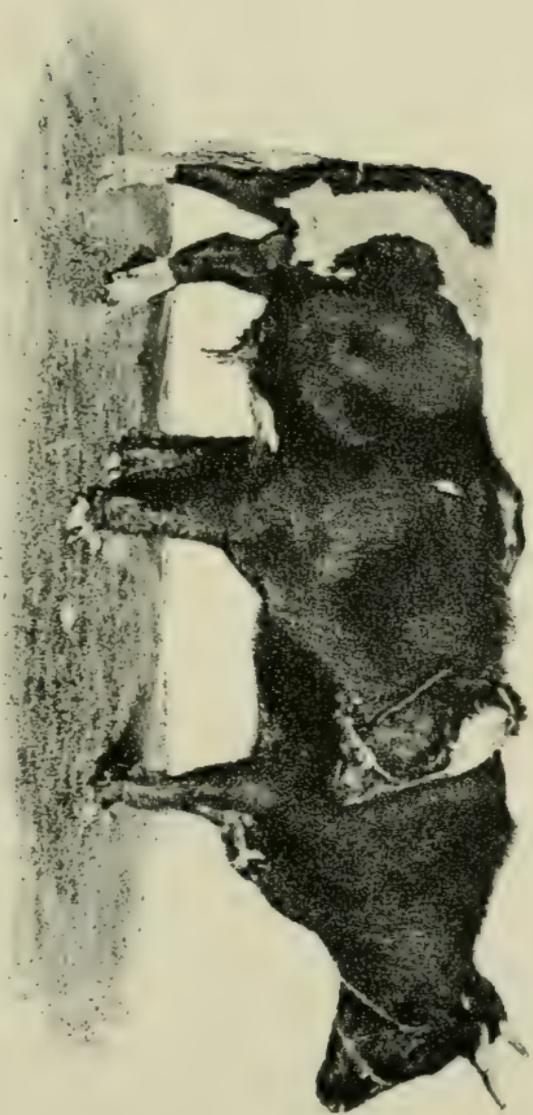
ORKNEY AND SHETLAND CATTLE

Belong to the Norwegian race, and Low says they are quite different from the race found on the Scottish mainland, though identical with that of Iceland. More recent authorities do not indorse this opinion.

A distinction is drawn between the cattle on the two groups of islands, although it is well known that crossing has gone on between the two varieties.

These island cattle are small, and, as a rule, irregular in their appearance and points, though the best of them may be called handsome. They lay on flesh readily, and produce excellent beef. They are also good milkers. The colours of hair are extremely various—usually broken, and of a light shade. The horns are short, irregular in form, and insignificant.

These cattle are hardy, and able to withstand the cold and trying weather they have during generations been accustomed to. They cross well with good bulls of other breeds, but improvement of the breed by importing alien blood has not proved a success.



32.—SHETLAND CATTLE.

The Property of the Most Hon. THE MARQUIS OF LONDONDERRY, K.G.



33.—SOMERFORD PARK WHITE POLLED CATTLE.
The Property of Sir C. W. SHAKERLEY, Bart., C.B., Somerford Park, near Congleton, Cheshire.

CHAPTER VI.—POLLED BREEDS.

Somerford Park White Herd—Milking Powers—The “Missing Link” —Blickling Hall and Woodbastwick White Polled Herds—Red Polls—How Descended—Points—Improvement—Low on the Breed—A Herd Book—The Aberdeen-Angus Breed—Home Locality Relationship to other Scotch Breeds—Absence of Horns—Black and other Colours—Buchan Cattle—Breed of the present Day—In-and-in-Breeding—Hugh Watson—William M’Combie—Recent Performances of the Breed—Characteristic Features—Compared with the Galloway—The Polled Herd Book—The Galloway Breed—Distinctive Characters—The Head—Origin of Polled Condition doubtful—Connexion between the Galloway and the West Highland Breeds—Additional Proof of the Influence of the Galloway in Crossing—Galloways as Dairy Cattle—The Establishment of a Galloway Herd Book—Galloway Crosses with other Breeds.

POLLED BREEDS.

THE Somerford Park White Herd, located in Cheshire, numbering about 35, are the most important representatives now extant of the hornless, domesticated direct descendants of the ancient white forest cattle of this country. In general appearance (including colour) they strongly resemble the Chartley cattle, the great difference being the want of horns. In some minor details the resemblance is striking,—for example, both breeds have the top knot of long white hair, white tail, and udder with usually black

teats, and black spots most numerous about the neck and head. **The Milking powers** of certain members of the breed are quite extraordinary. The herd averages daily over three gallons of milk each when at full flow on the grass, but individual cows appear now and then which give, when in bloom, as much as fourteen quarts at a milking, or seven gallons in the day. The best specimen of the present time yields six gallons daily when she is at her best. When not giving milk, the cows are not deficient as beef-producers. The breed, approaching in size to the short-horn, is well fleshed and massive, with the exception of the hind-quarters, which are rather light in proportion to the fore-quarters and trunk. They possess this defect in common with our wild cattle and with the cattle of India. The head is specially handsome, and the whole style of the animals is striking and attractive. The rudimentary mane present in the bull when in full coat is not only an ornament, but also an additional indication of the connexion of the breed with the ancient "wild beasts" of the forest. This is one of the most interesting breeds of British cattle, as it forms (with the remnants of the Norfolk polled whites) the "missing link" between the wild cattle and the breeds under domestication, and supplies a connexion between the horned and polled varieties. It also tends to prove the existence of a superior power of milk production in the aboriginal races of our Islands.

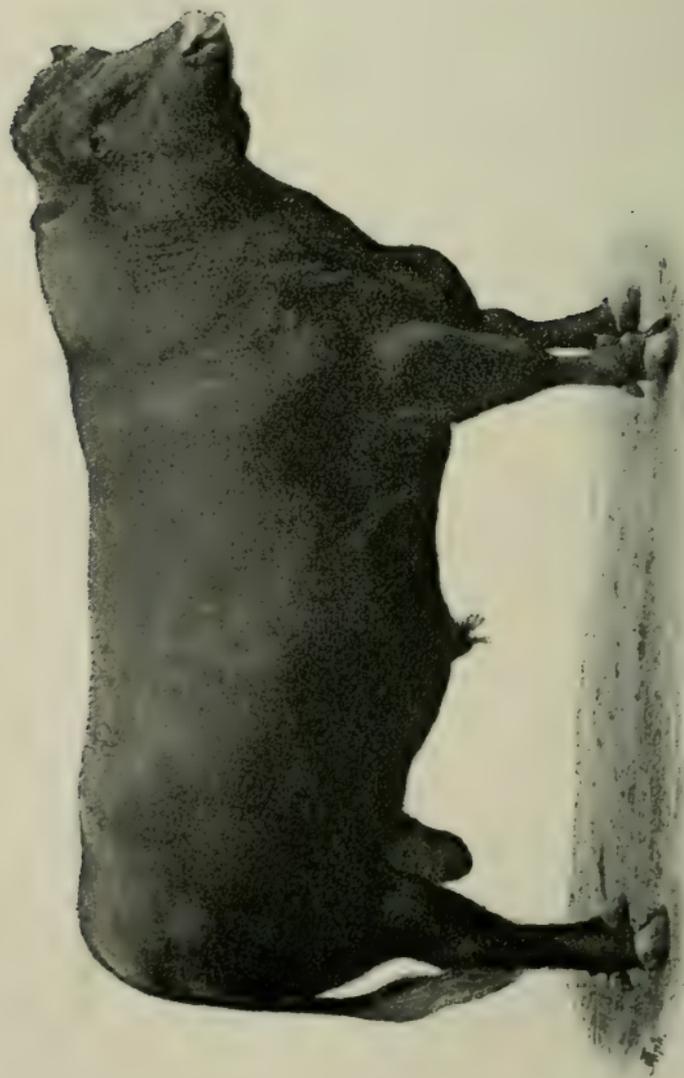
The Blickling Hall Herd and the **Woodbastwick Herd**, both in Norfolk, are the remaining branches



34.—NORFOLK WHITE POLLED PRIZE BULL, "TOM,"
The Property of the Most Hon. CONSTANCE, MARCHIONESS Dowager of LOTHIAN,
Hickling Hall, Aysham.



35.—NORFOLK AND SUFFOLK RED POLL COW, "EMBLEM," I. 3, 2782.
The Property of W. A. TYSSEN AMHERST, M.P., Diddington Hall, Brandon, Norfolk.



36.—NORFOLK AND SUFFOLK RED POLL BULL, "DIDLINGTON DAVYSON II," 657.
The Property of W. A. TYSSEN AMHERST, M.P., Diddlington Hall, Brandon, Norfolk

of an old Lancashire breed of domesticated white cattle with black or brown ears, which were first taken to Gunton Park. They have been crossed with shorthorns and red polls which have changed their external form. They are said to have visibly degenerated in size, though they are yet animals of good dimensions. In milking qualities and in their powers of breeding they are proficient.

THE RED POLLED BREED,

Or the Norfolk and Suffolk breed, is descended within comparatively recent times from the little, old, red-horned cattle of Norfolk and the dun or mouse coloured polled animals of Suffolk. The latter, though coarse and ill-formed in appearance, was noted for very superior milking power, which it now maintains, though not in the perfection that ancient records would have us believe it once possessed. In going still further back, we find that polled cattle were introduced for breeding purposes by importations from the original white breed of the country, and also from the Galloway bulls brought south with the annual droves of grazing cattle. About the beginning of this century the deep blood-red specimens were collected by some, and owing to fashion changing in favour of red and to its being intensified and perpetuated by close-breeding and selection, it has steadily replaced the old colour of the breed.

Points.—The head is small, neat, and well and

“cleanly” joined to the neck. In general appearance and refinement of parts the breed strongly resembles that of North Devon.

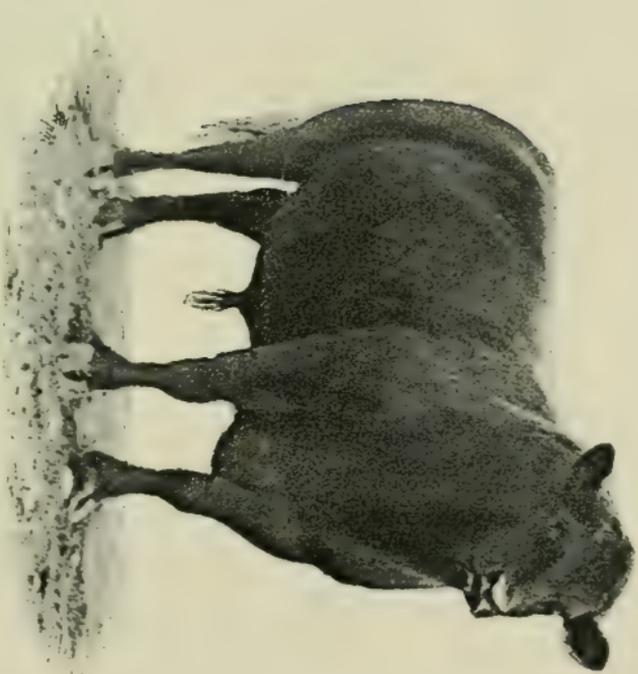
Improvement.—The rate at which the red poll has come to the front and taken its place among the most important breeds in this country is quite remarkable.

Low, writing in 1845, after giving the breed under the name of Polled Suffolks a poor character in respect of almost everything except milking powers, suggested the great probability of its immediate extinction. Recent years have seen not only improvement in quality, but a large extension of the numbers of good herds and of first-rate animals.

The existence of a well-conducted Herd Book will stimulate interest in and firmly establish the best blood which ought to be bred for milk production as well as the laying on of flesh.

The Aberdeen-Angus Breed from Aberdeenshire* and the district around, largely embraced within the adjoining counties, is the result of the amalgamation of a number of very different local polled and also horned breeds, associated with careful selection and in-and-in-breeding, together with, it is asserted, the infusion, within comparatively recent times, of a greater or less degree of alien blood. In common with the only other domesticated breeds of the Scottish mainland—the Galloway, the West High-

* I am indebted for much historical matter to the exhaustive work on Polled Cattle by Maedonald and Sinclair, Blackwood & Sons, Edinburgh.

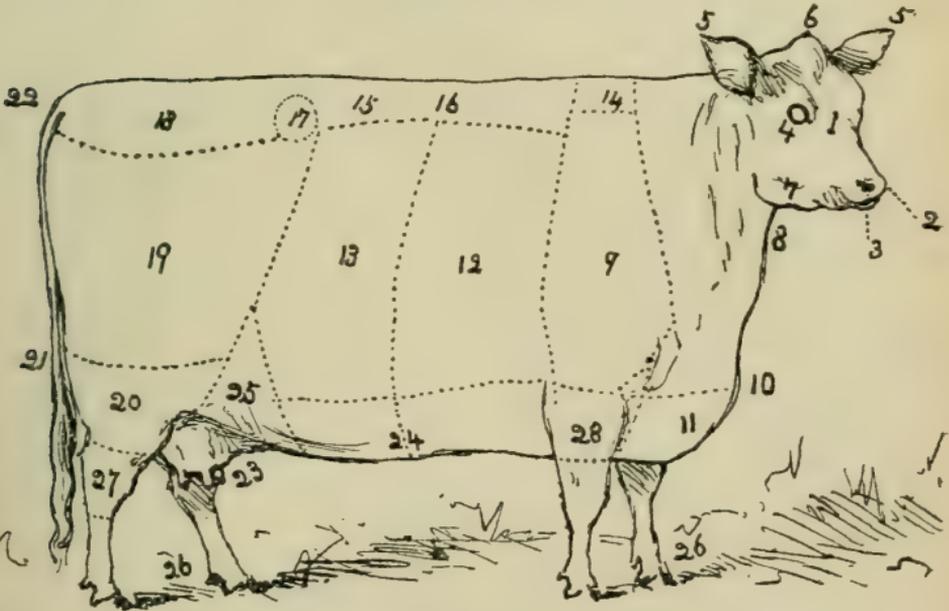


37.—FOLDED ABERDEEN ANGUS BULL, "THE BLACK KNIGHT," 1809.
Three times First at Highland Society Shows, and Winner of the McCombie Cup
at the Royal Northern.
The Property of GEO. WILKIN, Waterside of Forbes, Aberdeenshire.



land, and the Ayrshire—there is a strong probability, if there is not absolute proof, that it was originally

Typical ideal Specimen of Aberdeen-Angus (from the Herd Book, 1889).



INDEX OF POINTS.

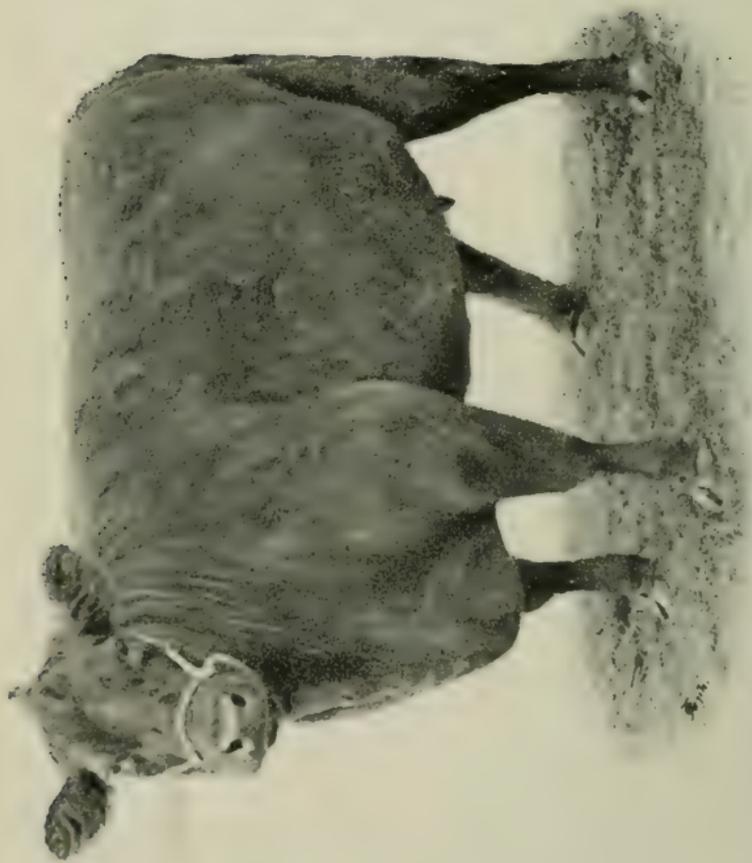
- | | | |
|---|--|--|
| <p>1. Forehead and Face.
2. Muzzle.
3. Nostril.
4. Eye.
5. Ears.
6. Poll.
7. Jaws.
8. Throat.
9. Shoulder.
10. Chest.</p> | <p>11. Bosom (or Brisket).
12. Fore Ribs.
13. Back Ribs.
14. Crops.
15. Loins.
16. Back.
17. Hooks.
18. Rumps.
19. Hindquarters.</p> | <p>20. Thigh.
21. Twist.
22. Tail and Setting on.
23. Udder
24. Underline.
25. Flank.
26. Legs and Bone.
27. Hocks.
28. Forearm.</p> |
|---|--|--|

descended from the native wild cattle of the country. The difference of climate and surroundings, together with the influence of the artificial selection of man,

and probably the importation of fresh blood from abroad, are sufficient to account for the difference of existing appearances in all of those allied varieties.

The absence of Horns, and the prevailing almost uniformly black colour, although ranking among the most persistent characteristics of the Northern Scotch polls, were by no means uniform features in olden times. Black animals without horns did exist 100 years ago and more, but long after the beginning of this century very many of the cattle from which the existing breed sprung had horns. Their colours were extremely variable ; some were yellow, red, or brown, others brindled (red and black, sometimes along with white mixed or broken in an irregular flaked fashion), black and white, "belted" and "rigged," the latter black with a white or brown stripe along the back. Certain herds had a brown ring round the muzzle associated with the brown ridge. According to the early records, the largest and best varieties of the polled cattle were to be found in the low country. The smaller horned cattle resembled the old Highland breeds and occupied the uplands.

Buchan cattle, about half of which were polled at the end of last century, justly claimed superiority. They did so as far back as the time of the Romans. They have been represented from time immemorial by two polled breeds possessing good milking powers, but of very different size. These were locally termed "humlies," while the early polled Angus variety were named "doddies." In the "General View of the Agriculture of Angus," published in 1813, it is



38.—**ABERDEEN ANGUS COW**, "WATERSIDE MATILDA II.," 6312.
Four times First at Highland Society's Shows, and Winner of the M'Combie Cup in 1886 and 1888.
The Property of GEO. WILKIN, Waterside of Forbes, Aberdeenshire.

stated, with regard to the general stock, that "little attention was then paid to the selection of the males or females by whom the breed was propagated." The good qualities of the cattle of the present day, we may therefore conclude, have been either developed in recent years, or have been selected and moulded from the superior herds of those proprietors who, before that time, took an interest in the improvement of live stock.

The **Aberdeen-Angus of the present day** occupies among Scotch cattle very much the same position as the Devon does among English breeds for equality of flesh, refinement of type, perfection of symmetry, and, it might be added, for the excellent flavour of its marbled beef; yet it must not be forgotten that these qualities, like the qualities of all British breeds, however distinct and however permanent they may be, are the results of the comingling of blood of various kinds. No single breed is pure if we go back for but a few generations.

It is recorded that less than 100 years ago, crossing was carried on with Ayrshire, Guernsey, Fife,* shorthorn, and Galloway cattle. How much of this blood has been maintained in the best animals of the present day is a matter for conjecture. It is true that the well-known attempt by Lord Panmure to introduce a Galloway cross was not attended with success; but, on the other hand, there is good reason

* The Fife horned breed is now extinct. They were large, black cattle, rather slow at coming to maturity at an early age, but unsurpassed as grazers after they were 3 years old.

to believe that the very extensive and successful use of shorthorn bulls in breeding grazing cattle for the southern markets led to the incorporation of shorthorn qualities into the breed during the early years of its improvement.

At times very distinct shorthorn characters appear by atavism in polled cattle of good blood and long pedigrees, and disappear in the next generation.* The use of a shorthorn bull on virgin polled heifers has also been accredited with the power of stamping shorthorn qualities upon their future calves by bulls of their own breed.

In-and-in-Breeding has been adopted to fix the good qualities which have from time to time been spontaneously produced by Nature under the influences of the tendency to change brought about by crossing. In the matter of consanguineous relationships, the Aberdeen-Angus is not an exception to the rule which applies to the shorthorn and other well-known breeds.

Hugh Watson, of Keillor, in Forfarshire (born 1789, died 1865), was the Colling of the northern polled breeds, carrying out the principles laid down by Bakewell and his followers.

It was reserved for **William M·Combie**, of Tillyfour (born 1805, died 1880), to make the breed known to the outside world. After a long and successful show-yard career, at the Paris Interna-

* The author remembers having seen a black and white cow of this kind some years ago, which had well-developed horns, and quarters unmistakably like those of a shorthorn. Her immediate ancestors as well as her descendants were animals of the pure type, and of superior quality.



39.—**ABRIDEN ANGUS FAT COW, "YOUNG BELLONA,"** 5630.
Champion at Birmingham and Smithfield, 1887.
The Property of CLEMENT STEPHENSON, Newcastle-on-Tyne.

tional Exhibition in 1878 he quite eclipsed all the previous performances of the breed by carrying off two champion prizes of £100 each—(1), For the best group of foreign cattle ; and (2), For the best group of beef-producing animals—both bred by the exhibitor.

During recent years, no breed has been so successful as the polled Aberdeen-Angus in competing for the highest honours at the London and Birmingham Christmas fat shows, and at similar “expositions” in America.

In this country the names of Clement Stevenson, Newcastle, George Wilkin, Waterside of Forbes, and Robert Walker, Altyre (agent to Sir G. Graham Montgomery), are closely associated with these honours.*

As a breeding herd of old standing, that of Sir George Macpherson Grant at Ballindalloch occupies the premier position in Scotland.

Only a few characteristic features† call for

* Full details of the wonderful show-yard performances of this breed on both sides of the Atlantic up to 1886 may be seen in Auld’s work, “The Breed that Beats the Record,” by Aldine Co., Detroit.

† STANDARD OF EXCELLENCE FOR ABERDEEN-ANGUS BULL.

From the Herd Book.

“Registered Pedigree.

Colour.—Black. White is objectionable, except on the underline behind the navel, and there only to moderate extent : a white cod is most undesirable.

Head.—Forehead broad ; face slightly prominent, and tapering towards the nose ; muzzle fine ; nostrils wide and open ; distance from eye to nostril of moderate length ; eye mild, full, and expressive ; ear of good medium size, well set, and well covered with hair ; poll well defined, and without any appearance of horns or scurs ; jaws clean.

special mention to point the application of the general description given at the opening of Chapter II. Though the nominal colour is black, the rusty brown referred to in varieties of the old breeds, and also white patches of moderate dimensions about the udder and belly, are tolerated. Though to appearance an animal of this breed looks small, yet owing to its short legs and compact and rounded form its weight classes it among the larger breeds. The

Throat.—Clean, without any development of loose flesh underneath.

Neck.—Of medium length, muscular, with moderate crest (which increases with age); spreading out to meet the shoulders, with full neck vein.

Shoulders.—Well laid in, covered on the blades and on the top, which should be on a line with the back, and moderately broad.

Chest.—Wide and deep.

Bosom (or Brisket).—Standing well out between the legs, and moderately covered with flesh and fat.

Ribs.—Well sprung from the back bone, arched and deep, neatly joined to the crops and loins.

Back.—Broad and straight from crops to hooks; loins strong; hook bones moderate in width, not prominent, and well covered; rumps long, full, level, and rounded neatly into hindquarters.

Hindquarters.—Deep and full; thighs thick and muscular, and in proportion with hindquarters; twist full.

Tail.—Fine, coming neatly out of the body on a line with the back, and hanging at right angles to it.

Underline.—As nearly as possible straight; flank full and soft.

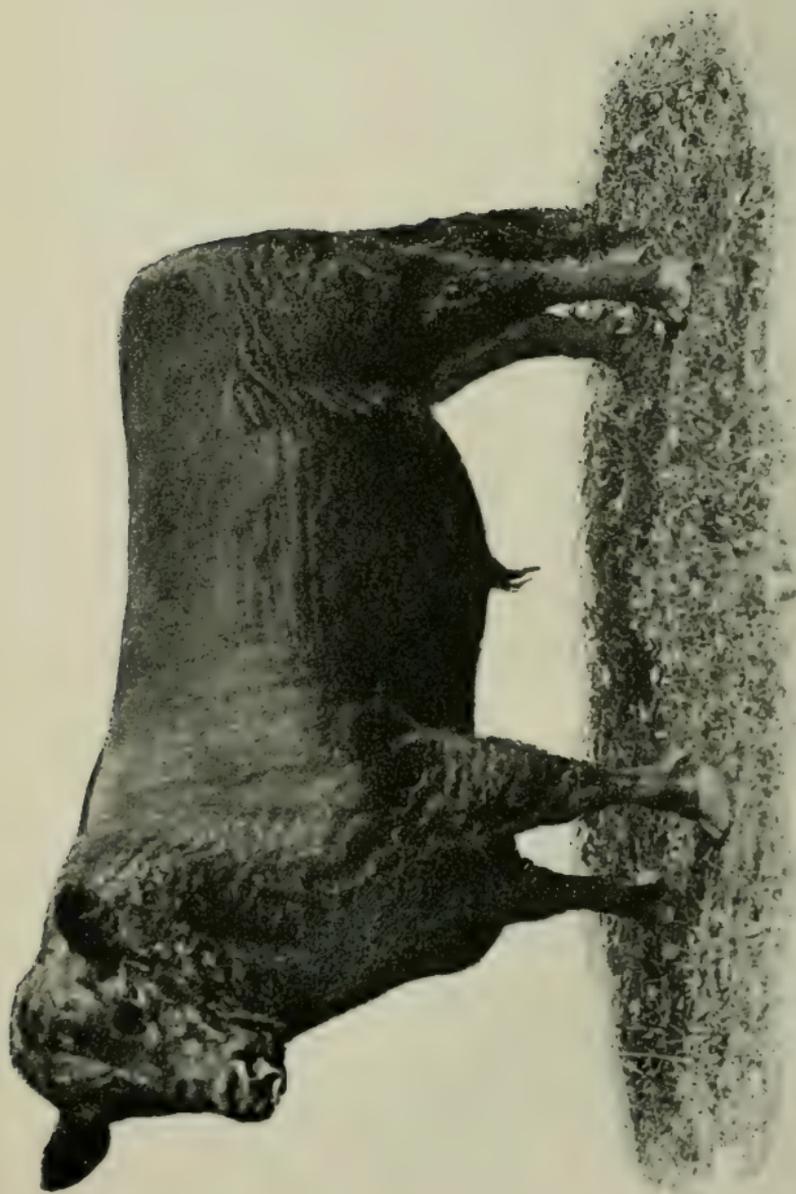
Legs.—Short, straight, and squarely placed; hind legs slightly inclined forward below the hocks; forearm muscular; bones fine and clean.

Flesh.—Even, without bumps or patchiness.

Skin.—Of moderate thickness and mellow touch, abundantly covered with thick and soft hair.

General Appearance.—Gay, well-bred, and masculine."

[With the exception of those relating to sex, the points of the female are identical with the above.]



40.—GALLOWAY BULL, "KINSMAN THE SECOND."
The Property of His Grace THE DUKE OF BUCCLEUCH, K.T., Drumlanrig.

hook bones are not so wide or prominent, and the quarters not so square as in the shorthorn. The absence of patchiness and the equality and levelness of flesh is proverbial. The milking qualities are low as regards quantity, the result of breeding for beef and the prevailing custom of suckling the calves.

As compared with the Galloway, the breed weighs heavier at an early age, owing to its greater rapidity in coming to maturity, though a difference in the size of breeding stock is not marked. The bones are finer, the skin thinner, the hair shorter and more silky, and the poll more pointed than in the Galloway.

The 1st volume of the "Polled Herd Book" was published in 1862, and the 2nd in 1872 after the formation of the Polled Cattle Society for the improvement of the breed. After the publication of the 4th volume, the Galloway portion was withdrawn, to be published separately.

THE GALLOWAY BREED

Derives its name from a district in the south of Scotland, comprising Wigtonshire and the stewartry of Kirkcudbright. At one time it was the most prevalent breed in Scotland south of the Forth and Clyde.

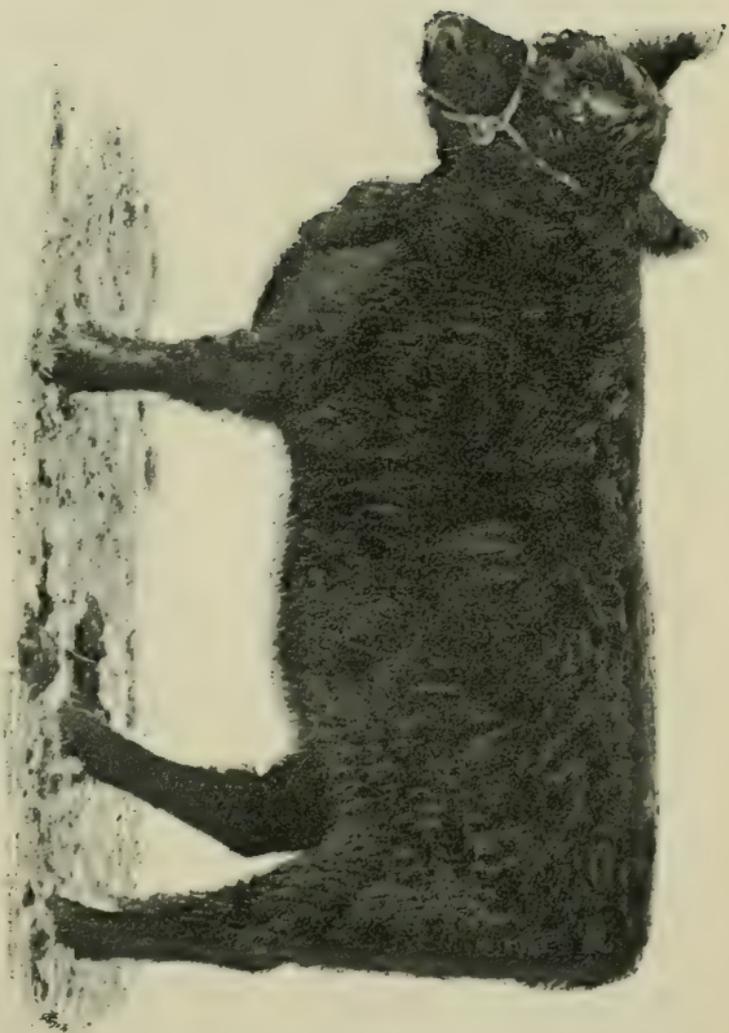
Distinctive Characters.—Though Galloways are now polled and of a black colour, with a brown tinge on the tips of the hair, particularly at that stage when it is long and inclined to be curly or

woolly, yet within the last hundred years many animals of pure blood had horns of considerable length, and not a few were red-brown in colour. These characters even now appear in specimens bred from the best strains. White patches on the udder or belly and also belted markings are common, and are not seriously objected to unless they are large or prominent.

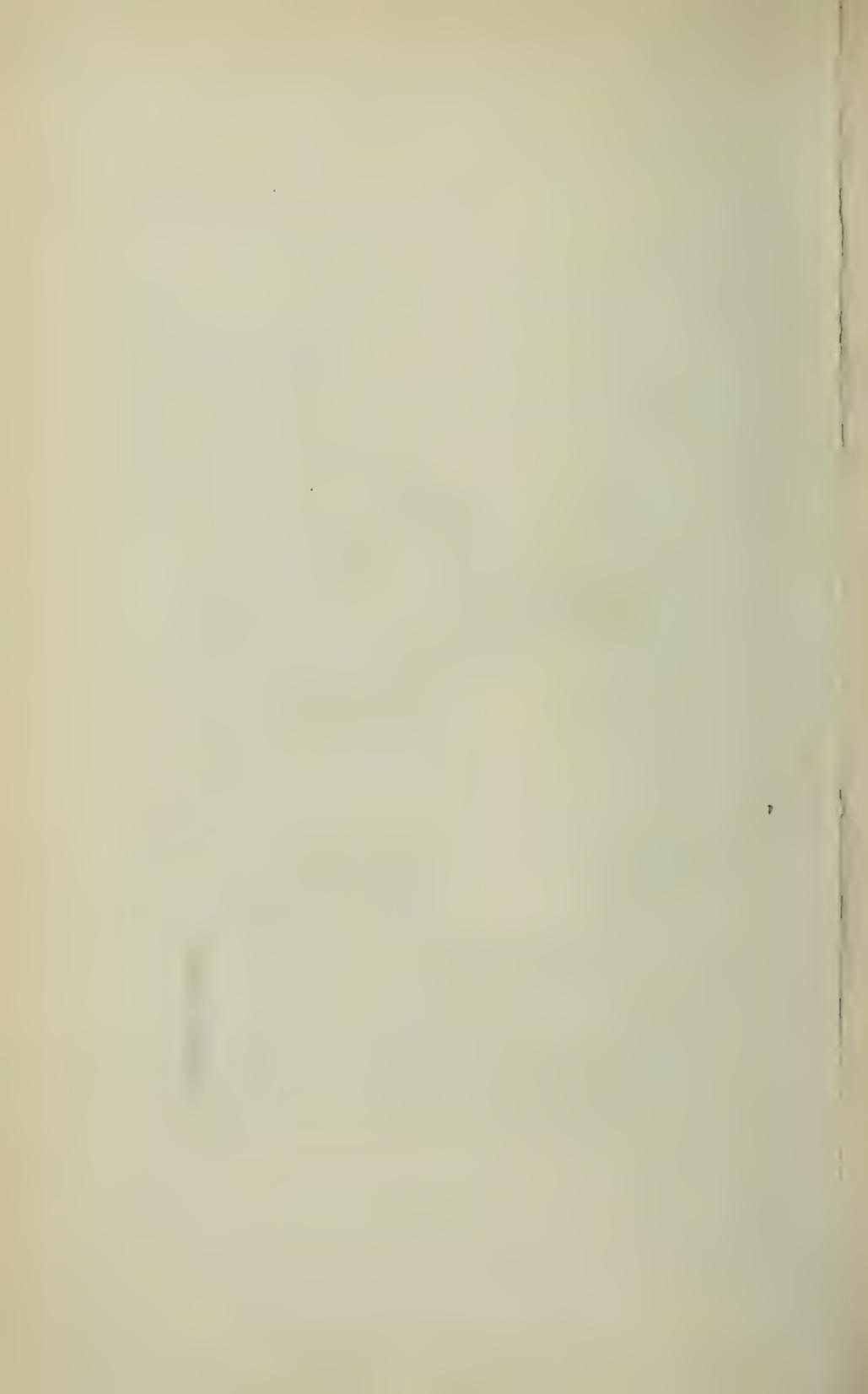
This tendency to revert to white on the under-line, which is most pronounced when two animals of very distinct types are mated together, indicates the descent from the ancient wild cattle, similar to that already pointed out in the case of other breeds.

The head of a Galloway should be wide and short—a long head is one of the prominent characters by which a black Galloway cross can be distinguished—the distance from the eye to the nostril short; the forehead broad and square between the eyes, carrying the width well up to the crown, which should be low and rounded, not peaked like the crown of the polled Angus. The ear is set on rather back, and should point upward and forward, resting on a short shank. The lobe or flap should be wide, rounded at the top, and abundantly fringed with hair.

The origin of the polled condition is veiled in doubt. It may be said that the early written history does not even speculate upon its cause. It is known that the characteristic was preferred by the English buyers who, since a time soon after the Act of Union of the two countries was signed in 1707, have



41.—GALLOWAY HEIFER, "CLARA VI," 19,513, DESCENDED FROM "CLARA," 1375.
First Prize Cow in Edinburgh, 1869.
Bred by and the Property of THOMAS BIGGAR & SONS, Chapleton, Dalbeattie.



carried bullocks of the Galloway breed to graze in the southern counties, notably to Norfolk and Suffolk.

The injury which half-wild cattle with horns were capable of inflicting upon one another, and possibly on the men in charge of them during a walk of some hundreds of miles, seems to be a sufficient excuse for the preference of the southern drovers for the condition of hornlessness, which was taken into their calculations in the purchase of their droves, and a higher price was given to secure it. It would not be possible to induce the polled condition as a hereditary character, but once present, it could be carried to perfection by selection. No doubt a tendency, however slight, was inherent in the original horned Galloway, and passed down through the line of descent from their remote ancestors, but the comparatively sudden change which took place in the matter of losing the horns seems to point to a stronger and probably an imported influence.

At the time which is now referred to, the wild cattle in Hamilton Park, in common with others now extinct, were hornless, and then, as now, what are termed black calves, but which really are tinged with brown, like Galloways, were dropped. History does not say anything of wild black polled bulls being used, but the possibility, as well as probability that they were so used is strong. Even the white polled bull, with his tendency to throw black calves if used on the dark cows of the country—and we have good reason to believe that Galloways at one

time extended as far north as Cadzow Forest—would be capable of accomplishing the result.

Country cows were both accidentally and intentionally admitted to wild bulls in other parts besides Hamilton. It is consequently not necessary to restrict the possibility of a cross of this kind to the *Bos scotica*, but to admit the likelihood of it taking place with the larger white polled breeds in the north of the English Midlands, possibly about the same time, with the same object in view, and under the same influences.

The Galloway and the West Highland breeds are universally considered to be descended from the same original stock. The former are said to be "Highlanders without the horns." This admission associates them directly with the wild forest cattle.

There is yet one other apparent proof of a recent connexion with the wild breed. Galloways are known to possess great power of stamping certain characters upon their crossed descendants—for example, the colour and the polled condition. They did not acquire this quality, as improved cattle have usually done, by close-breeding on both the male and the female side. Close-breeding has only been practised within recent years, as may be gathered from the wonderful hardiness of constitution possessed by the breed, and also from their being rather slower than some in coming to maturity. No great so-called "improver" ever rose to do the work of the Collings upon the Galloway breed. The old breeders knew

well that to improve them on the lines adopted by shorthorn men, to increase their size and shorten the period spent in coming to maturity by close-breeding, meant ruin to the constitution of the breed in the matter of withstanding the cold and inclement weather to which they are exposed under natural conditions in their native country. It is impossible to attain to excellence in regard to rapid maturity by the usual course, in-and-in-breeding, and retain the hardihood necessary in mountain cattle. This country already possesses an abundance of breeds that fatten quickly, and it would be a misfortune if a breed of animals that now produces the finest quality of beef, often on inferior food and under adverse climatic surroundings, were thoughtlessly and ignorantly sacrificed in the rush for early maturity.

We have not yet seen the final results of the system of in-and-in-breeding which has been going on more or less closely for a hundred years, but the time may come when it will be necessary to go back to such breeds as the Galloway to recruit the ebbing strength of some of the greatest sufferers from the consequences of the practice. Tubercular disease, so prevalent, and which is on the increase, is one of the signs that should warn us of the peril of a heedless course of inter-breeding.

As dairy cattle Galloway cows are not noted. The quality of the milk is excellent, but the quantity is, as a rule, deficient. Individual instances of cows giving large quantities of milk occur, though

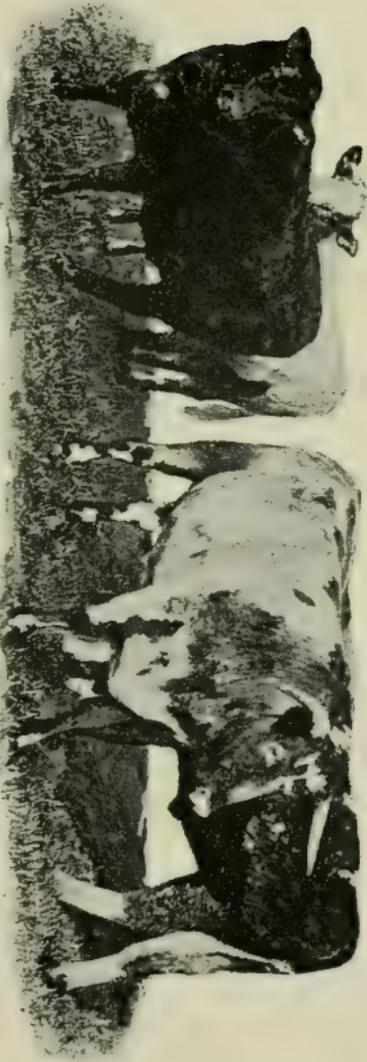
calves are generally allowed to follow their mothers, but, as a breed, they have never been managed like dairy cattle. The rage for the extension of dairying during the last half-century has brought about a great diminution of the numbers of this breed, and an increase in the better milking Ayrshire. It is asserted, too, that during that time, in spite of increased attention, the best animals are no improvement on the best specimens of former times.

The establishment of a Galloway Herd Book in 1877 * has given an impetus in the direction of improvement.

A Cross, bred from a Galloway cow by a bull of one of the favourite or improved breeds, such as shorthorn or Hereford, is usually an excellent butcher's animal. The prevailing colour of calves produced by a shorthorn, especially if he is white or light in colour, is a blue-gray or uniform mealy roan, polled, and much more like the Galloway than the shorthorn. At times the colour is black, sometimes red or patchy.

The Hereford crosses are also, as a rule, polled, with a white head and a red or dark gray body. Both produce beef of the finest quality; the Herefords, which are the smaller animals, are perhaps the finer of the two. Crosses by the Galloway bull on cows of other

* The editor is the Rev. John Gillespie, Mouswald Manse, Dumfriesshire, who is also the writer of a valuable article on *The Galloway Breed of Cattle* in the "Transactions of the Highland and Agricultural Society for 1878."



42.—GROUP OF CROSS-BRED CATTLE.

Three Shorthorn Crosses and one Polled Angus Cross. All Prize Winners.
The Property of JAMES SMITH, Pittengardner, Forfarshire.

breeds are, on the average, distinctly inferior, though an in-bred and well-bred bull has been known to be the sire of cattle by shorthorn cows that have nearly equalled the performances of crosses by Galloway cows. Galloway crosses from Ayrshire cows are slow and unsatisfactory feeding animals while young, though they are good light-weight butcher's beasts when finished.

CHAPTER VII. — MILKING BREEDS OF BRITISH CATTLE—THE AYRSHIRE—THE CHANNEL ISLANDS (JERSEY, GUERN- SEY, AND ALDERNEY) — AND THE KERRY.

Introduction—The Ayrshire Breed—Habitat—Early Records—Ayrshires of the Present Day—Breeds imported for Crossing—Influence of Locality on the Breed—Points of an Ayrshire Cow—The Typical Characters of Milking Cows for various purposes—Ayrshire Bullocks and Crosses—Practice of Killing Calves and its Consequences—Herd Books—The Channel Islands Breeds—The Jersey—Origin—Unimproved Form—Association with Druidical Remains—Remnants of Ancient Civilisations—Purity of Jersey Cattle—Revival of the Breed—The Jersey Island Herd Book—American Demand—Distinguishing Points—Docility of the Cows—Produce yields—The Guernsey—Compared with the Jersey—Effects of Climate—Guernsey Butter—Inferiority of Islands Cows for Cheese-making—The Alderney—The Old and New Forms—The Kerry Breed—Other Cattle in Ireland—Points of the Common Kerry—The Dexter Kerry—Kerry Crosses—Sale of Kerries in England.

INTRODUCTION.—Though certain strains of cattle already described—notably in the short-horn, the Welsh, and the red polled breeds—are good milkers, yet they could not be properly classed among those essentially kept for milk production. We shall find, on the other hand, that some of those



43.—AYRESHIRE BULL, "COCK A BENDIE," 1204, WHEN TWO YEARS OLD.
Won many Champion Prizes, including that of the Royal Agricultural Society at Newcastle.
The Property of J. OSBORNE, Drumjoan, Ayrshire.

which are distinctly and unmistakably milking breeds are also capable of producing excellent beef.

THE AYRSHIRE BREED

Has come into prominence in comparatively recent times.

Its natural habitat was Cunningham, or the upper of the three divisions of Ayrshire—Carrick, Kyle, and Cunningham—occupying that part of the country which lies to the north of the river Irvine.

The records* of the early history of the breed fix the date of the beginning of improvement from 1750 to 1780. Before that time the native progenitors of the Ayrshire were small, inferior, irregularly shaped, short and irregularly horned, dark animals, of a black, black-and-white, or brown colour, but hardy, and suited to the humidity and inferiority of the country in which they were placed. The descriptions of this early condition of the breed clearly indicate its descent from the *Bos longifrons*.

The Ayrshire of the present day, however, is very different, the change having been brought about by crossing with other breeds and subsequent careful

* Colonel Fullarton's "Survey of Ayrshire;" Aiton's "General View of the Agriculture of the County of Ayr, 1811;" Aiton's "Dairy Husbandry of Ayrshire, 1825;" Low's "Domesticated Animals, 1845;" Farrall's *Essay on the Ayrshire Breed of Cattle* in the "Transactions of the Highland Society for 1876." Ortelius, writing in 1573, speaks of a superior class of oxen in Carrick; but his remarks, no doubt, refer to the ancestors of the Galloway breed, not to Ayrshire cattle as the term is now understood.

selection in addition to the natural tendency, which soil and climate admittedly have, to develop or maintain certain qualities or characteristics.

The breeds definitely mentioned as having been imported and used in crossing with the native cattle are the Teeswater, or early shorthorn, and the Alderney,* besides "stranger cattle" of unknown or unrecorded breeds, which were imported by Dunlop of Dunlop, "Orr of Barrowsfield, and other dairy farmers." The extraordinary resemblance of the Chillingham Park wild cattle to the Ayrshire breed—in horn, in colour, and in form, as may be seen by comparing the accompanying Plates—clearly points to an introduction of blood from some direct descendants of the wild forest breed, possibly crosses from the cattle of Cadzow Park. The improvement in the milking qualities was no doubt largely due to the cross, whatever it was. To it also may in some measure be safely attributed the distinct tendency among improved Ayrshires to become lighter in colour than Ayrshires of a generation ago; indeed, the result is a most natural one to expect when the broad lines of the facts before us are considered.

A little, inferior, dark-coloured, poor-milking breed of cattle is found in a given district: it is improved in size and in milking qualities by crossing with an imported breed, which gives greater variety of colour

* Probably more correctly termed the Jersey, as cattle were sent to Scotland, according to Colonel de Conteur, by two successive governors of Jersey—Field-Marshal Conway and Lieutenant-General Andrew Gordon.

and a greater admixture of white. During subsequent selection, carried on with the main object in view of increased milk production, it is most natural to suppose that the animals possessing large proportions of the new blood would be favoured and preserved on account of form, size, and good milking qualities, and that along with these would be associated the tendency to whiteness, one of the correlated original attributes of the imported blood.

There are indications that although the Ayrshire is now accepted as a pure breed, all the characteristics contributed by the various breeds used in its formation have not yet been thoroughly distributed and blended. Proof of this may be seen in the fact that strains of Ayrshires, that are most successful as prize winners in the "eild" classes (for bulls and heifers), seldom produce animals which are very successful when shown in the milking classes.

These cows may give as much milk as those belonging to the strains celebrated for producing successful winners in the classes for animals giving milk, but their udders are rarely symmetrical enough to enable them to carry off the prizes, although they have an advantage over the others in style and in a more perfect form of body.

Some of the improved breed, when reared under circumstances of soil and climate suitable for beef production, **fall away** from the true Ayrshire characteristics, assume strong bones, heavy and fleshy forequarters and chest, and also decline in milking

powers ; but these changes are subservient to laws which are dependent upon local surroundings, and which have been already fully explained.

The best preventive of the worst results of the tendency to coarseness through high feeding is to arrange that the heifers shall calve at two years old in place of three years, the ordinary calving time of the breed. Should the calf arrive when the quey is two years old her milking powers are developed, and the tendency to produce flesh is held in check.

The following are the points of the **Ayrshire cow** and their values in judging in the show-ring, taken from a report by a committee of the Herd Book Society. The points of the bull vary only in the matter of masculine characters, which, according to the general rule, ought to be distinctly defined.

“1. *Head* short ; forehead wide ; nose fine between the muzzle and eyes ; muzzle large ; eyes full and lively ; horns wide set on, inclining upwards, 10

2. *Neck* moderately long, and straight from the head to the top of the shoulder, free from loose skin on the under side, fine at its junction with the head, and enlarging symmetrically towards the shoulders, 5

3. *Forequarters*—shoulders sloping ; withers fine ; chest sufficiently broad and deep to insure constitution ; brisket and whole forequarters light ; the cow gradually increasing in depth and width backwards, 5

4. *Back* short and straight ; spine well defined, especially at the shoulders ; ribs short and arched ; body deep at the flanks, . 10

5. *Hindquarters* long, broad, and straight ; hook-bones wide apart, and not overlaid with fat ; thighs deep and broad” [but thin of flesh on the inner thigh or twist] ; “tail long, slender, and set on level with the back, 8

Carry forward, 38



44.—AYRSHIRE COW, "BERTIE II. OF CLOCKSTON," 3217.
The Property of MARK J. STEWART, of Southwick, M.P.



45.—AVRSHIRE TWO-YEAR-OLD HEIFER, "NELLIE OF BARCHESKIE,"
First at the Dumfries Union Show, 1888.
The Property of AND. MITCHELL, Barcheskie, Kirkeudbright.

	Brought forward,	38
6.	<i>Udder</i> capacious, and not fleshy, hinderpart broad" [and rounded like the side of a cheese]. "The whole firmly attached to the body; the sole nearly level, and extending well forward; milk veins well developed; teats from 2 to 2½ in. long, equal in thickness, and hanging perpendicularly; distance apart, <i>at the sides</i> , equal to ⅓ of the length of the vessel, and <i>across</i> to about ½ of the breadth,	33"
	[Small teats are now considered most objectionable, both in the market and the show-ring.]	
"7.	<i>Legs</i> short in proportion to size; bones fine, and joints firm,	3
8.	<i>Skin</i> soft and elastic, and covered with soft, close, woolly hair,	5
9.	<i>Colour</i> red, of any shade, brown, or white, or a mixture of these—each colour being distinctly defined. Brindle, or black and white is not in favour,	3
10.	<i>Average live weight</i> in full milk about 10½ cwt.,	8
11.	<i>General stylish appearance</i> and movement,	10
	<i>Perfection,</i>	100"

The **Ayrshire** is unquestionably the most important and the **most typical** example of a milking cow in the British Isles. She shares with the Kerry the credit of being able to yield a greater return of dairy produce on poor land and inferior food than any other cow. She is essentially a cheese-dairy cow, on account of the comparatively small-sized butter globules of the milk and the abundance of curd-making material which it contains. The Channel Islands breeds supply, on the other hand, the true butter-dairy cows, owing to the large-sized globules which the specially rich and highly-coloured cream contains. In the same way the milking shorthorn is the typical cow for towns' dairying, for the supply

of large quantities of milk of moderate quality for immediate domestic use, and for the accumulation of beef of second quality as a bi-product during the latter portion of the milking period.

The bullocks feed well after they are three years old, and so do crosses with the shorthorn bull at an earlier age, and produce excellent quality of beef; but the former are not often met with, as the bull calves are usually sold as "slinks" for a few shillings, and killed when a day or two old. Many are not allowed to drink milk, but are killed immediately after birth, and sent for consumption into the large centres of population.

This practice has led to the destruction of much of the finest Ayrshire blood in the country, notably in the case of calves from the herds of great landlords, who, with the object of improving the breed among their tenantry, got together herds of superior quality, but who at the same time unwittingly put a premium on the destruction of surplus stock by giving their managers, as perquisites, the prize-money earned at show-yard competitions. The result has been that the managers referred to have bought from farmers the best animals in this as in some other breeds, so that the tendency has been for much of the finest blood to gravitate towards a number of main centres, and for competition in the show-yard to be taken in a great measure out of the hands of the tenantry and left in those of the managers of men of means who were ignorant of the injury done by the system to the stock of the country. It

is a manager's direct interest, by way of smothering opposition, to prevent the progeny of the beasts in his possession circulating back into the farmer's hands, unless at what is, to most men of moderate means, an altogether prohibitive price, and the consequence has been that in the case of the Ayrshire breed in some localities calves of the finest blood have regularly been killed, and sent to the butcher for 7s. 6d. or less each, because the average farmer would not submit to be blackmailed to the extent of having to pay something like £10 for what he knew was not worth 10s. in the dead meat market, to which, as the one alternative, it would be consigned.

There is a Scottish Ayrshire Herd Book and also an American Herd Book, which no doubt tend to improve the quality of the breed, and also to maintain its purity.

CHANNEL ISLANDS CATTLE— JERSEY, GUERNSEY, AND ALDERNEY.

These cattle have for many years been imported into England under the generic name of Alderney, although the animals from that island have been throughout the least important. The misnomer is supposed to have originated either from Alderney cattle having been the first sent to England, or through English officers being stationed in Alderney, and thus identifying all of the kindred breeds by the name most familiar to themselves.

The **Fowlers**, who have been the great exporters of stock from the Islands, perpetuated the custom by naming all their Islands cattle Alderneys.

*The Jersey**

This is the most numerous and most important of the three breeds which at some distant date sprung from a common origin, in which the Brittany breed of the adjacent French coast participated. Some specimens of these animals so strongly resemble Channel Islands cattle, although very inferior in milking qualities and the development of good dairying appearances, that they have been sold in large numbers in this country as Islands cattle, to the detriment of the good name of and injury to the trade in the genuine animals. The "whole" colour or "self" colouring, and the light shades which prevail in the improved Jersey are of comparatively recent date, and have been encouraged by American demand.

The original unimproved Jerseys described by the early writers † were variously coloured, "commonly red or red and white, occasionally cream-coloured or cream mixed with white, black with a dingy brown-

* For much information the Author is indebted to the exhaustive treatise on the history of the Jersey breed of cattle by John Thornton, being the Introduction to the first volume of the English Jersey Herd Book, 1880.

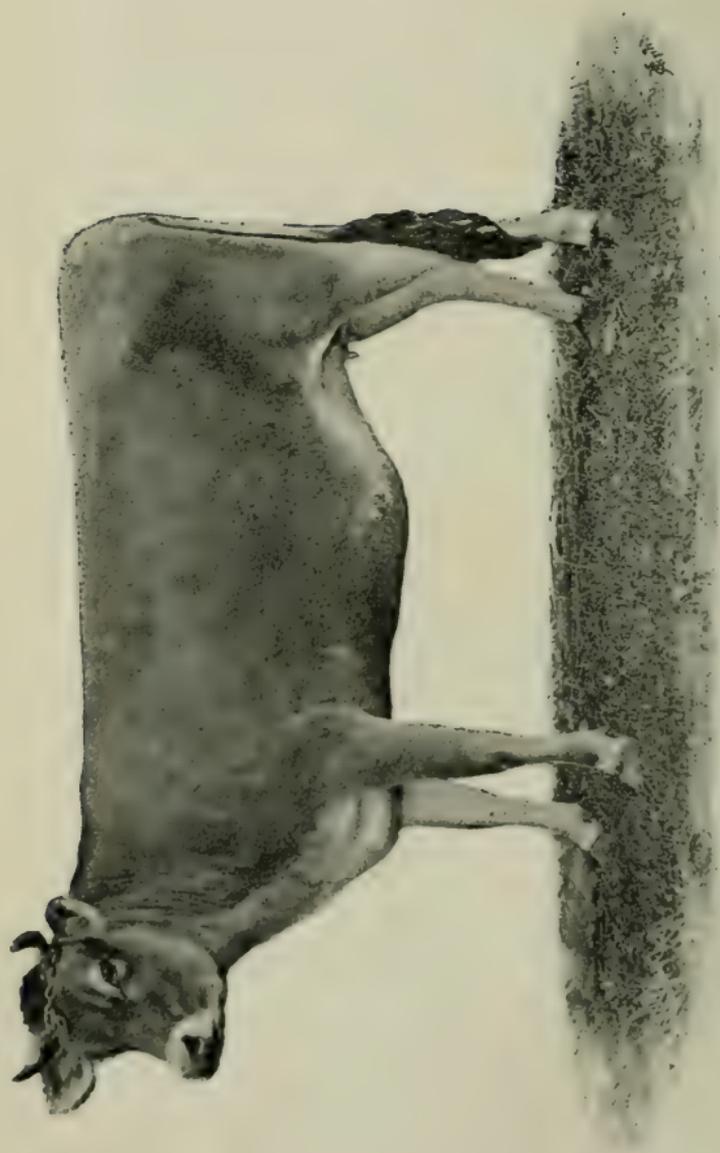
† Thomas Quayle, author of "The general View of the Agriculture, etc., of the Islands on the Coast of Normandy, 1812;" Garrard on "Varieties of Oxen common to the British Islands."



46.—JERSEY BULL, "QUEEN'S MESSENGER," 1906 E.L.L.B.

The winner of many Prizes.

Sold by Geo. Starnson, Wray Park, Reigate, to Dr A. Meadows.



47.—JERSEY HEIFER, "FLORA IV.," VOL. 56, J. H. B.
Sold for £200 in America.

Bred by G. FALLE, St Martin's, Jersey.

red about the nostrils and on the back ridge," also "black, and black and white."

Thornton calls attention to the similarity of colouring, and to the correspondence in the appearance of the older forms of the Brittany, Kerry, Welsh, Cornish, Shetland, and Ayrshire breeds. He further points out that these are usually located in the vicinity of ancient Druidical remains, and that there is a strong presumption that they are the most direct descendants of the small-sized, shorthorned, dark-coloured descendants of the *Bos longifrons*, which being the earliest domesticated of the aboriginal cattle of Great Britain, no doubt was the milk cow of the Druids. This is a most ingenious and feasible suggestion. They are found clinging to existence on the fringes of civilisation in out of the way corners, where they and the associated Druidical remains would naturally meet with least interference during the many disturbances that overwhelmed, altered, and destroyed the features of the more accessible interior of the country. This may be styled the remnant of the first wave of civilisation, with the improved Jersey as the most perfect thorough-bred specimen of it. The second wave seems clearly to be represented by animals which occupy an inner circle bordering upon the extreme fringe, and here and there, as in the case of the Welsh and Ayrshire breeds, mingling with it. Within the inner ring are the Norfolk and Suffolk red polls, Sussex, Devon, Hereford, Welsh, West Highland, and the two black Scotch polled breeds,

which, in common with the Ayrshire and Welsh breeds, bear distinct marks of their descent from the *Bos urus*. Within these rings came the long-horn, finally supplanted by the shorthorn.

Jersey cattle have been bred pure for a longer period than any of our British varieties, on account of the importation of foreign cattle being forbidden by law. In 1789 the "Act of the States of Jersey" detailed severe prohibitive penalties against the fraudulent importation of cattle from France, which effectually enforced the already long-standing regulations dealing with the importation of cattle.

During the first three decades of this century Jersey cattle degenerated.

The **great revival of the breed** was brought about by the formation, in the autumn of 1833, of the *Agricultural and Horticultural Society*, to the efforts of which, through its stringent regulations as regards the qualities which an animal must possess before receiving the stamp or decoration of merit, are due, in the first instance, the marked improvement which took place soon after that time.

The **Herd Book**, begun in 1838, no doubt materially contributed to the gratifying results. The unshapely form of the old-fashioned Jersey was soon changed to the symmetrical and handsome creature of the present time.

The milking qualities, which were always good, were also improved by careful selection of bull calves from the best milking cows.



48.—JERSEY COW, "HER MAJESTY." Vol. III., p. 235.

First at the Royal Society Show at Carlisle, &c.

The Property of GEO. SIMPSON, Wray Park, Reigate, Surrey.

About 1853 a demand sprung up in America for Jersey cattle, and one leading endeavour of the Board of the Agricultural and Horticultural Society has since been, owing to the increase of this demand, to encourage breeders to keep, at least for a time, their best stock in the Island, so as to secure the retention of a share of the best blood.

The following are the points in which Jersey cattle differ materially from the general form and characteristics of the Ayrshire, already stated in detail:—

Points taken from the Descriptive Part of the Ratio Scale for Cows and Heifers in the Jersey Herd Book.

1. *Muzzle* dark and encircled by a light colour—what is termed “mealy mou’ed” in Scotland.

2. *Horns* small, crumpled; yellow, and black tipped.

3. *Ears* small and thin, and of a deep yellow colour within.

4. *Chest* broad and deep.

5. *Hide* thin and mellow, and of a yellow colour.

6. *Teats* yellow.

7. *Hair* fine and soft, and of various, usually though not invariably, whole colours of fawn, silver gray, dun, cream, or white, in addition to rare specimens which are more or less black.

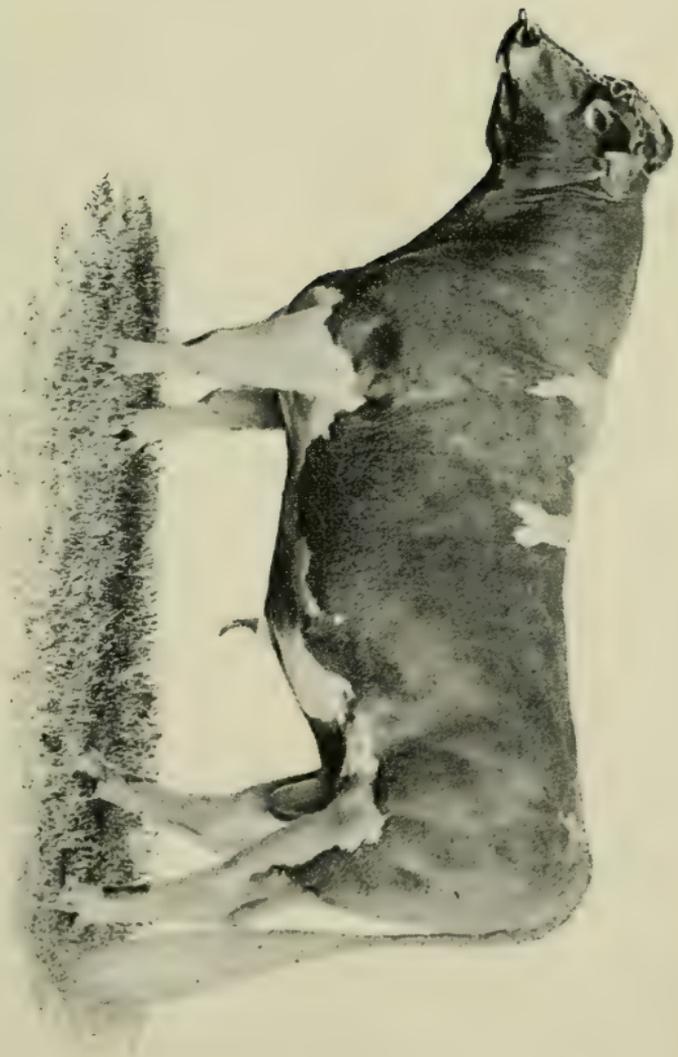
The whole form is handsome and deerlike, and the shades of colour being bright and uncommon,

they are, irrespective of their milking powers, favourite park or policy cattle.

The milk, though not usually so abundant, is noted for a large proportion of cream of peculiarly rich quality and colour, which makes the cows favourites in many private household dairies throughout the country. A few are also kept in ordinary farm dairies, where butter is the manufactured product, to make the churning of cream more easy, and to give the Jersey tint and flavour to the butter.

The cows are extremely docile, owing to their being constantly tethered at pasture in the Island, while the bulls are remarkable for their bad temper and ferocity. No doubt this is one explanation of the old custom which involved the destruction of bulls before they were three years old, as a precautionary measure of safety to human life. Another reason advanced to account for the practice is that the bulls had so many cows put to them that they became used-up and worthless.

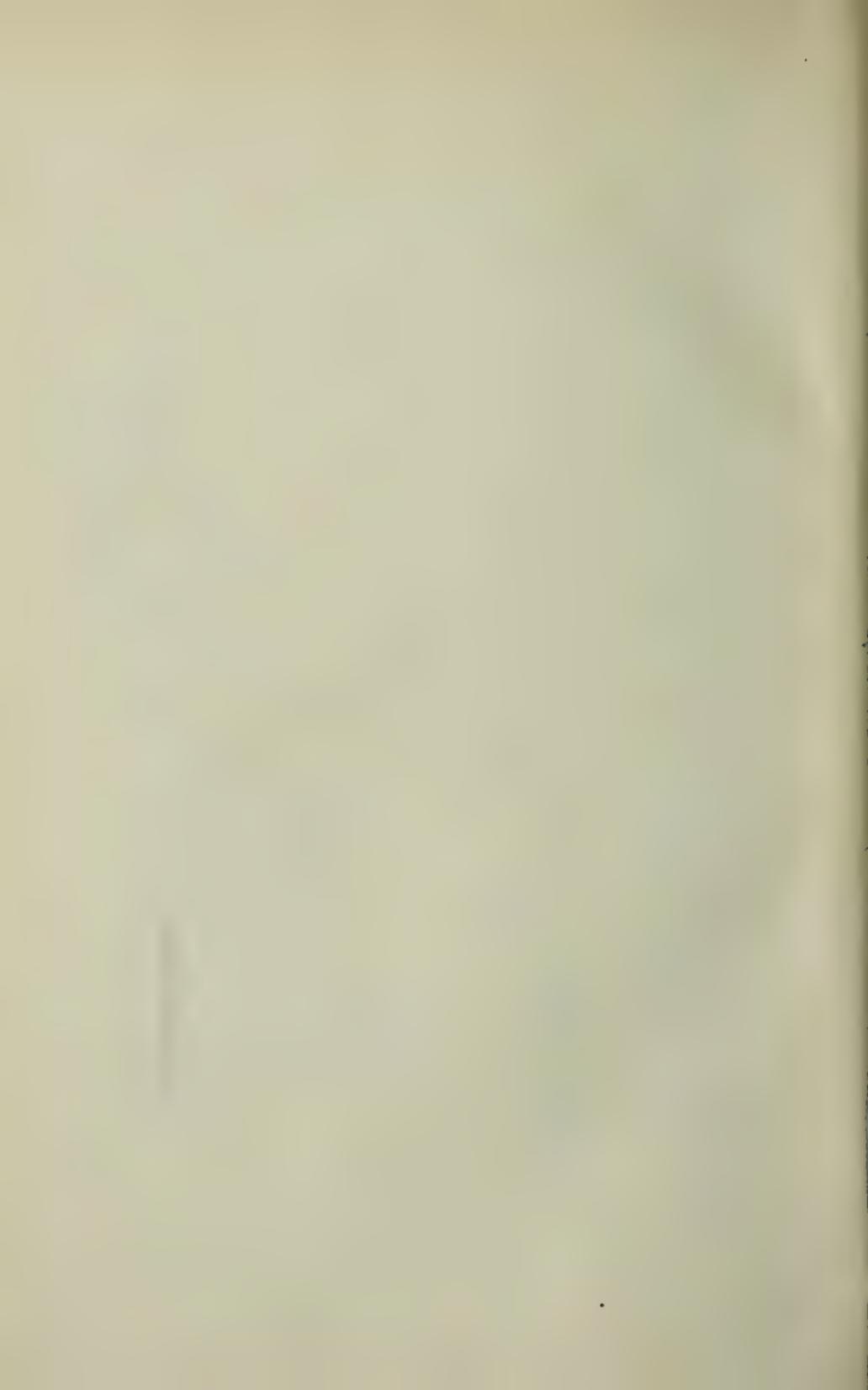
The general average of produce during the best part of the milking season may be stated at 10 to 12 quarts of milk per day, yielding from 7 to 9 lbs. of butter per week, although it is not unusual to find individual cows in this country which will double the average; and in America, owing to the extraordinary cramming with milk and butter-producing foods, even treble it. In reaching the extraordinary height of butter production, amounting to over 30 lbs. per cow per week, the life of the animal is frequently by over-forcing sacrificed in the effort to reach a

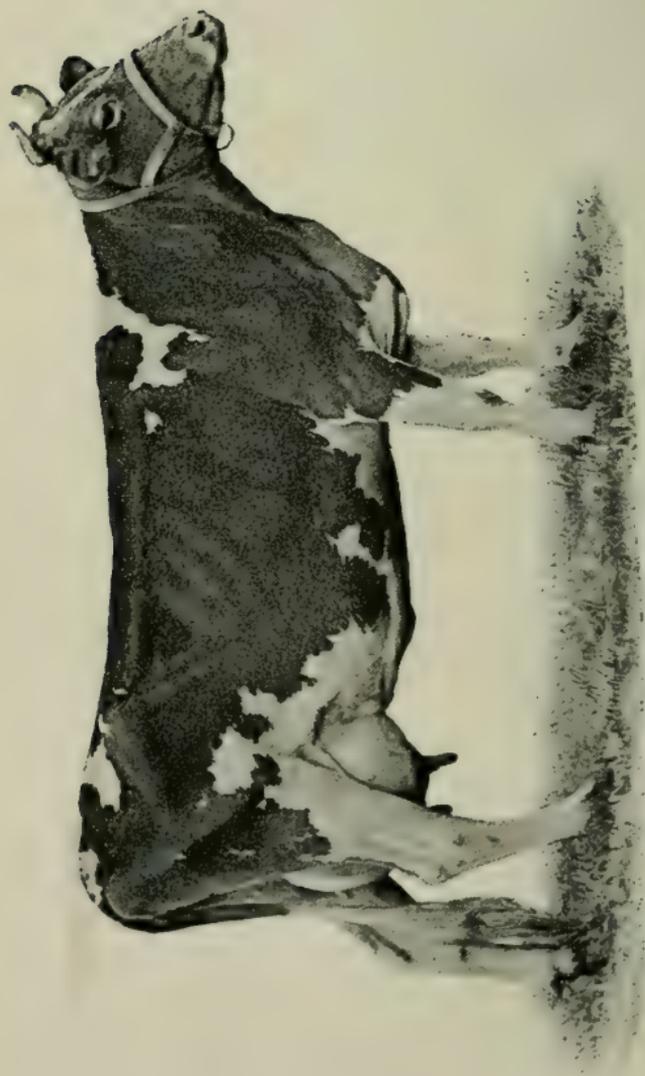


49.—(JERSEY BULL, "CLIMAX," 14 E. G. H. B.

Winner of Seven First and one Champion Prize.

The Property of The EXPRESS DAIRY COMPANY LIMITED, College Farm, Finchley.





50.—GUERNEY COW, "LADYBIRD II.," 388 E. G. H. B.
Winner of Two First Milking Prizes at the Dairy Show of the B. D. F. A.
The Property of THE EXPRESS DAIRY COMPANY LIMITED, College Farm, Finchley.

record which will afford a good trade advertisement for the sale of the descendants of her living produce.

The Guernsey.

This is a larger, stronger-boned, and coarser animal to look at than the Jersey. Its outlines are not so regular or symmetrical, but in addition to good milking qualities—the sole possession of the Jersey beyond its good looks—the Guernsey adds no mean capacity for beef production when not giving milk. The meat is not of first-rate quality, being yellow in the fat like that of the Jersey.

Guernsey colours are more broken than Jersey colours, patches of white appearing on the predominating light yellow, brown, or fawn. The muzzle is flesh-coloured.

The climate of the island is not so genial as that of Jersey, and consequently the cattle are hardier, and more inured to cold and exposure than those from Jersey on their arrival in England. The latter become acclimatized in a few years, and their descendants are likewise hardier, but they also lose the refined delicacy of skin and form, and become stronger in frame and altogether coarser.

Guernsey butter is, like Jersey butter, deeper in colour than that of ordinary milking cows when they are at grass. This quality, along with the possibility of selling the calves at a better price than Jersey calves, owing to the thin condition of the latter, has raised the Guernsey in favour with dairy farmers.

A further inducement is the greater weight of the animal, as compared with the Jersey, when dry and fed for beef. But in estimating the various qualities of the breeds some overlook the fact that five Jerseys can be kept on about the same amount of food as four Guernseys or three shorthorns.

For **cheese-making** purposes, the milk of the Islands cows, owing to the quality of the cream, is inferior to the milk of the Ayrshire or shorthorn.

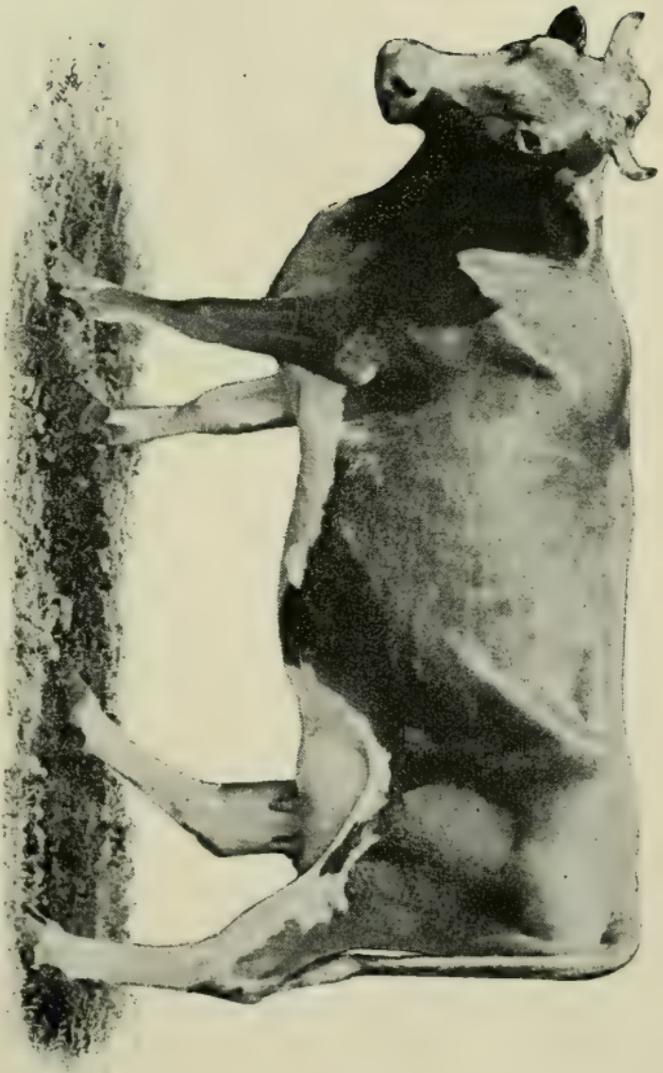
The Alderney.

This animal in its genuine form, which corresponded much to that of the Jersey, does not now exist. It was darker than either of the other varieties, the hair being dark brown or black, and the nose, tongue, and teats black. It was then smaller than the Jersey, but now, since the use of Guernsey bulls, the breed in colour, size, and relationship is more nearly allied to the Guernsey, but of smaller size.

THE KERRY BREED,

From the mountainous region in the south-west of Ireland, is the only pure remaining Irish breed.

The predominating cattle of Ireland are shorthorns more or less mixed with the ancient Irish that at one time, to a large extent, belonged to the long-horn breed. The last twenty years has seen an enormous improvement in the feeding qualities of



51.—ALDERNEY COW, "BEAUTY," 76.

First in the Heifer Class at the Royal Show, 1886; and First as a Cow in 1887.
The Property of P. HERVEL, Magistrate, Alderney.



52.—PURE KERRY BULL, "MOONLIGHTER," AGED TWO-AND-A-HALF YEARS,
The Property of MARTIN J. SUTTON, Reading.



53. PURE KERRY COW, "FLORA."

First at the Royal Show in 1887; First at the London Dairy Show in 1885, and again in 1887.
The Property of MARTIN J. SUTTON, of Reading.

the general run of Irish bullocks brought over in large numbers, and sold at fares and markets in both Scotland and England.

In some secluded districts, such as a poor tract of moory and unreclaimed land lying to the west of Cork, the old Irish milking cow, a breed anterior in time to the longhorn in the island, is yet to be seen in a form which does not appear to be much changed by the introduction of foreign blood. These animals are thin fleshed and slow to feed, but give on inferior fare a considerable quantity of poor milk. Their horns are of medium length, thin and "spaley." The hair of the body, usually brown, has more or less of single white hairs mixed with it, and also forming a ridge of white along the line of the backbone: a characteristic which is now intimately associated with Irish cattle other than the purest shorthorns or their best-bred descendants. The longhorn breed possessed it, and when Low wrote it was an acknowledged point of the Kerry, though it has disappeared from the best Kerry blood of recent years.

The **Kerry** is "the poor man's" or the Irish cottier's cow, especially in cold and inferior districts, but the breed also possesses the power of beef production in an eminent degree.

Points.—The true Kerry colours are orange skin with black hair, though specimens with red-brown hair do occur in the purest blood, but more frequently, perhaps, in the Dexter variety than in the other. White patches also appear from time to time. In general outline the Kerry has much in common with

the Jersey and also with the Ayrshire, though in size it is, under its home conditions, smaller than either of the two. Its spare form indicates its superiority in milking rather than in beef production. The horns are fine and waxy, yellow or white, with sharp black tips, and curving gracefully upward in the cow.

The Dexter variety, though now distinctly, in all senses of the term, a pure Kerry, whatever may have been its origin, is a much more compact, more substantial, and lower set animal than the Kerry proper. Its toes turn in after a peculiar fashion, and it tends to walk over the outer digits, especially in the case of the hind feet. The leg bones are shorter and more substantial, the neck thicker and shorter, the horns heavier, not so elevated and airy, and the head heavier and not so deer-like as in the case of the original Kerry.

Low, in 1845, states the prevailing belief as to its origin to be that it was introduced, whether through crossing or selection was not known, by an agent of Maude Lord Hawwarden called Dexter, but some considerable amount of doubt exists as to the accuracy of the statement. The author, while travelling in Kerry some years ago, found the word Dexter used in a generic sense of all animals which correspond to the above description, even of men who are low set and bandy legged; and also that the term was in the first instances applied to short-legged sheep kept by a resident Coast Guards officer.

Kerries cross remarkably well with other breeds; with the British flesh-producing breeds for fattening



54. DENVER KERRY HILL, "PARADISE," FOUR YEARS OLD.
The Property of MARTIN J. SUTTON, Reading.



55.—DEXTER KERRY COW, "ROSEMARY."

Never beaten but by "Irisene."

The Property of MARTIN J. SUTTON, Reading.

cattle, and with the milking breeds—Channel Islands and Ayrshire—for dairy cattle. The cross animals when at a little distance often strongly resemble West Highlanders. This is an additional proof of the common origin of the breeds.

Kerries have in recent years attracted great attention in England as fancy cattle, and have on more than one occasion been specially taken notice of by Royalty. James Robertson, of Malahide near Dublin, has, as a recreation and a change from the ordinary routine of business, been largely instrumental in bringing the breed into prominence by exhibiting good specimens of it at the Royal Agricultural and the London Dairy shows, and finally by carefully selecting the young and undeveloped members of the purest and best sorts at the Killarney and other western fairs, and shipping them as they come forward to sale condition to supply a growing demand in this country.

CHAPTER VIII. — THE BREEDING AND MANAGEMENT AND THE GRAZING OF CATTLE.

Breeding and Management and the Grazing of Cattle—Calves—Methods of Rearing—Diarrhoea—White Scour—Treatment of the Growing Calf—Ringworm—Lice—Grazing Cattle—Early Maturity—Points of Feeding Animals—Grazings in this Country—Symptoms of Disease in Grazing Cattle—Acorn Poisoning—The Warble Fly.

IN a system of good management it is essential to have stock of good quality, though for ordinary purposes not necessarily the strain of blood most run upon, and consequently commanding the highest prices. Dealing in fancy animals and fancy prices is more or less of the nature of gambling, and is not for the ordinary farmer.

A calf, however reared, should have its mother's milk, and that only, for the first three or four days. Beastings or first milk is the best food for the calf, and it is unfit for other purposes. It often contains streaks of blood, especially in the case of heifers of the first calf. Good butter can be made from "green milk" rather sooner than good cheese.

Calves may be—(1), tied by the neck; (2), kept in small cribs singly; or (3), let run together, loose,

in a large, dry, well-ventilated place. When loose they often suck each other about the navel, which causes enlargement and often sores. To prevent this, they are sometimes muzzled by putting on a bridle with sharp prongs over the nose, to prick other calves and prevent them standing to be sucked. It is better to give artificial food, as cake, immediately after the milk, to take up the attention until the strong instinctive desire to suck passes off. Hay-racks and small boxes for cake should be fitted up on the side of the wall of the crib or calf house at convenient heights.

Concrete makes the best floor for all cattle houses, being easily cleaned. Sufficient fall should be had into gratings opening over covered drains, to prevent urine standing in pools. The drains should be regularly swilled out to prevent the occurrence of sour or putrid smells, which are specially objectionable in a calf house.

Three Methods of Rearing Calves.—*1st*, Allowing the calf to suck its mother. This is the most natural way, and it makes the best calf, but is expensive, and the calf grows up wild unless frequently handled. There is greater mortality when foot and mouth disease breaks out among sucking calves than among hand-fed ones, as a change to healthy milk cannot be made if the mother becomes affected, and the virus of the disease in milk acts as a blood-poison. Bulls and pedigree show-stock, especially in beef-producing breeds, are often allowed to suck. Less milk given in this way suffices; "farrow" cows

with little milk may rear good calves. Two calves are often fed by the same cow when she has a plentiful supply of milk. After the first two are weaned, another pair may be put to the cow, and again a single one as the flow of milk lessens at the end of the season. Sometimes the last of the milk is drawn away by hand. This is richer in cream than the first part. A cow which suckles a calf, say this year, is none the worse for milking next, although some dairymen are prejudiced against cows which have been so treated. Should a cow be sucked for a number of years, the milking qualities are at last impaired.

2nd Method.—Giving full milk alone, newly drawn from the cow, when the milk is about 90° F. A calf is taught to drink from a pail by giving it a finger and keeping its lips down in the milk, so that while sucking the finger it draws in the milk. In a few days it will drink without the finger. An ordinary shorthorn calf should get for a day or two $\frac{3}{4}$ gal. divided into three meals. Representatives of smaller breeds require smaller quantities. Milk should be given in moderate amounts at first to encourage the calf's instinctive desire to satisfy the cravings of hunger to develop and thereby train it to drink freely. Increase should be gradual. Some only feed twice a day, although it is better to do so three times. From the second week, the amount should be increased to 2 gallons by the end of the fourth week, and $2\frac{1}{2}$ at three months; then the calf may be weaned by gradually reducing the amount. Some go on, especially with

bulls, for six or even nine months. Dry cake and long food are given in gradually increasing quantities when the calf is old enough. This method is also expensive and not much practised. Fattening calves should have as much milk as they will drink, and be kept quiet and in the dark.

3rd Method.—Giving the full milk of the mother for six or eight days. The calf should be rubbed with straw, or simply covered up with straw to keep it warm until it dries, and the cow not allowed to lick or even see it, as this unsettles her when removed. Many allow the calf to suck for three or four days and then take it away, but the cow is apt to fall off in milk, which does not always “come back” to the full amount. When the calf is ten days to a week old, the new milk may be gradually reduced, and skim-milk made up to the standard of full milk by artificial substitutes, as boiled gruel, at a temperature not exceeding 100° F. Begin with a tablespoonful of boiled linseed until the stomach gets accustomed to digest solids, a larger quantity would cause indigestion. An excellent mixture is half and half linseed-meal and pea-meal. Linseed-cake ground to meal may be used, and then it may form two-thirds of the mixture. Oatmeal is good, but it is more liable to cause acidity if the feeding is not well and regularly attended to. Cotton-cake kills young calves; they cannot digest it. One gallon of skim-milk per day with mixed meal gradually increased to one pound and then to two pounds, is enough for an ordinary calf before weaning. In the last stage—sweet whey is

sometimes substituted for milk, or one-quarter of the meal may be Bowick's Lactina. Calves are fond of the latter, but it seems to be rather dear, and requires great care, so that the water in mixing is quite boiling, else calves fed on it scour and get thin in condition. Much less milk than that stated above is often made to suffice. One Ayrshire cow, aided by artificials, has been known to rear sixteen calves in one summer, and in the summer of 1884 a good shorthorn cow, in the neighbourhood of Horsham, supplied all the milk given to twenty-four shorthorn crosses. This was carrying the use of milk substitutes rather far. However useful these may be when an animal is a few weeks old, there is no doubt but that to follow Nature's plan of feeding largely on milk in the early stages of the life of a calf is the most economical.

A deadly diarrhœa, which often assumes a contagious form, is not uncommon among calves, if the cows are highly fed, or if the food is impure or inferior to such a degree that the animal system is fevered, and an abnormally large proportion of albumen is present in the milk. The albumen becomes precipitated in the calf's stomach and made hard and indigestible by the acidity which develops. The irritation throughout the alimentary canal, no doubt intensified by some alkaloid poisoning, induces death within a few hours.

Treatment must be directed towards restoring the normal condition of the cow, and while this is progressing, treating the milk so that the excess of albuminoids and other deleterious matters are ren-

dered innocuous. This may be to some extent accomplished by a favourite local but successful method of burning the milk, by stirring each pailful with a red-hot bar of iron.

White scour (and *tympanitis* or "hoven" from indigestion) often breaks out even in sucking calves, when they begin to eat hay. The calf's stomach is too small, and unsuited for digesting such food. Green food or silage in place of hay is better, or a very little fine hay. In hand-fed calves the milk should be given oftener than twice a day. The undigested curd gives a light colour to the fæces; the acid in the stomach having expelled the whey, and made the curd hard like cheese.

Remedies:—In young calves, diet by feeding often and reducing the quantity of food supplied, giving boiled starch and less cream if the milk be rich. Administer a stimulant and purgative, as a mixture of powdered rhubarb and magnesia, 4 drachms, along with 15 to 30 grains of ammonium carbonate, two or three times daily in flour gruel. Two to 4 oz. of castor oil may at times be substituted for the rhubarb and magnesia; and when calves are older, give 4 to 6 oz. Epsom salts, and $\frac{1}{4}$ oz. gentian and ginger powder.

All calves should be taught to eat linseed-cake before weaning, so as to make the change as slight as possible at that time; and each may be allowed 1 lb. per day all summer, especially when the land is subject to black-leg. The cake keeps the animals thriving all the time, and they are less liable to

disease. A seton put into the dewlap is also widely believed to be a preventative. Castration should be done when the calf is about a month old ; if much older it goes off thriving for a time. When the operation is not performed till strong masculine characteristics develop, the animal (then called a "seg") is reduced in value in the market owing to its bull-like appearance and coarseness of flesh.

Bulls should be taught to lead, before they are a year old, by "bulldogs" or "humbugs," or by a ring put through the gristle between the nostrils. At a year they may serve heifers or small cows, but if not quite large enough should not be allowed to take an advantage, say on a hill side or slope, as a bull, under such circumstances, is liable to fall and injure his back. Bulls are now more docile than of old, owing to their being more gently treated. While at service they should be maintained in good store condition, and each may have daily, according to size, up to 5 or 6 lbs. of mixed meal or bruised grain. With this they are usually more sure, and get better calves, than when fed on cake.

Calves should be housed for the winter early in October, as soon as cold nights come, to save flesh and prevent "hoose," or render it less severe. *Treatment* of "husk" or "hoose" (which is recognised by the unthriving appearance of the animal, a husky cough, and a discharge from the nostrils): keep warm, feed well, and give turpentine ($\frac{1}{2}$ oz. to 1 oz.) soaked into dry meal and then mixed with cold gruel ; repeat once, or perhaps twice, after an interval of a few days. When given in this way the risk

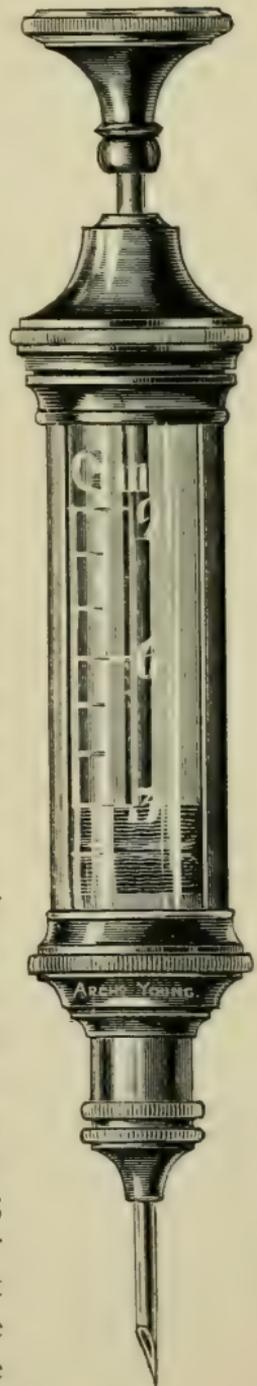
of choking from turpentine is reduced to a minimum.

Another effectual remedy is Intratracheal Injection, consisting of—

Olive Oil,	100 parts.
Oil of Turpentine,	} 2 parts of each.
Chloroform,	
Pure Carbolic Acid,	

The sharp point of the syringe is thrust through the skin and the wall of the trachea (windpipe) in the middle of the neck, and 2 to 4 drachms of the mixture injected into it. The operation may require to be performed 3 times, with an interval of 3 days between two operations.

Young cattle are particularly liable to ringworm in winter if in poor condition, as imported Irish often are. White scaly patches without hair appear (most abundant about the head and neck) as the result of the growth of a vegetable parasite (*trichophyton*), which may be destroyed by applying red mercurial blistering ointment made up with a double supply of lard ; carbolic acid ; hot lime made into a thin paste and spread on with a flat-pointed stick ; or even treacle smeared carefully over the surfaces of the affected parts. It is well to prepare the patches for the dressing, either by scraping off the



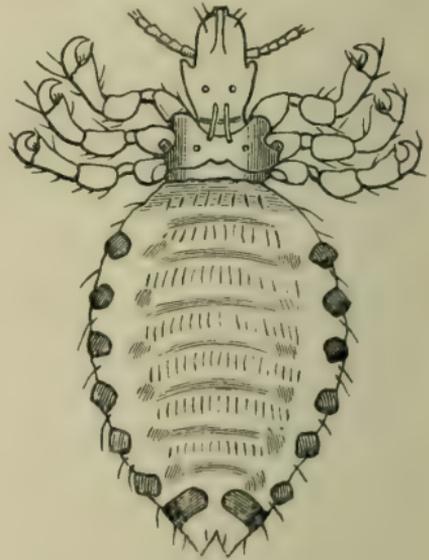
PROFESSOR W. O. WILLIAMS'S INTRATRACHEAL INJECTION SYRINGE (REDUCED $\frac{1}{2}$).

white scurf or by washing the spots with paraffin oil a day or two before the dressing is used. The inside walls of the cattle-shed must be whitewashed with lime after an outbreak of ringworm, else the cattle wintered in it next year will take the disease.

Lice of two common species appear on British cattle—(1), the large or broad-bodied, or sucking ox-louse (*Hæmatopinus eurysternus*), which lives by pierc-



SMALL BITING OX-LOUSE
(*Trichodectes scalaris*).



LARGE SUCKING OX-LOUSE
(*Hæmatopinus eurysternus*).

(After Drawings made by Professor Allan Harker, Cirencester.)

ing the skin and sucking blood; and (2) the small or biting ox-lice (*Trichodectes scalaris*), which has biting jaws in place of a sucking mouth, "and feeds on the decaying portions of the cuticle and hairs," and not on blood. Both are insects with six legs, and both do injury by causing irritation, the sucking one

to the greater degree. If cattle of any age are allowed to get too lean, kept too hot in a close house, or fed for a time on insufficient food, as barley-straw or flying-bent (*molinia*) hay, they are liable to become infested with lice, usually both varieties together, most abundantly about the rump, head, neck, and shoulder tops. Lice may be destroyed by one or two dressings, well rubbed in, of train-oil, sour buttermilk, black soap, or any of the various carbolic dressings. Paraffin oil is effectual, but requires care. Anything that would poison the animal through its licking the skin, which it should do regularly, must be avoided. Serious losses have at various times occurred among stock through poisonous dressings being applied to the skin.

Weak cattle kept back from feeding by the others thrive badly, and should be removed and placed apart.

During the first winter a moderate amount of cake may be continued, say 1 or 2 lbs., if straw is the fodder used. If plenty of good roots is given, the cake may be reduced or omitted.

GRAZING CATTLE.

It is more difficult to judge store cattle than fat ones. The most important rules for this cannot be learned by reading. A man must come to understand animals instinctively through long experience, to be able to judge of the outcome from the appearance at any time. In buying, one

ought to learn how the beasts have been kept for some months previous, and never take those from a better climate or better food than is to be had in their new quarters. Cattle moderately fed, and not kept too warm in winter, do better by the end of the grazing season than those well fed but kept in close byres, where the hair tends to fall or rub off early, leaving them too little cover when turned out in spring. Those that lie out all winter often do best, if not too lean at the beginning of the season: the extra constitution gained by being out enables them to make up more than the winter's loss. To those not fed on cake in winter, a few pounds per day, given for five or six weeks before turning out, affords a good start, and "comes out" afterwards in extra condition. Cattle three or four years old come more quickly to maturity than two-year-olds, and kill better than they look, having more internal fat, or are "better made up," though they do not necessarily lay on more beef during the time. These ages are difficult to procure unless from poor or cold districts, where it would not pay to force by feeding, and where maturity is more slowly reached.

Early maturity.—The propriety of making beasts prime at two years, or of allowing them to be three or even four before finishing, must be determined entirely by the quality of the natural products of the farm, the climate, and the tendency to the laying on of flesh by the animals suited to those surroundings. It would be absurd, and would never pay, to



BRITISH ISLES



try to force a Galloway or West Highland to maturity at two years, when kept in its native conditions. Time must be allowed for overcoming local natural disadvantages. It would be equally poor practice, with the best of everything at hand in the way of food and climate, where animals of a breed accustomed to mature rapidly would do best, to keep them a year longer than necessary. A large proportion of food (and in this instance expensive food) is burnt up to supply the waste of the system; so that keeping animals till three years old, when by proper management they could have been off at two, increases the loss in the shape of food substance burnt up in the system by at least one-third.

The points of a good feeding animal are very much those already described, under general points applicable to all flesh producers. M'Combie says, the following denote slow feeders: "Deep neck; thick legs ['trousery'] and tail; thick skin, with hard hair and hollow eyes."

Grazings in this country may be divided into three qualities—(1.) *First-rate pasture*, which is rented at 3 guineas per acre, more or less, having been reduced from about 4, or in some instances 5 guineas a few years ago. The extent of this land is not great, and much of it is annually let by auction. It is found in Leicester, Nottingham, Somerset (the marshes), the fen land in Lincoln and Cambridge shires, on parts of the Old Red Sandstone of Herefordshire, and in many small areas along the banks of rivers. These pas-

tures feed large bullocks without cake, and often somewhat less than an acre per bullock is sufficient. Sometimes an extra sheep per acre is put on, but the practice is not to be commended: the sheep do well, but the cattle would be better without them. The grass season is from 1st May till 1st November. At first, if grass is not fully come, a little hay is given. Thistles, nettles, and all large weeds are cut regularly before seeding; tufts of coarse grass are also mown. Dung is either spread or carried off to prevent the growth of dark green "tathy" patches. It is considered a sign of good land to have a perfectly even surface, and a very close cover, which should not be allowed to get too long. Very fine pasture has a velvety feel under foot.

Shelter is either natural, as trees and hollows; or artificial, as stone walls, hedges, and shelter-sheds. In Leicestershire, straw is sometimes thrown under the hedges to make a comfortable bed. Two lots can be made prime fat on the same land in one season—the first going by the first and second week of July, having put on, without being caked, from 8 to 10 stones of beef. The land is cleaned by resting for ten days. In spring, the second lot would not be so good as the first, and would have been kept for a time on pasture slightly inferior to that described. These require a few lbs. of cake, as the grass begins to fall off in quality at the end of September and in October. Some think it pays to give cake to cattle even on the best pasture throughout the whole season.

A few rough beasts (perhaps one to four or five acres) bought to clean up rough grass, run out all winter, and do remarkably well, if sheltered from cold winds, and if a little fodder be given in time of storm.

(2.) *Second quality pasture*, rented at from £2 to £2, 10s. per acre, suited for keeping the lighter breeds or smaller animals. If these are being finished they should have cake all the time (beginning with 3 or 4 lbs., and ending with 6 or 7 lbs.) given in troughs moved regularly to distribute the manure equally. By feeding cake, beef is produced faster, and of better quality; the land is also gradually improved by the increased amount and value of the droppings, and will keep more stock.

(3.) *Third quality pasture*, rented at from nearly £2 down to a few shillings per acre, only suited for keeping store cattle or sheep, or, in some localities, for dairy cattle. The land is often good, but the climate unsuited for fattening beasts. Besides hill and mountain lands the various downs belong to this class.

Symptoms unnatural in healthy Cattle at Grass, and which may be seen without handling:—

(1.) An animal away by itself, if accustomed to go with others, and perhaps cowering behind a wall with its back up.

(2.) Not stretching itself on being quietly raised.

(3.) Hair standing on end, "Staring."

(4.) The absence of lick-marks on the hair.

(5.) Saliva flowing from the mouth.

(6.) Not feeding or chewing the cud for any length of time.

(7.) Thin condition of body.

(8.) Blown out by gas forming through stoppage of digestion.

(9.) Hollow sides consequent from want of food.

(10.) Quick breathing, or a cough.

(11.) Peculiarity of movement of the head or limbs.

The hollow condition of a heifer "a-bulling," from want of settling to feed, must not be mistaken for disease. She will then stand quietly while another jumps on her, and will try to jump on others which, however, do not stand.

In addition to visible signs, the extremities, including the horns, may be cold, and the skin tight and cold to the touch: the temperature may also rise from the normal state (100° to 102° F.) to 105° or 106° in the more ordinary forms of disease, such as pleuro-pneumonia or foot-and-mouth, or even to 110° in a case of rinderpest.

Acorn poisoning takes place when large quantities of green acorns are blown down early in the season from oak trees growing in pasture. Serious loss by death often occurs among young stock through the irritation produced in the stomach and bowels by their consumption of immature acorns as food. After a storm of wind the cattle must be moved to pasture away from oak trees, and the acorns collected for the use of pigs during winter, before the animals can be safely returned.

Yew tree leaves at certain periods of the year are deadly poison to cattle and horses, and the same remark may be applied to the foliage and pods of the laburnum.



1. OX WARBLE FLY; 2. MAGGOT; 3. CHRYSALIS.

(After Drawings by Miss Ormerod.)

The Warble Fly or Bot Fly (*Hypoderma bovis*, De Geer) is the source of great discomfort to cattle, and enormous annual loss, estimated at millions of pounds, to the farmers of this country. Miss Ormerod, who has so ably brought its evil consequences and the means of prevention before the British public, says—

“It is a two-winged fly, upwards of half an inch in length, so banded and marked with differently coloured hair as to be not unlike a humble bee. The face is yellowish; the body, between the wings, yellowish before and black behind; and the abdomen whitish at the base, black in the middle, and orange at the tip. The head is large, the wings brown, and the legs black or pitchy, with lighter feet.”

The female possesses a long ovipositor, with which during summer she most probably pierces the skin and plants an egg, which “is oval and white, with a small brownish lump at one end.”

Subcutaneous irritation begins in early winter. The young warbles are placed with the head down

and the tail up in connexion with breathing tubes, which open on the surface of the skin. They are



BREATHING - TUBES
OF WARBLE MAGGOT
MAGNIFIED.

easily destroyed, and the earlier the better, by the application of some liquid such as M'Dougall's Dip or strong salt brine, which will run down the tubes and poison the inmates, or the mouths of the tubes may be closed up by some sort of greasy material.

If this were largely practised, the injury resulting from the flies existing in such enormous numbers might be undone in a few years. The flies can be prevented from striking by applications rubbed in once a week along each side of the backbone, the favourite seat of attack, such as train-oil, or a mixture of linseed oil, sulphur, and carbolic acid. Paraffin and kerosene are useful only for a short time, as the smell goes off rapidly. Mercurial ointment, unless applied with great caution, is liable to produce poisoning, through the animals licking it off.

As the weather becomes warm, the maggots force themselves out from beneath the skin and drop to the ground, where they assume the chrysalis form, of a dark colour. The fly appears in about three or four weeks if the season is warm and favourable.

CHAPTER IX.—HOUSE-FEEDING OF CATTLE.

Methods of Housing—Dishorning—Time to House—Regularity in Feeding—Roots—Concentrated Food—Necessity for Grooming—Amount of Food to give—M'Combie's Method of Feeding—Cost of Feeding per Week—Lawes and Gilbert's Experiments—Calculation showing Food and return in Beef—Conclusion dealing with the Relations of Live Weight to Dead Weight—Function of Live Stock.

THERE are three methods of arranging cattle in a house to feed—

1st, Tying by the neck in a byre, either in stalls or without divisions between them.

2nd, Putting them in loose boxes, one in each.

3rd, Leaving them untied, several together in a shed, with an open door and an outside (uncovered) court.

In a byre, they may be arranged, if in more than one row, either with the heads looking towards the centre of the house, or the heads facing the side walls, with or without a feeding passage in front. It is a mistake to have stalls more than $7\frac{1}{2}$ feet wide to hold two, even when they are large cows; for smaller ones 7 feet is sufficient, and for Ayrshires 6 feet. Six feet is long enough for the largest stall, with 2

ft. 6 in. additional space in front for a manger to hold fodder. When the stall is too long the animal lies in its droppings, and gets matted with dung on the thighs and legs. The manger should be placed low down, so that it will not interfere with the animal in rising, or prevent the head resting comfortably during sleep. The bottom ought to slope towards the stall, so that cake when given may be within reach of the animal, to prevent it trying to put its fore feet into the trough, which may be of glazed earthenware, 18 inches wide. Ventilation is of special importance, and can be secured by holes low down in the walls together with openings in the roof. Where the heads are close to the wall, it is well to have a $1\frac{1}{2}$ -inch pipe through it, low down between every two cows in a double stall, and inclining upward, so that the current of cold air passes over the cattle.

Boxes (each 10 ft. square, to hold one) are best for all kinds of stock, except young stores, only this arrangement is expensive, as it takes up much surface area. Litter, cut if convenient to lengths of 6 or 8 inches, is given to each animal in a box, at the rate of 20 lbs. per day, while for those kept in an open yard the rate is 40 lbs. each. In a byre it is not positively necessary to allow any. Cattle keep rather cleaner behind with it than without it, and if properly attended to, it also protects the leg joints of heavy cattle from injury on the floor.

Open sheds, with uncovered courts, may be—

1st, Large, sufficient to accommodate 10, 12,

or more animals, and sometimes designated a "Reed."

2nd, Small (called a Hummel in some parts), to contain from two to four.

Sheds are best for stores or for feeders in very hot weather. The great objections to them are—(1.) The loss of manure by rain washing, which, however, may be prevented if the water from the eaves of the houses adjoining the court is removed, and an ample layer of bedding spread on the floor. Contrary to the general belief, surplus moisture tends to rise to the surface through the animals puddling, and a comparatively dry layer is found at the bottom of an open court-yard. (2.) The extra straw required; and (3.) Strong cattle starving the weak ones.

Dishorning should be practised on all cattle that are to be housed in this way, as they persistently torment each other and frequently inflict severe injury by horning their neighbours. When the horns are well developed and strong, the sharp tops should be nipped off by a pair of powerful shears. This method is quicker, more simple, and less painful than that by sawing the horn. In the cases of calves and young animals, the horns should be wholly removed in the early stages by a knife as they are budding; and when delayed for twelve months or more, by means of a fine saw: in both instances getting well down underneath the base of the core of the horn. When this is properly and skilfully executed, the pain and bleeding are reduced to a minimum, the gain to the owner and the reduction of the sufferings

of the animals from the savage dispositions of their stronger companions are simply enormous. It is estimated that no less than 200,000 cattle and horses are killed annually in the United States of America by horning, which must be accompanied by an enormous amount of suffering on the part of the unfortunate victims. It is a relict of barbarism of the worst kind, for which there is no excuse, to shut up in a close place where escape is impossible, a number of fully armed beasts to deliberately maim and maltreat each other. This is a matter which is well worthy of the consideration of the Society for the Prevention of Cruelty to Animals. Polled cattle have been appreciated on the American prairies because of the immunity they enjoy from the enormous losses resulting to cattle from goring by their horned neighbours, and because horns are liable to become frost-bitten and diseased, and the animals bearing them in consequence worthless.

Dishorning is practised in the case of some Irish cattle, but it is capable of, and worthy of great extension in the Irish branch of our live stock trade, owing to the close confinement of animals during shipment. It has been estimated upon good authority that there is an average loss of 5s. per head, due to horn wounds and bruises, on Irish cattle brought over to this country.

Cattle should be housed in the north by the end of September. In the south they should be in before the beginning of November. It is a fatal error to leave feeding beasts out after the weather becomes

cold and stormy. Not only do they lose flesh rapidly, but when housed they take a considerable time to recover from the shock or "backset" before they begin to thrive. A man at 15s. or 16s. per week can tend 30 to 40 bullocks tied in stalls if the food be close at hand. He can undertake 60 to 70 if they are untied.

Regularity in feeding is the first consideration. Do not give too much at one time, and carefully remove any food that is left. Each feed should be eaten before the animal leaves the trough. This allows time to rest and chew the cud, and to prepare for the next meal. All changes of food should be gradual. Large allowances of turnips given suddenly and without preparation cause scour. Clover, if wet and in excessive quantity, produces hoven, and often death from suffocation on account of the pressure of the distended stomach suspending the action of the diaphragm.

White and yellow turnips should be used first, as swedes are sweeter and keep better. With fattening cattle one can never go back with success to an inferior food. Of the various roots mangels keep best, and are best for spring use. Roots should be stored in good time in autumn, for if frosted they are bad for all animals, especially when they are kept in the house. Roots are now only given in quantity to supply water,—1 cwt. per day to an ox is about the limit, while $\frac{3}{4}$ cwt. is often sufficient. Potatoes should not be washed (as earth in this instance acts as a corrective or aid to digestion), nor given in large

quantities, as they are on account of their starchy nature difficult of assimilation.

Roots are given whole to amuse the animals, sliced to save waste of energy (some bullocks with a specially anxious or greedy disposition are liable to leave their troughs in a disagreeably wet condition, due to the escape of saliva while consuming whole roots), or pulped and mixed with chaff the day before, so as to ferment slightly and raise the temperature in cold weather. Some feeders think cattle like the mixture best when newly prepared. Others object to the practice except with young store beasts, saying that the quality of flesh in cattle coming into prime condition is reduced in market value by giving pulped roots.

The concentrated food should be chosen according to what is cheapest in the market, and may consist of a selection from the following or other common food stuffs:—cotton or linseed cakes, maize-meal, Indiana or Paisley meal, wheat, oats, barley, beans, peas, gram, lentils, or linseed, all ground into a fine state of division, to be more easily digested. Whole grains, which have escaped the action of the teeth,* come through cattle undigested. All the above substances may be given dry, spread on the top of the chaff in the feeding-troughs; the rough and short food then go down together. When the fodder is inferior, as in the case of barley straw in Norfolk,

* In the Western States of America, pigs, two to each bullock, are often kept solely on Indian corn which they pick out of the droppings of cattle. In other cases when the corn is bruised they eat the dung.

the chaffed straw and meal may be mixed in a heap on the floor, and boiling water thrown over it sufficient to wet it, though not to drain away. By covering up the heap and leaving it till next day the whole mass is well cooked, and made palatable and more digestible.* A little locust bean-meal may be added to the mixture to sweeten it, but not too much, else it makes the animals neglect the unsweetened food. Treacle is a good fattener, and may be used, when cheap (£6 or £7 per ton), as a relish. It is useful in moderate quantities, say 1 to 2 lbs. daily to each animal, for maintaining the digestive organs in a healthy state, and it is quite as effectual, when necessary, in restoring them to a natural condition if given once or twice in quantity, 6 to 8 lbs., slightly dissolved in a little hot water. Cane sugar † is, if possible, better liked by cattle than treacle, and is more easily manipulated, but it is too expensive for ordinary feeding. As a rule, the mixture is half cake and half mixed meal. Some prefer giving pure cake for one feed in the day to make greater variety of food. Having begun with a little, say 2 lbs. per day if given for the first time, gradually increase every few weeks. A fixed quantity of concentrated food loses its effect. Eight or 10 lbs. per day is a good average amount to get up to with an ordinary bullock near the finish; more than 10 lbs. is a waste. The return after a certain point is

* For full details of the wonderful success of this system of feeding, see a lecture by the author, printed in the Journal of the Newcastle Farmers' Club for 1886.

† See a paper by Sir J. B. Lawes in the Royal Agricultural Society's Journal, 1885.

in inverse proportion to the amount supplied. Much forcing of young animals, even for fattening, is a mistake, and it is much worse in the case of breeding stock. It is best simply to keep them thriving throughout. Heifers feed faster than bullocks, especially when young. The great drawback is their coming in season and not feeding for a day or two each time, and, if loose, keeping others that jump on them from settling to feed properly. The ancient and excellent practice of "spaying" heifers for feeding purposes has been discontinued in this country.

Tied-up cattle ought to be groomed regularly, especially about the rump and neck, where they cannot lick themselves. They should be kept quiet, and at a uniform temperature of about, but not over, 60° F. If the hair be very rough when first put up (as is often the case when the animals are kept the first part of the winter in a straw-yard, until room is got in the stalls by sale of those first made prime), the back, half-way down the ribs, the thighs, and tail, may be clipped bare. This prevents excess of sweating, which would take place at first on their being introduced into a warm shed from an open court, and they can be more easily kept clean, and consequently fed faster, but in some markets where the practice is not common the appearance produced might be a drawback in selling.

A heifer or bullock that would, if killed, weigh 40 to 45 st. dead-weight if put up to increase 14·4 lbs. of dressed beef per week, should get on an average 6 lbs. of cake and meal mixed per day (beginning with 4 lbs. and finishing with 8 lbs.), $\frac{3}{4}$ cwt. roots,

$1\frac{1}{4}$ st. straw (partly chaffed), or a small portion of this replaced by hay of equal money value—a small foddering once a day. It will not pay to feed much on hay worth £4 or £5 per ton.

M'Combie's method.—At 6 A.M., or earlier, give half the artificial mixture; when this is eaten, in an hour or so, one-third of the roots. At 12 o'clock give another one-third of the roots, and at 5 P.M. half the mixture of cake and meal; at 9 P.M. the remaining roots, and perhaps a little rough hay in the racks. Uncut straw should be provided during the day as well as chaff. Depending on the condition at first, three to five months may be taken to finish prime,—giving an increase of from about 15 to 28 stones.

Calculation showing Cost of Feeding per Week.

		s.	d.	
{	Per day.	3 lbs. cake* and 3 lbs. meal, or 42 lbs. a week, @ $\frac{2}{3}$ d. per lb.	= 2	4
		$\frac{3}{4}$ cwt. roots, or $5\frac{1}{4}$ cwts. per week, @ 4d. per cwt.	= 1	9
		$1\frac{1}{4}$ st. straw, or $8\frac{3}{4}$ st. per week, @ $1\frac{1}{2}$ d. per st.	= 1	1
		Attendance,	0	6
		<hr style="width: 100%;"/>		
		Cost of producing 14'4 lbs. of beef, . . .	5	8
		<hr style="width: 100%;"/>		
		Or about 5s. 6d. per imperial stone of 14 lbs.		

* Cake or meal at 1d. per lb. = £9, 6s. 8d. per ton; at $\frac{2}{3}$ d. per lb. = £7; at $\frac{3}{4}$ d. per lb. = £6, 4s. 6d.; roots (consuming value) at 4d. per cwt. = 6s. 8d. per ton; straw and litter averaged at $1\frac{1}{2}$ d. per st. = £1 per ton.

Sir J. B. Lawes and Dr Gilbert showed by experiment many years ago that it required from 12 lbs. to 13 lbs. of dry food to produce 1 lb. of increase of live-weight in oxen, but their more recent investigations make this amount of dry food too high by a few pounds, and the proportion is more correctly stated at 9 or 10 lbs. to produce 1 lb.

Applying this reduced rule (of say 1 lb. live-weight per 10 lbs. of dry food) to the following calculation:—

Calculation showing the amount of Food consumed and the resulting product in lbs. of Beef.

(1.) *Concentrated Food*—

Cake 3 lbs. — 12 p. c. water } average, 13 p. c. water,
Meal 3 lbs. — 14 p. c. water } leaving 87 p. c. dry.

6 lbs. per day, or 42 lbs. per week.

$$100 : 87 :: 42 : 36\cdot5$$

(p. c. dry). (lbs. natural cake and meal). (lbs. dry cake and meal).

Dry cake and meal, . . . = 36·5 lbs.

(2.) *Roots*.

$\frac{3}{4}$ cwt. = 84 lbs. per day, or 588 lbs.
per week — 89 p. c. water,
leaving 11 p. c. dry.

$$100 : 11 :: 588 : 64\cdot68$$

p. c. dry roots). (roots, natural). (total dry roots).

Dry roots (say) . . . = 64·5 lbs.

Carry forward, 101·0 lbs.

Brought forward, 101·0 lbs.

(3.) *Straw.*

$1\frac{1}{4}$ st. per day = 17·5 lbs. per day,
or 122·5 lbs. per week — 14 p. c.
water, leaving 86 p. c. dry.

100 : 86 :: 122·5 : 105·5

(p. c. dry). (lbs. straw, natural). (lbs. dry straw).

Dry straw (nearly), . . . 105·5 lbs.

Total dry food, . . . 206·5 lbs.

$206\cdot5 \div 10 = 20\cdot6$ lbs. increase of live-weight.
Live-weight brought to dead-weight at 70* p. c.
= 100 : 20·6 :: 70 : 14·4 lbs. of dressed beef laid on
per week.

Conclusion.— Since artificial feeding stuffs became so reduced in price, the value of the life of the well-bred animal has been proportionally increased, as will be noticed when it is realized that the price paid for the flesh of a year-old store bullock, costing 4s. 3d. per stone live-weight, is equivalent to nearly 8s. 6d. per stone, estimating it at 50 per cent. dead to live-weight.

The practice of selling fat and store animals, and even at times horses, by live-weight has long been

* Warington gives 60 p. c. as the proportion of dressed beef from a prime fat bullock's fasted live-weight, and Lawes says 50 p. c. from a store bullock if killed at the time of putting up to feed. The ordinary butcher's animal, it should be remembered, is only "moderately fat," and will not give more than 57 p. c. of dressed beef, or even less. The increase of dead-weight during the late stages of fattening may be approximately estimated at 70 p. c.

successfully carried on in America, and in this country it is making slow but sure progress. It is now made possible by the facilities which Government has recently offered through the passing of an Act which makes the erection of machines for weighing live stock compulsory in all places where tolls are charged. The scales form a ready means by which the farmer can satisfy himself of one of the most important factors in the question which he puts to himself, as to how much money his beasts are worth. This is an extremely important point gained, as without such help the farmer with his small experience in the market is placed at a great disadvantage by the middleman with his wide experience. No one believes that a knowledge of the weight of an animal will alone indicate its value, but that, along with a settled conviction of the quality according to the breed of the bullock and the stage of forwardness of his condition, makes the calculation not only easy, but certain to show accurate results. The elaborate and excellent handbook of **computing tables** by Sir John Lawes* now supplies a key to the farmer in the estimations pertaining to the weight and value of his live stock. It may be roughly estimated that bullocks which are in prime fat condition will yield 60 per cent. of dressed beef from their "**fasted live-weight.**"† Three-year-old

* Published by the Royal Agricultural Society, 12 Hanover Square, London.

† The expression "fasted live-weight" in America means that an animal has consumed no food for twelve hours, but the British acceptance of the term is here adopted, viz., that the fast has lasted for twenty-four hours.

stores should give 56 per cent., two-year-olds 53 per cent., and one-year-olds 50 per cent.

When cattle are weighed at home, allowance should be made in accordance with the following data for the loss which is sure to occur while animals are being taken to market. Sir John Lawes estimates the loss by fasting 24 hours at about 5 to 5½ per cent. of the gross live-weight = 50 to 55 lbs. on an ox weighing 1000 lbs. John Swan & Sons, of Edinburgh, from their extensive experience in weighing live cattle, estimate the loss at about 5¾ to 7 per cent. = 80 lbs. from a bullock of 1400 lbs., or if come by rail a long distance in addition to fasting, the loss would amount to 100 lbs. The difference is easily accounted for by the greater rapidity at which a bullock is "emptied" when excited by travelling. The loss of original total live-weight may fairly be estimated at 5 up to about 7 per cent., according to the treatment the animal has undergone during the period of fasting.

The following table shows the relative proportions and prices of animals in various stages of development at the Edinburgh sales in the spring of 1889:—

	STORE CATTLE.			FAT CATTLE.
	1 year old.	2 years old.	3 years old.	
Estimated percentage dead to fasted live-weight, .	50	53	56	60
Price per Imp. stone of fasted live-weight, . .	4s. 3d.	4s. 2½d.	4s. 1½d.	4s. 9d.
Price per Imp. stone, or estimated price, . . .	8s. 6d.	7s. 11¼d.	7s. 4½d.	7s. 10d.

The figures show that at current rates the market price of the flesh of young animals is higher than the market rate of beef on an animal ready for the butcher. This is most distinctly so in the case of one-year-old cattle. The flesh of two-year-olds approaches more nearly in price to prime beef, and in the case of three-year-old store cattle, which are well forward but not quite ready to place in the market, the tendency has carried the price of rough beef below that of butchers' beef. It must be admitted that these figures and relations vary from time to time with the condition of the market, but for the moment they go to show the extent of the advantage that the breeder has over the feeder.

So long as the price paid by the feeder does not exceed the market rate of dressed beef he ought not to complain, as it has been shown that the production, if that is done entirely from the best of food materials, can be most economically accomplished during the last stages of fattening.

When the animal is young and growing it requires more exercise to keep it in health, and there is in consequence greater waste of food material than when it is finally shut up to finish. Against this must be put the fact that the food consumed by the young and growing portion of the stock of the farm is or ought to be the least costly. Again, in comparing the two sets of figures—(a) the price of the estimated beef on a store animal, 8s. 6d. per stone, with (b) the cost, 5s. 6d., of producing 1 stone of beef during the last stages of fattening, it should

not be forgotten that (*a*) represents the cost plus the feeder and middleman's profit, while (*b*) is simply the net cost.

Should an animal in store condition be killed, the beef being unfinished will bring a low price. It is therefore, as previously stated, the life of the animal which is valued, in the light of the prospect of what it will ultimately produce when the fattening process is completed.

The market value of life in this sense varies according to quality, as the value of beef varies for the same reason, and we find well-bred animals sell at higher prices, weight for weight, than ordinary beasts — the presumption as regards their possible performances is worth so much more to the purchaser.

The great function of live stock on a farm is not the making of so much profit on so many stones of beef, as this, unless side issues and secondary advantages are estimated, is frequently absent, but (*a*) the formation of a home demand for the crude, bulky, and unmarketable farm produce, and (*b*) the making of farm-yard manure to maintain the fertility of the land.

The Author's attention has been called to a most ingenious little instrument, a "Live Stock Computer," patented by G. H. Meire, Eyton-on-Severn, Shrewsbury, which gives at sight the values of animals:—(1), by comparison; (2), at a live-weight price; and (3), at carcass price.

CHAPTER X.—DAIRYING—PASTURE AND FOOD.

Conditions, Suitable and Unsuitable—Best Dairying Localities—Cow Pasture—Water Supply—Natural and Artificial Herbage—Weeds—Extent of Dairy Land—Data for Calculating the Amount of a Cow's Food—Plan of Arrangements for Feeding 100 Cows on 300 Acres.

CONDITIONS, *suitable and unsuitable*.—The climate is the only limit to success in dairying in this country, and that on account of wet and cold on the higher of the hilly regions. All other difficulties, as deficient rain-fall and clay soil (such as the heavy clays near to London), that were at one time (and not so long ago) thought to be unsurmountable, can be overcome by adapting to the prevailing circumstances one of the many varied systems which are practised. There is a choice (1), of "soiling," viz., keeping the cows entirely indoors and carrying all food, whether green or otherwise, to them; or (2), pasturing during summer: besides many combinations or variations of the two plans.

Dairying is more remunerative in some localities than in others, owing to the presence of

favourable conditions; but the absence of some of these does not necessarily exclude the practice of this industry. The districts of most renown are—parts of the counties of Cheshire, Derby, York, Leicester, Gloucester, Somerset; and in Scotland, Wigton, Kirkcudbright, Ayr, Renfrew, and Lanark. Such places have the soil and climate suitable for growing good grass, which is the best and cheapest main supply of food for dairy cows—grass being used for summer, and hay for the winter months. Roots were at one time considered indispensable, and it was thought that, if roots could not grow, dairying need not be attempted; but now that the smell and taste of the products are more looked to, roots, for reasons to be explained later, are not so popular, and the success of silage in many places too high for the growth of roots, has increased the feeling against them. Extremes of either heat or cold are disadvantageous, but these are not so great in this country, except on high cold mountain ranges, but that they can be easily overcome by providing shelter. Summer shelter is necessary against the sun and flies in warm weather, and from wind and rain while stormy, and this may be got from high hedges, belts of plantation, high stone walls, or cheap low-roofed shelter-sheds. The winter shelter given is usually by housing, except in a few of the milder districts—as in Cheshire, where cows lie out all winter, and where the shelters provided in summer prove valuable. Extreme cold reduces the flow of milk; and excessive heat, with its

various accompanying irritations, lowers both quality and quantity. There is no animal product of the farm so easily affected by adverse circumstances as milk. Materials for its secretion are only provided by the cow after every other want of the animal system has been supplied ; consequently the maximum of milk production can only be attained when the cow is free from all annoyances or discomforts, so that she may settle to the consumption of a proper quantity of food and then make the best use of it. Moderate exertion, as browsing in a field, is advantageous to animals that are to be retained as dairy stock from year to year, by keeping the limbs and the constitution generally in a good healthy condition, and preventing running to fat, as cows tend to do if tied up all the time. An immediate reduction in the quantity of milk follows any excess of exertion ; this may occur through the cows "startling," and running frantically from the gad-fly (*Tabanus bovinus*), and the little gray horse fly or cleg, also one of the *Tabanidæ* (*Hæmatopa*), which appears in July ; it occurs also when they are in season ("for bulling"), or if they are hunted in any way, or even driven a long distance to pasture, especially if not allowed to go at the slow pace natural to a cow. More food is necessary under these circumstances to make good the extra waste of the system, and all is deducted from what should have gone, under more settled conditions, to the formation of milk. The milk secreted is also inferior in quality, being poor in heat-producers,

especially butter-fat (cream), and more liable to spoil in keeping or in the manufacture of its products; this is supposed to arise from the presence of an alkaloid which appears in the systems of all animals that are excited or over-heated; as in a fit of bad temper or after being hunted. The amount of milk given by a cow in the morning as compared with the evening (twelve hours elapsing in each case after the previous milking), varies with varying conditions. When cows lie out all night, and when day and night are both mild, there is usually more milk at the evening meal than in the morning. When the nights are cold this is more marked; but should the nights be warm and comfortable, and the days too hot and the cows unsettled, there will be a greater yield of milk in the morning. In moderate weather cows feed more by day than by night, and the result of this is immediately seen in the milk production.

A cow-pasture is better undulating than flat—the banks not being so steep as to cause accident. It is a mistake to have it all thoroughly drained as if it were arable land—unless it be arable land that is soured by stagnant water. It ought to be sufficiently dry to enable cows to walk over the surface without breaking and poaching it, but the hollows should be left moist enough to encourage the growth of food-plants and grasses different from those seen on such land when thoroughly dried. These parts provide a variety of food, in conjunction with the drained land, during the whole grass-season, and

are particularly serviceable in a scorching hot summer, and at all times in autumn. Deep drains are better than open surface-drains where the land is good enough to bear the expense of their construction. Large open ditches, especially with steep banks, are most objectionable in cow-pastures, as there is always a danger among horned cattle of their being pushed or horned (Scotch—dunched) into them.

The **water supply** is of extreme importance, as animals giving daily such large quantities of fluid produce require to drink deeply. The smallest inconvenience from want of water is seen immediately in the diminished flow of milk. It must be pure as well as abundant, as with contaminations from decaying organic matter, more particularly if it be of animal origin, the milk and its products do not keep so well, and are liable to objectionable tastes and smells; besides, outbreaks of typhoid fever have been traced to sewage in cows' drinking water. A pure running stream, with a hard bottom and gradually sloping sides, is the best possible watering-place; but where drainage or river water is not plentiful, rain-water should be safely stored in ponds or in underground tanks in times of rain against the dry season, and in such a way as to keep it clean. A stagnant pool which cows can walk into and stand in is undesirable. Droppings are left in it, and it soon becomes filthy. Cows are fond of standing in water in hot weather, which is not only injurious, inducing rheumatism, but is a waste of feeding time, and a cause of loss of produce

in the end. They follow this practice for the double purpose of cooling themselves and of escaping from their insect enemies.

Natural herbage from good old pasture, being a mixture of the best matured grasses and leguminous plants, makes the finest quality of dairy produce; forced grass from high manuring or irrigation is watery and imperfect; and when that and young "seeds" grass are used alone, perhaps because there are fewer varieties of plants represented in it, there is often a difficulty in the manipulation of the products, more especially in the case of cheese. Young grass has one advantage in coming earlier in the season, and it is good for encouraging the flow of milk in conjunction with old pasture. There are many hill grasses and plants, on which mountain sheep live, that must not be considered inferior for dairying; as light hardy cows often do well on wild-looking pasture in upland districts, rented at 6s. to 10s. per acre, if plenty of room is given, so that they may have a choice of food—say between 3 and 4 acres of pasture, and the aftermath of 2 acres cut for hay. This hay meadow should produce a little over 2 tons, or sufficient fodder for a small cow during winter, without roots or any artificial food, till after calving in spring, when each cow would require a quantity of mixed meal and cake up to the value of 20s. to 25s., to keep up the flow of milk until the grass was sufficiently grown to support her.

Of weeds that give a taste and smell to milk or butter, the different species of garlic (*Allium*) are

perhaps the worst and most common, besides being very difficult to get rid of. Garlic mustard (*Alliaria officinalis*), and several other varieties of wild mustard, also camomile (*Anthemis*), and ivy (*Hedera*), give a taste to milk. As several of the latter grow mostly in the shade and shelter of fences, the injury may be minimized by frequently cutting the weeds along such places. Buttercups (*Ranunculaceæ*) are thought by some to give a rich golden tint to butter, and by others to produce an acrid taste in milk. Most probably both ideas are wrong. Grass-butter in May and June, the buttercup season, is naturally yellow from any good pasture, even when free from them. The change to the yellow colour is more noticed at this time, coming in contrast with the pale house-butter of winter and spring. Cows do not, if they can avoid it while grazing, eat the flower stalks and heads of ranunculus, though cases of poisoning have been traced to the consumption of acrid species. Buttercups are said to be an indication of good land, but they appear abundantly on both good and bad. As a rule, the quality of land is not indicated so much by the presence or absence of weeds as by their size and habit of growth; for instance, a well-developed thistle (*Carduus*), or a large cowslip (*Primula veris*), will not grow on poor land: small and inferior specimens only, although often in great abundance, are to be seen there.

Extent of Dairy Land.—Three acres of good grass (rented at not over £2 per acre, including

taxes) is sufficient to set aside for the keep of each cow during both summer and winter: rather more than an acre would be cut for hay, and the remainder, along with the aftermath of the hay land, would be grazed.

About one-tenth of an acre of roots is often made to replace so much grass, but there is a danger of milk-fever, if roots are provided along with a full supply of hay, if this is of very fine quality.

If roots are given without concentrated food in autumn before cows go dry, more milk is produced, but the cows are thus made much leaner and are more difficult to winter. The average return of a well-managed dairy of good shorthorn cross-cows should be about 550 gallons of milk under the treatment described, with some artificial food in spring. Really good Ayrshires on such land are not far behind. The ordinary Ayrshire on poorer land should give about 450 gallons or upwards. Pure bred shorthorns do not, as a class, even taking only milking strains, milk quite so heavily as their crosses and non-pedigreed, though often well-bred, relations, which are usually found in English dairies.

When the "soiling" system, and higher feeding and farming generally, are adopted, the yield of milk may be raised by 150 gals. or more each, which will repay the extra labour should conditions necessary for such a system be present.

Data for calculating the amount of cow's food in a mixed system of summer pasturing and soiling. As in the grazing example, 3 acres go to one cow,

but the grain grown is sold, if it is not thought advisable to use it as concentrated food which, in the other case, had to be bought. Each cow requires, besides summer pasture, 2 tons of straw and hay for fodder, amounting to 25 lbs.* per day, during the six winter months, besides concentrated bought food given in spring, as cake and meal, which might cost from £1 to £2, or more if cake is continued on the grass. In addition, the following roots and forage crops may be given at the various seasons throughout the year:—

(1.) One-third cwt. roots per day for 4 winter months (18 weeks), given mostly when cows are dry (= 2 tons 2 cwts., or 1 acre for 10 cows—swedes 15-ton crop, mangels 27 tons—average 21 tons per acre).

(2.) One-half cwt. of rye per day for 3 weeks in April (= 10 cwts. per cow in 20 days, or 1 acre for 10 cows, with a 5-ton crop).

(3.) One-quarter cwt. per day of crimson clover, rape, vetches, etc., for 21 weeks in summer (= 37 cwts., nearly, per cow, or roughly, 5 cows to 1 acre, with a 9-ton crop).

(4.) One-half cwt. cabbages per day for 10 weeks in autumn (= 35 cwts. per cow, or 15 cows per acre, with a 26¼-ton crop).

* Sir J. B. Lawes and Dr Gilbert in their pamphlet on "Experiments on Ensilage (1886)," Harrison & Sons, page 28, give 25 lbs. of "dry substances" of food as the daily amount necessary for an ordinary cow.

Plan of Arrangements in feeding 100 Cows on 300
acres by the above System.

100 acres arable on a 4-course rotation.

150 „ permanent pasture grass.

50 „ permanent grass-meadow, cut for hay.

Annual Crops on the Arable Land.

(1.)	25 Acres.	(4.)	25 Acres.
Wheat or Oats, followed by 20 acres winter catch-crops and 5 acres winter fallow.		“Seeds” cut for hay, 20 acres latter-math pastured, and 5 acres cut for forage.	
(2.)	25 Acres.	(3.)	25 Acres.
Roots and forage crops following catch crops, etc.		Oats, as a “nurse” for the grass “seeds.”	

Analysis of Root and Forage Crops, including Catch Crops.

10 acres roots.

6 $\frac{2}{3}$ „ cabbages.

10 „ rye.

20 „ vetches, clover, and rape.

46 $\frac{2}{3}$ „ Total root and forage crops.

<i>Winter Catch Crops and Fallow after a Grain Crop.</i>	<i>Root, Green, and Forage Crops in the Regular Rotation.</i>
5 ac. cleaning for man- gels to be sown next spring.	10 ac. roots (5 ac. man- gels and 5 ac. swedes).
—	6 $\frac{2}{3}$ „ cabbages.
10 ac. trifolium and vetches.	8 $\frac{1}{3}$ „ vetches and rape.
10 „ rye.	—
—	—
20 ac. Tot. catch crops.	25 ac. Total.

The above totals make 45 acres of root and forage crops including catch crops, but 46 $\frac{2}{3}$ acres are required, and can be made up by taking a second cut off 5 acres of "seeds" land, which is an equivalent of 1 $\frac{2}{3}$ acres of vetches. A second cut of "seeds" will give 3 tons per acre, or one-third of a good vetch crop.

House Feedings as practised in the Production of Milk for a Town Milk Trade.

When good non-pedigreed milking shorthorn cows are kept at all seasons in the house, and fed to the highest degree possible, the yield per cow can be made double of that obtained under the natural system described—the produce can be raised from 550 to 1100 gallons. This system is

not compatible with calving down the cows a second year. Animals at their prime, viz., after the third or fourth calf, are selected, and they go directly to the butcher, usually after milking for nine months, without being put quite dry, although the yield of milk is naturally reduced, so that it would not pay to keep them longer. This is a severe drain on the supply of the best milking cattle, and it has unquestionably, since the great increase of the milk trade in towns, tended to reduce the numbers of cattle in this country.

The amount and cost of food per cow per day is as follows :—

	<i>s.</i>	<i>d.</i>
7 $\frac{3}{4}$ lbs. cake and meal, } (£6, 10s. per ton),	= 0	6 $\frac{1}{2}$
2 lbs. treacle,		
$\frac{1}{2}$ cwt. brewers' grains,	= 0	6
$\frac{2}{3}$ cwt. roots (£1 per ton, towns' prices),	= 0	8
10 lbs. oat straw (£2 per ton, semi-do.),	= 0	2
Refuse straw for litter,	= 0	1 $\frac{1}{2}$
Labour, tending, and milking (3 times),	= 0	2
		<hr/>
Total cost per day,	<hr/>	<hr/> <u>2 2</u>

In summer the turnips, straw, treacle, and part of the brewers' grains are replaced by grass from sewage meadows or by green forage—frequently ryegrass forced by dressing with nitrate of soda. The cost of this should be rather under its equivalent of winter food.

The yield per cow while in milk will average 4

gallons per day = 1105 gallons in nine months. As each cow is replaced at the end of that time by a "green" or fresh newly calved cow, the average of milk given annually per stall is raised to 1460 galls. The reduction in value of the cow may be estimated at £4 between the "laid in" and selling price, but this is balanced by the value of the manure.

CHAPTER XI. — DAIRYING — COWS AND THEIR MANAGEMENT.

Treatment of Dairy Cows—Milking—Milking Machines—Period of Lactation—Guenon's Escutcheon Theory—De-sexed Cows—How to put a Cow Dry—Three Points with regard to Purchased Food—Effects of Common Food Stuffs—Hoven—Good Permanent Grasses as Food—Breeding and Calving for the First Time—Signs of Pregnancy—of Parturition—Calving—Protracted Labour—Premature Labour—Means of Preventing Abortion—Straining—Cow Breeches—Protrusion of the Vagina—Milk Fever—Trembling or Loupin' Ill—Weed—Inflammation of the Udder—Choking—Lameness.

TREATMENT of Dairy Cows.—It is of the utmost importance to have the cows, byres, and everything connected with them kept scrupulously clean, not only because produce is so easily spoiled by the presence of any dirty impurity or smell, but on account of the necessity for perfect health and comfort in the animals to attain the maximum of production. Good ventilation keeps the temperature a few degrees below 60° F., which prevents cows losing their hair and being too bare and susceptible to cold when turned out for water in winter or to grass in spring; and it also keeps the atmosphere pure and sweet. This may be aided by swilling the gutter daily with water, where means

admit of the practice. Regular grooming during winter is necessary with cows, as with all animals that are tied up, and are thus prevented from rubbing or licking themselves, or getting licked by others on tickling or itchy parts. General comfort means more produce, or better condition, with a given amount of food. March and April is the usual calving time for cheese or butter-making summer dairies, so as to have cows coming to their "flow" within two months, on getting a full supply of grass: May, June, and July being the three best months for abundance. Heifers calve, usually, a month later. Pedigreed cows calve at any time, but the best period is soon after the New Year, to give the young ones as much time to grow as possible. Where milk is sold, more cows than in other systems are "calved-down" in autumn, to provide for the winter demand. Milk-making is then expensive, and in a country dairy does not pay at ordinary prices for milk, but it is arranged for by milk companies in their yearly contracts with farmers. Cows go to pasture for good either before or after 1st May, depending upon the climate, having been gradually prepared by a short daily run over young grass, which is usually early. The amount and kinds of forage crops sometimes given while cows are being milked have been already stated. Three pounds or four pounds of cake supplied to each animal daily while on grass no doubt increases the amount of produce, but, unless in special cases, where the pasture is insufficient or wants manuring, it is a question if the practice pays

when dairy produce is at ordinary prices ; for cows thus treated are more difficult to keep up to the mark in winter, and age more rapidly.

Milking is usually done twice a day, in the house if possible, as cattle are there more at rest in the shade and free from flies, besides milk is kept cleaner, especially in wet weather, when rain would wash dirt into the pail from the skin. All dirt adhering to the udder (more usual in winter than in summer) should be wiped or sponged off to prevent taint in the milk. The only sufficient excuse for open-air milking is when cows pasture at a great distance from the farm buildings ; and, again, if cows are milked in a very close, warm byre, they run the risk of being chilled when turned out at night in autumn.

It is sometimes necessary to milk three times a day, when the vessel is hard and swelled soon after calving, when there is an excessive secretion and milk running from the teats, or when mid-day milk is wanted in a local trade. More milk can thus be got on the whole, but the additional expense debars the practice, unless when the cow's comfort or the circumstances of trade urgently demand it.

Cows are kept in the house over night, as autumn frosts and cold or stormy weather come on, to prevent the quantity of milk falling off rapidly, except in those districts where cows are wintered out of doors. Then they rapidly go dry and cease to give milk. For the first few nights the yield is less, but it increases as the animals become accustomed

to the change, and remains pretty constant for a few weeks.

During winter they are only let out once daily, or better twice if their fodder is salted, to drink water and lick themselves, unless when the ground is frost-bound and slippery, when water should be carried to them. A walk of a quarter of a mile before drinking, and the same back afterwards, prevents shivering, which occurs frequently when cold water is given in the house. The exercise also keeps the limbs in good condition, and helps to maintain the constitution of the cow in a healthy state.

If cows are constantly milked by one person for a length of time, they often "keep up their milk," or "do not let it down," should another milker try. It is a usual rule in dairies to change the milkers regularly each time to avoid this. The custom has other advantages: it gives each milker the same share of the "stiff" or difficult, as well as of the cows easy to milk, and prevents an inferior milker "putting the milk off," or "drying" certain cows by bad milking, carried on regularly.

Cows get into the habit, especially if going always on the same pasture, of finding the way towards the milking place generally at the right times, which should be regularly kept, and should divide the twenty-four hours equally. Each knows her own place in the byre, and if not disturbed will usually go directly to it unless she is induced at times to steal food from a neighbour's allowance by the way.

Milking should be done as quietly, quickly, and thoroughly as possible. If all of these requisites are not attended to, the quantity of milk soon falls off. One of the greatest difficulties of the dairy farmer is to get good milkers. A cow must not be struck or frightened in any way; as, in addition to the small quantity given, the quality is so injured at times that it has been known to affect the milk of a whole dairy when mixed with it.

A calf takes about three or four minutes to suck a cow dry. Milking by hand should come as near to this as possible. A good man (or a woman in Scotland) milking ten cows (a usual and ample number) will finish in an hour, if the work is done by contract, except for a week or two when the full flow of milk is on. When milking is done in the ordinary way, on the master's time, nearly two hours are taken up. An hour and a half may be stated as a good average.

A milker sits on a stool close to the animal, and holds firmly between the knees a "handy" or pail large enough to contain all the milk, to do away with the necessity of rising to empty a portion of it into the receiving or carrying can before the operation is finished. The hand next the cow's hind leg should be kept close to it, to be ready to hold it back should she attempt to kick. Some tie the hind legs together at the hocks. If it were always done without pain this would be harmless, but there is the risk of workpeople doing it roughly. It is better to "dry milk" or handle young cows

for some weeks before calving to break them in, and to treat them gently and coax them to stand quietly. Special care is necessary at first while the udder is hard and painful. Sometimes a nervous or wicked cow, or one with sore teats, from cow-pox, hacking with cold east winds, or raw from flies, will stand in no other way than with a man holding her head, with a finger and thumb in her nostrils. After a time, in many cases, the presence of a person near the shoulder, without holding, is sufficient, showing that if care had been bestowed at first this unnecessary expense might have been avoided. Sometimes such a cow is secured by "bulldogs" or "humbugs" put in the nostrils, and tied up by a rope.

There is no right and wrong side on which to milk. In double-stalled byres the milker gets between two cows, milks one from the right side, and turns round and takes the other on the left. It is well to train a cow, especially a show animal, to milk from both sides. This keeps the vessel hanging "square." It usually gets heavier at, and hangs to the milking side. The near-hind and far-fore, and far-hind and near-fore teats should be milked together alternately. Cows with very small teats, especially when swelled after calving, are very difficult to milk, and tiring for the hands of the milker, as only the forefinger and thumb can be used.

Others are "stiff" to milk, from the passages of the teats being small. These can be widened by

inserting a form of bistoury which opens like a glove stretcher. The cutting surface is on the outside of one of the blades, and after inserting it into the



BISTOURY.

teat the incision is made by opening and suddenly withdrawing it. When this operation is overdone, milk flows without the action of milking, causing loss. A safer method of improvement, in ordinary hands, is that of using a small ivory cone, which is left in the canal of the teat to distend it between milking times. The cutting instrument is sometimes used, but not often successfully, when a cord forms at the neck of the teat, through the contraction or growing up of the milk diaphragm, usually the result of suppuration. Sore teats should be well greased, before and after milking, with vaseline. If the skin of a teat is very tender, the milk may be withdrawn for a few days by a silver milking-tube or syphon, while the sound teats are being milked. A piece of red yarn or tape ought to be tied to the tube to prevent its being lost if dropped among the litter.

Milking Machines are all unsatisfactory, as the rubbing action of the calf, which encourages milk-secretion, has not yet been properly imitated. There are many varieties following one or other of two principles—*1st*, Letting the milk flow by means of syphons inserted into the teats: these are too slow

in action, apt to do injury; and troublesome to fit on.

2nd, Sucking the teat in imitation of the natural method. This is likely to draw blood at the finish, and thus requires much care; it also necessitates finishing the milking by hand.

The usual period of lactation is between nine and ten months, giving the cow a rest of two or three months to prepare for the next milking period. Cows naturally take this time, more or less; they are also affected by the kinds and quantities of food given, and by the general treatment. Some would yield milk right through till the next calving, but these do not milk so well the following year.

M. Guénon's "Escutcheon" or "Milk-Mirror" theory* holds that the extent of surface of the

* The system was instituted by Mons. Francois Guénon of Lisbourne, the son of a poor gardener, and a great student of Nature as represented in the vegetable and animal kingdoms. As far back as 1814 he, while tending the household cows, believed he could trace a relationship between the yield of milk and the form of the gravure or escutcheon. After making further inquiries, which tended to strengthen his belief, he began business as a cattle dealer in 1822, and dealt in cows of different nationalities. The result of his long and careful observations led him to classify animals in three groups according to size—large, middle, and small: the signs he divided into eight classes, and each of these classes into eight orders. From an intimate knowledge of their variations he could indicate the quantity and quality of milk a cow would give daily, and the length of time she would continue to give a good yield. In 1837 he stated his results before the Bordeaux Agricultural Committee, and in 1838 to the Agricultural Society of Aurillac. His views were accepted after test trials of the system, and by the few who have undertaken the great labour of mastering the details it is pronounced to be an excellent guide in the selection of cows possessed of good dairying qualities.

udder and thighs that is covered with hairs turning up and out, in place of down like the rest of the body, is an indication of the amount of milk the cow will give. If the surface covered by the reversed hair is large and broad above the udder, extending far on to the thighs, the cow should be a good milker, and if it be broad and smooth up near to the setting on of the tail, the flow should last well out at the end of the season. Great attention is paid to it in America and in France, where it has been studied for over sixty years, but it is little regarded in England. The explanation given seems a very doubtful one, viz., that the arteries supplying the udder terminate in the skin and turn up the hairs, and if there is a large surface, this shows there are larger arteries which have abundant terminations. The size of the milk-vein, taking away the refuse blood which passes through the udder in the process of milk secretion, is a much more reliable indication of the "depth" of a cow's milking.

De-sexed or "Spayed" cows milk on constantly for years, and give, on the aggregate, a larger yield than in the usual way. They are specially suited to outlying districts in the colonies, where there is grass all the year, and where settlers' single cows are many miles from a bull. The milk resembles that of farrow cows, being richer than when cows are some months gone in calf.

The best way to put a cow dry, without risk of losing a quarter through suppuration, is to stop milking and reduce the supply of food for a time.

Milking once a day, every second day, or after a few days when the vessel swells up, is now found to be a mistake. The action of milking causes the secretion of milk which would otherwise never form, and only retards the drying process. Bleeding is at times adopted, and a dose of 16 oz. of Epsom salts is not infrequently administered. This is the only time that salts may be given to a cow in milk, as they most effectually reduce the quantity, and in a great measure permanently for that season. These extreme measures are most applicable to cows with a considerable flow of milk, or that have been put to grass. Inferior fodder should be used up when cows are not in milk. If the fodder is very bad, a few roots may have to be given as well, or it might be necessary to sprinkle it with treacle-water from a rose-can if the taste and smell are objectionable.

There are three points that a farmer should satisfy himself upon before choosing food stuffs:—*1st*, That the price, according to feeding value of the suitable food which he selects, is as moderate as that of any equivalent he could find in the market. This is too often neglected by the farmer, and accounts at times for the prices of certain well-known feeding stuffs being far above their real values. Farmers are slow to learn and loath to make changes, especially in matters where scientific advice has to be called in to determine the quality.

2nd, He should employ those foods that do not produce a disagreeable taste in milk or butter—as cabbages, mangels, and the more common meals

and cakes—and avoid using turnips. Swedes are not quite so objectionable. Soft turnips, especially, give a disagreeable taste and smell to milk and its products. The proper time to give turnips is when the cows are dry, or, in a case of necessity, in small quantity immediately after milking; then they are thought to be less hurtful. It is asserted that cutting off the crown of the bulb close to the base of the leaves is a preventive. Palm-nut cake or meal, unless given in small quantities, flavours milk, but not very objectionably.

3rd, He should use the proper foods to suit the condition under which an animal is placed. Cotton-cake given in quantity to cows in calf will at times cause the death of most of the calves when they are about ten days old. Three pounds per day may be given with safety,—undecorticated if on grass, as it has astringent properties and counteracts the tendency to excessive looseness of the bowels. Decorticated cake ground into a fine state of division, as it is hard to chew if in lumps, is better in winter, or mixed with maize-meal when used on the grass.

Effects of a few common Food Stuffs.—Bean-meal, perhaps to a greater degree than anything else, increases the flow of really good milk. Meals of leguminous seeds have a binding or costive tendency, being deficient in oil. Bran counteracts this, and is itself excellent for milk production. Treacle is now increasingly used to fulfil the function of bran. Brewers' grains, costing 4d. to 5d. per

bushel (a full allowance for a day), are also opening, and greatly increase the flow of milk, but the quality is very poor, unless the animal is otherwise liberally fed. When used freely they injure the breeding powers, and are in consequence of most service in town dairies, where cows are being fattened off. A small quantity of malt dust in a mixture gives it relish, and as a food it is also a first-rate milk producer. Clover, green and wet, unless in small quantity, is most dangerous for cattle not accustomed to eat it, producing hoven, especially in the case of cows which are ravenous feeders. The giving of clover should be begun gradually, and when it is dry.

Hoven results from the stoppage of digestion. It may be acute, due to some sudden ailment, and dangerous to life, or chronic, the result of a derangement of long standing. In the acute form, digestion stops and gases are evolved in the process of fermentation which sets up in the food contained in the stomach of the animal, more especially if the food is of a green or succulent nature. Pressure is thus brought to bear upon the diaphragm, which is unable to act, and ultimately, if not relieved, the animal dies of suffocation. *Treatment.*—With a cow not giving milk, 1 oz. of turpentine soaked into dry meal and administered in cold gruel or cold water may overcome the disorder if given in good time. As turpentine permeates the whole system and flavours the milk, cows “in profit” should be drenched with 2 quarts of hot beer, or a pint or more of whisky made into hot toddy. In a case of urgency,

instant relief is got by puncturing the rumen with a trochar and canula at a point on the left side equally distant from the anterior spine of the ilium, the



TROCHAR AND CANULA.

transverse process of the lumbar vertebræ, and the last rib. The canula is left in the wound for a little to form a free vent for the escape of gas. On its withdrawal, the wound in the stomach contracts on account of the opening having been made when that organ was greatly distended. A clean pocket knife may be used in a case of extremity; but as there is nothing left on its removal to preserve the channel, a portion of the food blown out by the gas is liable to lodge under the skin and in course of time produce a suppurating sore. The chronic form of the ailment should be treated by the administration of repeated doses of treacle along with $\frac{1}{2}$ oz. of carbonate of ammonia or turpentine as tonics, or salts with 2 oz. of a mixture of ground gentian and ginger.

A mixture of good permanent grasses and other plants, grown on soil naturally fertile, but in a state of Nature, is by far the best food for making the most perfect dairy products. Grass or forage crops from highly improved land or irrigation meadows, although they may increase the quantity, diminish the quality of milk, and more particularly its products, and make it often much more difficult to manipulate in

manufacture. The same remark applies to cakes and most other foods given to cows while on the grass. If there is not inferiority of taste or smell, the natural conditions are changed in some other way, and may appear, for instance, in the altered texture or keeping power of the butter, or in a greasy condition of the cheese.

Breeding, and Calving for the first time.—The ordinary dairy farmer should not buy but always breed his own stock if possible, paying the greatest attention to selecting the calves of the best milkers, both for bulls and heifers. When that is done there is then less risk from imported disease ; and as a man can usually breed better cattle than he can buy, he can produce animals of better quality than are to be found in the market. The milking powers of a herd can be vastly improved within a few years by this means. To fill up the places of old cows, and those that have proved unlucky or unsuitable, young heifers, to the number of between one-fourth and one-third of the total of the dairy, should be available each year. Whether it is right to calve-down at a little over two years old or a little over three years, is simply a question of feeding. If cattle are kept in thin condition, as the ordinary Ayrshire is in its native county, the best results are got by calving at “three years off.” At two years an animal, if poor, is too small, will not milk satisfactorily the first season, and is very likely to miss the bull and remain farrow the second. If heifers are well fed, and made to calve at two years off, as in the case of Channel Islands’ cows

and well-bred milking shorthorns, then the natural development and growth which go on for even years after are led into the lines of milk production, and the organs which are then most active are not allowed to become stunted from want of use, or gorged with fat in the attempt of Nature to get rid of a superabundance of material in the circulating system. Nature gives an indication of the proper course to follow, in well-fed animals if not over-fat coming in season sooner and more regularly than poor ones. Very fat cows are most uncertain breeders, and when this is overcome they usually produce small calves.

The usual period of gestation is nine *calendar* months.

Signs of Pregnancy.

1. A cow does not come a bulling when pregnant, otherwise she should do so at intervals of three weeks. The exceptions to this rule are, that extremely poor, or, on the other hand, very fat "eild" cattle may not come a bulling so often, while some few continue to bull although they are in calf. This latter peculiarity has been noticed during the early stages of tuberculosis.

2. The right side of the belly becomes enlarged, and after a time the calf, as a hard lump, can be felt with the hand near to the flank, and seen to "jump" or "quick" at times, especially when the cow drinks cold water.

Signs of approaching Parturition.

1. Enlargement and firmness of the udder and teats.

2. Fluid may be drawn from the teats more milk-like and less watery than that found in the teats of eild cows.

3. Loosening and enlargement of the hinder parts, as the external portions of the organs of generation, and relaxation of the pelvic ligaments. Large heavy cows then find it difficult to rise or walk about. These indications often last for days.

4. Within a short time of calving, which might extend to a few hours, a cow becomes restless, lies down and rises frequently, and whisks her tail, as if in pain.

5. The right side becomes flatter as the calf goes into the pelvic bones.

Calving.—It is wrong to assist a cow too soon, and it is equally bad to leave her in difficult labour until she is worn out and the pains become weak. The young within the mother has its head and legs doubled up, and takes the form of a ball enclosed within a bag called the “amion,” “clean,” “fœtal-membrane,” or “after-birth.” The bag contains a slimy fluid in which the calf floats. The fluid lubricates the passage on the membrane being broken. When assistance is given, the hand and arm should be well rubbed with carbolic oil before being inserted. The right position for the calf is with its head and fore-legs “forward,” in the position of a man diving. When

the hind legs come first, there is considerable difficulty, but it is not often so necessary to turn the calf before pulling, as with many other false presentations.

The cow should lie on her side, and the pulling, which is done by the fore-legs, should not be straight, but inclining slightly towards the houghs of the cow: one man distending and freeing the os vagina with his hands. A cow should be raised immediately after calving to prevent after-straining. If the animal is exhausted and there are no symptoms of straining she may be overlooked, and left to rest for a few minutes. She may have a small drink (say 1 gallon) of cold water with a little oatmeal thrown into it, and this repeated every few hours until thirst is quenched. It is an unnecessary precaution and a mistake to warm the water, as a cow will often not drink it. All that is necessary is to beware of giving too much at a time to chill her.

In protracted labour stimulants are necessary, as one pint bottle of whisky, a quart bottle or more of beer, or $\frac{1}{2}$ oz. of carbonate of ammonia. A mouthful of cold water is often beneficial.

Common Causes of Protracted Labour.

1. False presentations.
2. Death or deformity of the calf, at times necessitating the cutting and removing of it in pieces. Sometimes it becomes mummified and remains in the animal for years: the cow coming a bulling,

but unable to breed. At other times it rots and comes away gradually in small pieces or as putrid matter. In this case the animal gets into a very lean condition and poor state of health, and may even die of blood-poisoning.

3. Disease, or abnormality of any of the internal reproductive organs.

The "cleansing" hangs for a time, but should come away within a few hours. *Treatment*—Give opening food stuffs, as linseed (made into tea), bran-mashes, and treacle.

Abortion.—When a cow calves before her time she is said to "cast," "slip," or "pick" calf. The calf is usually dead, but it may be alive and live even if so early as the seventh month. In any case the loss is great, as there is usually no adequate preparation by the cow for milking.

Causes of Premature Labour.

1. Eating ergotized grass in autumn.
2. Injury, as from horning by other cattle, hunting by dogs, crushing out of narrow doorways, shaking and bruising on a railway journey, etc.
3. Walking through a dung heap, or over boggy or soft land, and getting strained.
4. Very cold or foul water, or too many frosted turnips, especially if given in the house while the animal is not moving about.
5. Superpurgation, either natural or induced by physic.

6. Any contagious, febrile disease, of a serious character.

7. Contagion arising from association with newly aborted cows which are affected with contagious abortion, or from bad animal smells.

The last is perhaps more common and dangerous than all of the others put together, because its work is being done unseen, and it often cannot be easily avoided, even when its presence is detected.

Symptoms are usually seen for some days, or even a week or two, before the crisis comes. A cow should be taken out of the lot, whenever this is noticed, which may be done by taking the temperature if a man is on the outlook for it. The normal temperature of a cow in a byre is not over 102° F., even when kept too warm and close, but it goes higher as abortion approaches if the affection is of a contagious nature. Quiet and proper dieting may sometimes avert it, if the calf is not dead.

In cases of abortion the after-birth usually adheres firmly to the button-like connexions (cotyledons) with the uterus, and part of it often remains rotting for weeks. The cow falls off in condition, and if not attended to there is danger of absorption of the fœtid matter into the circulation, blood-poisoning, and death. Should the opening-food treatment not succeed in two or three days, the bulk of what is left is sometimes removed by the hand, which should be well smeared with carbolic oil before being introduced to sever the connexions. Tepid water, con-

taining 1 per cent. of pure carbolic acid, should be injected to wash out twice a day. This is not a practice to be recommended at any time, but is most dangerous if rapid decay of the "cleansing" is going on and putrid matter is present. The points of attachment to the uterus are left more or less open sores, by which poison may get into the blood. Cows that have been thus treated do not readily conceive.

Means of Preventing Abortion.

1. Cut over in the pasture the seed stems of grasses, like rye-grass, liable to ergot.
2. Prevent fright or injury of any description.
3. Whitewash the inside walls of byres twice each year with fresh lime, and disinfect now and then with carbolic acid, chloride of lime, or hot lime.
4. Remove all decaying animal matter that is within reach of the cows.
5. Have the floors of the stalls as nearly horizontal as possible.
6. Remove at once from among the cows any animals that have aborted, and those that threaten to go wrong.
7. Get quit of all such unlucky specimens before another calving season.

Professor W. O. Williams, writing on the Prevention of Epizootic Abortion, says:—

"Prof. Nocard, of the Alfort Veterinary School, who has made the study of epizootic abortion in cattle a speciality, formulates the following measures for its prevention:—

“*a.* Every week the cow-shed floor should be thoroughly cleansed (if unpaved, the soil should be scraped), and sprinkled with a solution of sulphate of copper (10 drachms to 1 $\frac{3}{4}$ pints of water).

“*b.* The individual treatment of the cows is more complex, and should consist of—

“1. Vigorous vaginal injections of the following fluid (with a horse enema syringe), which ought to be tepid :—

Distilled or Rain Water,	.	35 pints.
Glycerin,	.	}
Alcohol at 36°	.	
Bichloride of Mercury,	.	grs. 75.

Dissolve the mercury in the alcohol and glycerin, mix them thoroughly with the water, and keep the fluid in a wooden vessel away from animals and children.

“2. Every morning, when cleaning the cows, with a sponge dipped in the fluid, carefully dress the vulva, anus, and anterior surface of the tail of all of them.

“3. When a cow aborts, she should be delivered at once by hand, and the fœtus and its envelopes immersed in boiling water, or destroyed by fire.

“The uterine cavity should then be irrigated with twelve to fifteen pints of the above fluid, by means of a long piece of india-rubber tubing passed into the organ by the hand.

“The intravaginal or intrauterine injection always causes, especially in young cows, apparently violent expulsive efforts, but these, in reality, do no harm. As to the cows in which the contagium has already reached the interior of the uterus, nothing can be done. The treatment does not produce any good effects until the second year. In the first year there are always some abortions, though they are less numerous.

“Nocard has obtained the best results from the employment of this method, and he is of opinion that a single vaginal injection, given at the commencement of the treatment, will establish asepsis, but only when the daily sponging of the vulva, anus, and tail is strictly carried out.”

“**Pressing,**” “**straining,**” or “**after-pains,**” producing inversion of the uterus, are very frequent after difficult parturition, being caused by injury or

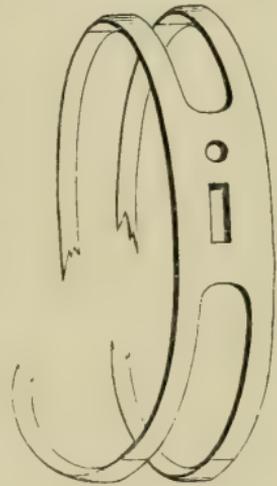
irritation. Injecting laudanum and carbolic oil,—carbolic 1 to 7 or 8 of oil,—if taken early, suffices to allay it. Carbolic oil used alone has been known to increase the irritation in the case of a scratch or injury, and to drive the cow almost frantic.

When the displacement of the uterus is noticed before it is far out, it may be easily replaced by closing the hand, to prevent injury by the finger tips, and pressing gently but firmly. If necessary, the uterus may be washed previous to replacement, tepid water being used as giving less pain than cold. The hand is withdrawn after the right position of the uterus has been secured. The most effectual way to prevent its reappearing is to stitch over from each hip, so as to pass over the lips of the vulva and give support, clean, white tape or wire drawn through three holes made by a pen-knife in the skin on each side. The treatment appears cruel, but is the only effectual remedy in serious cases. Amputation is the only course when the ailment is allowed to go very far. To insure safety, before any symptoms of pressing appear, and also in mild cases, cow-breeches are of great service, but are of little use when it is severe, as they cannot be put on very tight.

Cow-breeches are made of ben leather, with four strong canvas terminations, in a form shown in the accompanying figure. They are put on to prevent expulsion of the womb: openings are left for the escape of the solid and liquid excrement. The tail of the cow rests in the bifurcation of the two upper ends ;

these cross over the back, and are carried forward and tied to a strong band or girth fastened tightly round the body in the region of the heart, while the other ends conducted past the udder (one on each side) cross on the belly and are similarly fastened below.

Protrusion of the Vagina (or the "body" in common language) occurs both before and after calving, when some animals that are in high condition and well fed lie down. The proper treatment is to bathe for the purpose of cleaning, and wash with a solution of chloride of zinc to stimulate the relaxed parts and to prevent smells. The floor of the stall should be a little higher at the heels than at the knees of the animal, and the food should be concentrated rather than bulky.



COW-BREECHES.

Milk-Fever or **Parturient Apoplexy** occurs not so much in fat cows as is usually supposed, as among cows that are being well fed, and are full-blooded and thriving rapidly at the time. Many fat cows are in this condition, but very many that die of milk-fever cannot be said to be fat. Deep milkers are more liable to it than others, but only in the case of cows of more than one calf. It usually appears within three days after calving, but sometimes, though rarely, before it. Digestion stops, there is

high fever, with pressure of blood on the brain, and consequent loss of power. In severe cases there is little chance of recovery unless bleeding is resorted to in time. Eight lbs. of warm treacle and a teaspoonful of saltpetre (nitrate of potash) should be given as soon as practicable. This acts quite as quickly as Epsom salts, and is more suitable for a cow in milk. Stimulants (as a pint of whisky, or, if not at hand, an equivalent in strength of beer) are indispensable; turning three or four times a day should be practised; and friction, ironing, or a mild blister, mustard or turpentine, applied to the back along with cold water to the head; and the milk should be very frequently drawn. The whites of eggs broken up and rubbed on the back is a favourite remedy with some. Milk-fever is often induced by giving cows their own milk to drink at first, when it is of little value, especially if not mixed with an equal amount of water. With poor, weak cows, however, this is a good and safe practice.

An attempt at prevention is best, though at times all precautions fail, and it is difficult to see why. It is advisable to restrict, as by shutting up at night without giving anything, the amount of food for some time before calving, and to keep the bowels open by bran or grass. Green food in moderation is less to be feared than that which is hard, woody, and indigestible, as rye-grass hay, which perhaps has been over-ripe when cut. If the udder is very large and troublesome, milking should be done

regularly, even ten days before calving. Should these preventives not prove sufficient, as would be shown by one cow of a number similarly treated becoming affected, the animals most likely to become ill may be bled and physicked a day or two before delivery, or only physicked with 14 to 16 oz. of Epsom salts, followed, in fourteen or fifteen hours, by a pint of linseed oil to counteract the costive after-tendency of the salts. This may be repeated. All the above treatment is directed to the reducing of the plethoric condition of the blood, and the keeping of the digestive system in good working order, without at the same time doing anything to permanently reduce the natural flow of milk after calving.

Trembling or Loupin' Ill in cows is very like milk-fever in symptoms and treatment, though the cause is quite different. The disease is described under sheep.

Weed.—Lean cows often go down within a few days after calving, especially if exposed to cold or draughts, and are quite as helpless as those in milk-fever. The great difference as compared with milk-fever is, that there is no fever and no flow of blood to the brain, and the animal often eats and drinks well, and will even milk heavily for a time. The method of nursing is the same, only part of the other treatment is varied to suit the different condition: bleeding, or the application of cold water to the head, is unnecessary. Weed is altogether prevented by keeping a cow in a warm and comfortable place after

calving, and covering the back with a sheet for a few days.

Inflammations of the Udder.—1st, *Udder-Clap* is an affection which attacks cows that have given milk, but are at the time yeld or dry. Heifers with fleshy udders, but which have never bred, have been known, but rarely, to take it. It is thought to be produced by the “striking” of a gad-fly, and that this sets up inflammation, which is followed by suppuration. It appears usually in or after hot weather in August. One-quarter of the vessel swells and becomes painful. If not treated in time, two or more quarters may become affected, high fever is set up, and a hind limb may become involved. At times the enlargement extends along the belly and down the fore-legs. Death is often the result in extreme cases, and there is at least the loss of one-quarter of the udder, and from one-third to one-half of the value of the animal.

The Treatment is to give a dose of salts, rub, bathe, and draw the quarter every day until pus disappears. Should it be too far gone, or if daily attention cannot be paid, the teat is either cut off by the neck, or a good opening made with the knife in the flesh of the udder near to it. The only difficulty after that would be from flies on the wound, unless the weather became cold for a few days. This form of disease is effectually prevented by rubbing the vessel, at least three times, at intervals of two weeks with a mixture in equal proportions of Archangel-tar and butter or grease. By beginning in July, the

fly is kept off, and, besides, the tar acts as a stimulant, although the grease dilutes it sufficiently to prevent blistering.

2nd, Common Inflammation or "garget" of the udder comes when cows are in milk, and have been badly managed or injured in some way, the gland being swelled, red, hot, and painful. It most frequently follows "hefting" for sale or show, or it may result from cold immediately after calving; it is then called catarrh of the udder, weed, or garget.

The Treatment is to apply mustard and rub with grease (this stimulates and softens the part), milk very frequently, and foment with hot water, or, in an extreme case, use bran poultices, slung up against the udder by means of a broad band of strong canvas passing over the back. Give oil or treacle to open the bowels.

Impaction of the Rumen or first stomach is not uncommon when cattle are in poor condition. It may be caused by unsuitable food, as when they are fed solely on cut straw and pulped roots, when much use is made of dry, concentrated rich food, such as cotton-cake or bruised grains; and again it may occur when cattle are turned out to bent land on the hills in spring. *Treatment.*—Withhold bulky food, and give gruels, which digest without necessitating chewing the cud; give stimulants also, and repeated doses of oil or treacle to keep the bowels open.

Persistent impaction may be caused by something hard, like a piece of old shoe leather, which has been swallowed. This can only be got rid of by

cutting a hole on the left side into the stomach and removing the foreign substance, and giving very little food for a few days till the wound heals.

Choking is most frequent when animals are fed on whole potatoes or small turnips. A lump of the unchewed root slips over the throat and sticks there, the gullet spasmodically closing before it. A "pro-bang" is a dangerous means of relief unless in very skilled hands, the gullet being so easily ruptured if force is applied. The most simple and most effectual practice is to gag the animal by fastening a stick across like a bit, to keep the mouth open to avoid choking by saliva which then runs from the mouth, and also to prevent the formation of gases in the stomach. Choking may be prevented by keeping down the heads of the animals while feeding on roots, by letting down on the backs of their necks a long pole about four inches in diameter, hinged on to and suspended from the rail supporting the upper ends of the stakes to which the cattle are tied.

Lameness may be caused by something hard, as a small stone picked up and fixed between the digits, or by scalding in wet seasons. A hind-leg can be held up for examination and treatment by a man on each side standing in close to the cow, and lifting by means of a stick, about the length and strength of a single-horse whipple-tree, which is put across between them in front of the hough.

A strip of strong canvas, drawn backward and forward between the hoofs, clears away all dirt or

foreign matter ; thereafter footrot-mixture,* or some other acid stimulant, should be applied by means of a thin splinter of wood.

Cows or bulls which are not allowed much exercise get lame through the hoofs growing very long and turning up at the toes. The surplus horn may be removed by sawing, and then using a pair of long-handled powerful shears for the purpose of finishing.

* As that of Joseph Ewing, Dumfries.

CHAPTER XII.—PIGS.

Pigs—*Sus scrofa* and *Sus indicus*—General Show Points of Improved Breeds—The Bacon-curer's Pig—Changes in Feeding and in Curing—Distinguishing Characteristics—Yorkshires—Large, Small, and Middle Breeds—Scotch White Pigs—Black Breeds—The Berkshire—The Essex—The Tamworth or Staffordshire Breed—General Management—The Breeding Sow and Her Treatment—Fattening Pigs—Feeding—Cooked *v.* Uncooked Food—Warrington's Estimates of Dead and Live-Weight—Berkshire Crosses and their Yield—Cost of producing One Stone of Pork—Number of Pigs kept in a Dairy—Diseases of Pigs.

PIGS are divided into two groups—*Sus scrofa* and *Sus indicus*.

The latter, or Chinese pig, is by far the more improved (refined) of the two.

The Scrofa, or the European pig, is sprung from and resembles the wild boar. As compared with the Indicus type, it is longer, leaner, narrower, coarser in bone, in hair, and in every way; the nose is longer and the forehead narrower, but these defects in form are associated with a hardier constitution.

Improved pigs in this country are usually divided into two classes, White and Black, but the chocolate-coloured Tamworth deserves now to be mentioned in such a classification.

The Whites prevail in Scotland and the north of

England; the Blacks in southern England. Between the two, in central England and Wales, are to be found the russet colours and the mixtures of the three colours, the result of crossing. All have been improved by crossing the ancient native pigs with the improved Indicus, and by selection. The Berkshire and Essex breeds, for instance, were improved about half a century ago by the use of a number of imported pigs belonging to an Italian breed, the Neapolitan, which had been dashed by Indicus blood.

Improved breeds have a much greater tendency to fatten, have finer forms, but are not so active and hardy of constitution as the older kinds. Close-breeding shows itself by want of sufficient hair, inability to breed, or deformity of structure. There are many mixed or small local breeds in Britain, but only a few of the leading ones need be described.

POINTS APPLICABLE TO ALL IMPROVED BREEDS.

(Show-yard Standard.)

In judging it is best to begin at the feet and legs; these are most important, as they have to carry the weight when the animal is fat and heavy.

Feet small and neat.

Legs perfectly straight, fine boned, and fleshed down as far as possible in both fore and hind-quarters.

Back broad before and behind, not drooping too much at the rump when walking out. Pigs are all liable to arch in the back and droop at the rump when standing. Back-line straight and extending over the neck; belly-line parallel, and continued below the jole.

Ribs well sprung and deep.

Neck thick and of medium length.

Ears, in most, not too large or flapping.

Head small, broad between the eyes; nose short; the under jaw shorter than the upper; cheeks very full; eye not too small, quick, but mild.

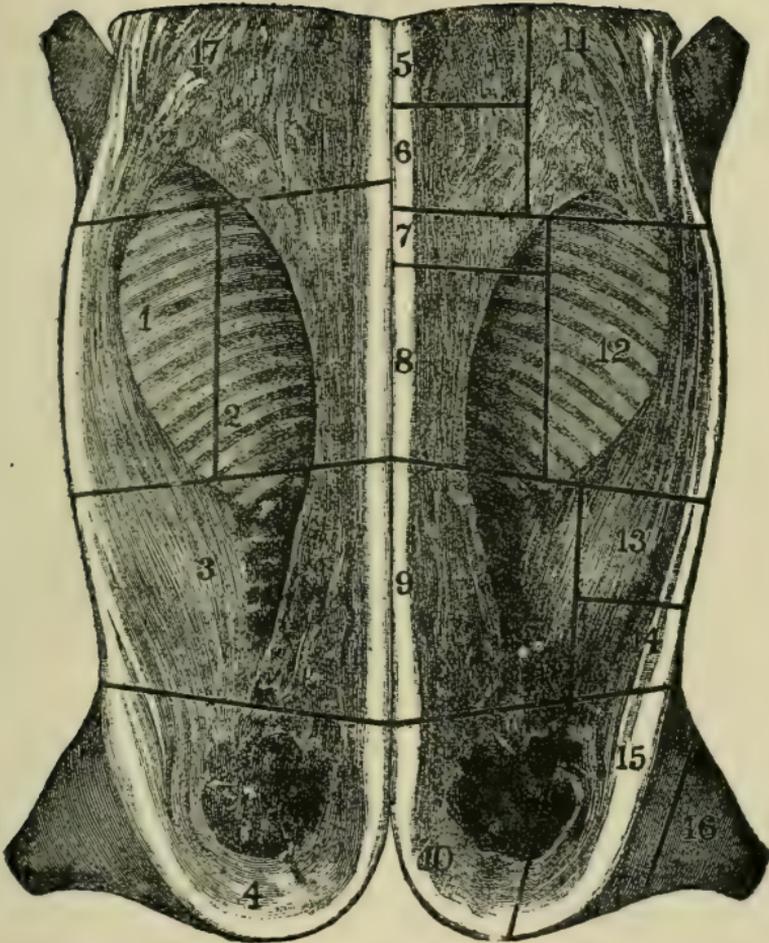
Tail long, and a tuft of long hairs on its tip.

Body well covered, all over, with flesh, and of a rectangular shape from all points; deep and wide before and behind.

Skin medium in thickness, and covered with an abundance of hair.

Though the points enumerated are those looked for at shows, it has been most forcibly pointed out by Sanders Spencer,* one of the most successful breeders of white pigs in England, and also by those interested in the bacon-curing trade, that the most economical pig to breed, and consequently the one which ought to be encouraged in the show-yard, should be long in the body, a good medium depth in the ribs, light in the neck and forequarters, and heavy and deep behind in the hams or gammon; or, as A. W. Shaw of Limerick has tritely put it: "What

* Paper read at the Irish Conference of the British Dairy Farmers' Association, May 1887, by S. Spencer, Hollywell Manor, St Ives.



MODEL SIDES OF BACON.

Current Prices		Current Prices	
No.	per lb.	No.	per lb.
1. Streaky Quarter . . .	11d.	10. Fillet . . .	10d.
2. Rib Quarter . . .	11d.	11. Shoulder . . .	6d.
3. Middle Quarter . . .	8½d.	12. Prime Streaky . . .	11d.
4. Ham Quarter . . .	8½d.	13. Thin Streaky . . .	8½d.
5. End of Neck . . .	7½d.	14. Flank . . .	6½d.
6. Middle of Neck . . .	8½d.	15. Middle of Gammon .	11d.
7. Thick Back and Sides .	10d.	16. Knuckle of Gammon	7d.
8. Prime Back and Ribs .	11d.	17. Fore-End . . .	6d.
9. Loin . . .	10d.		

Reproduced from the paper mentioned in footnote, page 170. Though the prices are not changed they fairly represent current rates, which vary according to local circumstances in different places, or localities of the same place.

is really wanted is a pig that is neat in the head, light in the neck and shoulders, deep in the heart, thick in the loin, stout in the thighs, and short in the legs,"—the reason being that changes in the curing trade and the pork market have resulted in certain parts of the animal being of greater value per lb. than other parts, as will be seen from the accompanying Plate after an original diagram shown by A. W. Shaw. The shoulder and neck being of least value, it is shown that it is a waste of food substance to transform it into flesh of inferior quality, if by selecting animals with tendencies to greater development in the more valuable parts a greater amount of material of higher market value can be produced.

A great change has come over the system of feeding pigs, as well as of curing their carcasses, within comparatively recent times. A generation ago it was the custom to kill pigs about two years old, at enormous weights, after the flesh had become coarse and inferior. The method of curing left the lean flesh gorged with salt, hard, indigestible, and uninviting: then it was an advantage to have a large proportion of fat to lean. Now, however, the systems of mild-curing leave the flesh sweet and juicy, and all efforts are directed towards the production of as great a proportion of lean to fat as possible. The large increase of the consumption of fresh pork has also encouraged the demand for young lean bacon; and, on the other hand, the change of fashion which has put young and tender pork on the market has helped to increase its consumption.



53.—LARGE WHITE BOAR, FOURTEEN MONTHS OLD, "HOLYWELL WINDSOR," BY "HOLYWELL KING," 509, OUT OF "HOLYWELL GEM," 708.

The Property of SANDERS SPENCER, Holywell Manor, St Ives, Hants.

DISTINGUISHING CHARACTERISTICS.

WHITE BREEDS.

The **Large Yorkshire** is the largest breed of pigs in the United Kingdom, and one of those directly descended from the original pig of the country, and, it is asserted, without having been crossed with foreign blood. It has been vastly improved within recent years, still it inclines, even in its modern form, to exhibit the points of the wild pig, viz., a hardy constitution, more or less drooping hind-quarters, large head, long nose, large, overhanging ears, strong bone, flattish sides, and proportional narrowness as compared with the Berkshire, when the great length and weight of the Yorkshire are taken into account. The size to which the animals are now reared has been much reduced within the last generation, but this is more a matter of change of system of management than a change of breed. It was no uncommon sight at the Royal Agricultural Society's shows a few years ago to see large Yorkshires estimated to weigh over 50 imperial stones, or as much as a bullock.*

The tendency towards early maturity, arrived at by greater care in breeding and better feeding and management, has yet left as an attribute of

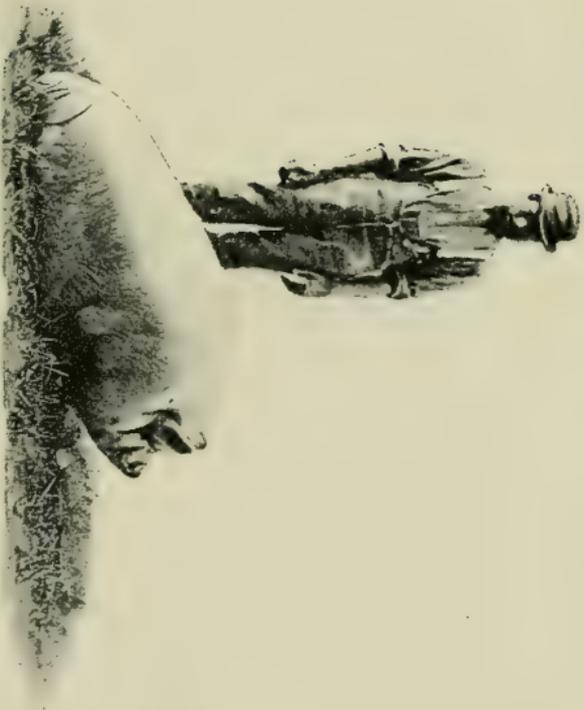
* Sanders Spencer's boar, Sampson VI., winner at the Royal Society's shows at Carlisle and Derby, weighed 9 cwt. as he walked.

the breed the property of lean flesh production as against fat production,—a quality which continues to grow in favour with bacon-curers and in the public taste.* It is thought that the general improvement of the large breed of White Yorkshires was initiated by crossing with improved Leicestershire white pigs, which had been themselves improved by Bakewell, who applied to pigs the system of breeding already explained under cattle.

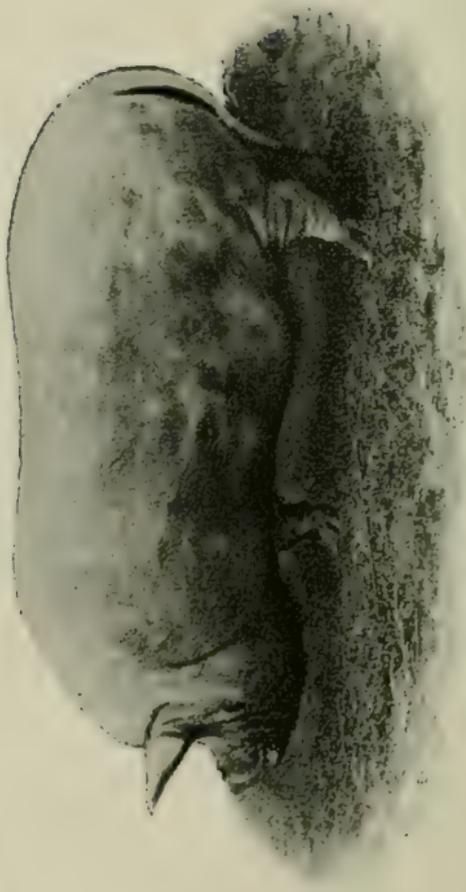
The Small Yorkshire is descended on one side from the same native ancestors as the large Yorkshire, nevertheless the two breeds resemble each other in nothing but colour. The small breed is noted for its refinement and beauty, its small bone, and great tendency to run to fat,—qualities which have been acquired through its ancestors crossing with Chinese pigs.

The small white occupies among pigs the position which the Southdown sheep holds among the Down breeds. It is not so much a tenant's pig as a landlord or gentleman's pig, when bred pure. It produces excellent fattening animals by crossing with any of the common pigs, or even with the Berkshire. It has been used for crossing in the improvement of inferior breeds.

* Referring to the foreign trade, Sanders Spencer, writing to me in 1889, says that during the last four years breeding pigs (boars especially) have been sent by him to many important centres of bacon curing in Ireland, Canada, Germany, Holland, Denmark, Sweden, and quite recently to Russia, where the government are assisting in the establishment of bacon-curing factories.



57.—SMALL WHITE YORKSHIRE SOW, "PRIDE OF OXFORD,"
In 1878 First at Bristol, also Two Champion and Ten other Prizes
Bred by SANDERS SPENCER, Holywell Manor, St Ives, Hants.



58.—MIDDLE WHITE BOAR.

Winner of Five First and Two Special Prizes.

The Property of SANDERS SPENCER, Holywell Manor, St Ives, Hants.

Points.—The body is rounded, plump, and symmetrical ; the head small ; the ears small, erect, and inclining forward ; face excessively dished ; nose straight while still young, but becoming much contracted and quite turned up after a time—like the nose of a pug dog.

The leading drawbacks to the breed are the small numbers of young usually got at a birth, and the general delicacy, requiring extra care and attention, especially while young. Both points of weakness are no doubt due to close-breeding, but in the matter of hair the animal does not seem to have suffered in at least one of the ways in which the injury from in-breeding usually shows itself. The small breed is quite famous for a profusion of long and fine hair. Its refined character of flesh suits it best for producing porkers, but the want of a due proportion of lean flesh to fat, besides a want of balance of parts in the animal according to the demands of the cured-bacon trade, excludes it from being a favourite with bacon-curers.

The Middle-bred Yorkshire breed is the produce derived from a cross between the large and the small Yorkshire breeds. As might have been expected, in accordance with the general laws and principles of breeding, the small refined and so-called improved breed has stamped its likeness more fully on the produce of the cross than the large and less refined Yorkshire. The middle breed is little more than a large variety of the small white, being

only slightly modified in form through its relationship with the larger animal.

Theoretically, it ought to combine the good qualities of the two distinct breeds, but as yet the want of uniformity of type and the uncertainty as to the character of its produce are not fully overcome. The recent changes of fashion in the market have been rather in favour of those qualities which are produced in the most perfect form by the large white and the Tamworth breeds as against the quality for which the small breed is prized, of producing at a rapid rate quantities of over-fat meat. Had the middle breed taken more after the large than the small variety, it might have secured even a greater share of good favour than has fallen to it.

Lincolnshire Lop Ears are large, rather coarse pigs, but they are good feeders. They have long straight noses, with an abundance of curly hair. They are often a little heavy in the forequarters, and in this they do not tend to conform to the fashion of the times.

The Common White Pigs of Scotland have some of the characters of the large Yorkshire, but are hardier than those of improved pure breeds; they have longer noses and longer legs. They are slower feeders than south-country pigs, but milk well, and breed excellent crosses by the more highly improved boar, such as the Berkshire or the Yorkshire. The



59.—BERKSHIRE BOAR.

The Property of RUSSELL SWANWICK, Royal Agricultural College Farm, Cirencester.

crosses when fat, and weighing about 12 stones, have about 1 stone less offal than the pure Scotch pig.

DARK BREEDS.

The **Berkshire** is dark brown or black, with a pinkish skin; a little white on the nose, forehead, feet, and tip of the tail; the nose straight, only the face a little "dished," as is the case with all pigs; in size it is intermediate between small and middle-bred Yorkshires.

Defects that are frequently met with:—

The Quarters droop from being too short, and the *Tail* is then consequently too low set.

The Ribs flat, causing deficiency of girth.

The Skin furrowed, with deep lirks down the sides.

The Flank light, and the animal leggy.

The Absence of white on the tail indicates the presence of Essex blood.

The Hair, when too hard and strong, shows want of breeding; when not abundant (especially in the boar), want of constitution.

Berkshires are great favourites, the boars being valuable for crossing. They are widely distributed throughout both England and America. Crosses by the Berkshire boar on white pigs are often partially red in colour, showing that they have descended from the chestnut-coloured native pig from

which the Tamworth has also sprung. The produce of a Berkshire sow by a white boar is almost invariably white, though dark colours frequently appear in after crosses.

The **Essex** pig is much like the small Yorkshire and the Berks pig, but is altogether black. Though not so widely known, it is well bred and has good points, including a fine head. It, like other varieties of the same black type, **Dorsets**, **Devons**, **Shrops**, has become by natural selection well suited to surrounding conditions in its own district. All these breeds are improvements on the old forms of the localities which give the names.

The **Tamworth** or **Staffordshire** Breed from the Birmingham district seems to be the most direct descendant of the aboriginal pig of the country. If crossed with the imported Neapolitan and Chinese pigs, which were used in the improvement, or, more correctly stated, the refinement of nearly all the existing breeds of this country, the influence of the cross has not been so distinct as in the case of other breeds, as may be seen from the greater length of snout and the greater tendency to grow a good proportion of lean bacon. In this respect the Tamworth resembles the large Yorkshire, and is in consequence, in its improved form, a favourite with bacon-curers, who object to a great proportion of fat, a heavy jole, and excessive breadth of back. The common uncared-for specimens of the breed are



60.—TAMWORTH BOAR.

Reproduced from "Stephen's Book of the Farm," by JAMES M'DONALD.

The Property of the AYLESBURY DAIRY COMPANY, near Horsham.

undoubtedly leggy and ungainly in appearance and slow maturity animals, but these defects have, within the last 5 or 6 years, been greatly modified, it is said, by crossing with the Yorkshire breeds. The improved pigs still retain the great length of nose and hardiness of constitution, and are through selection attaining the power to lay on flesh rapidly. The great function of the Tamworth breed ought to be to produce crosses by animals of the Berkshire or Yorkshire breeds. By this means good pigs for fattening purposes can be secured. The colour of the breed is reddish or chestnut, sometimes a tawny gray with black spots. This is a breed which has come but recently from local obscurity into public favour, and is likely to have a successful career in the immediate future. Separate classes for Tamworths have been formed for the last four years at the shows of the Royal Agricultural Society. At the Nottingham show in 1888, the competition was unusually keen and the quality superior to that of former years; of the ten prizes offered, seven went to the neighbourhood of Birmingham, two to North Lincolnshire, and one to Sussex.

GENERAL MANAGEMENT.

The Breeding Sow should be lengthy rather than short, yet not out of proportion, and should possess the characteristic points of her breed. She may be put to a young boar for the first time when big enough, say six months old. If "missed," she will come back

in exactly three weeks. The period of a sow's gestation is sixteen weeks. Breeders should run out till near farrowing to take plenty of exercise and to get green food, and also to save expense. There should be six or eight pigs reared the first litter, and ten to twelve, or even more, in after litter, if there are teats enough. A bad milker, or one that kills her young, ought to be fattened off. Sows kept to breed pigs for fattening pay best to feed for bacon after the second or third litter. Usually two litters are got in a year. Pigs are weaned about six to eight weeks old, and a sow comes in season for the first time after breeding (according to condition) about three days to one week after the pigs are removed. Forty-six to fifty weeks are thus occupied, according to the age of weaning. They may be made to have five litters in two years by beginning to feed the young on milk at two or three weeks old. Gradually thicken the milk with oatmeal porridge, and, after a little, turn the mother out during the day, and feed her liberally. She should then take the boar before the pigs are weaned, when they are about five weeks old. When milking very heavily, an animal is not in that condition in which she is most likely to come in season or conceive.

All pig-houses should be warm in cold weather. No animal of the farm is more injuriously affected than the pig with cold or damp. "Sows" should be managed so as to have the young ready at the season of the year when there is most food for them, and when the weather is mild.

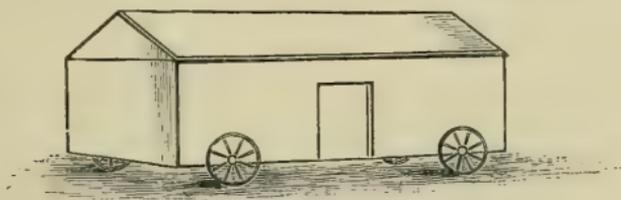
A few days before farrowing, a sow should be put by herself into a place about 10 feet square, which has been fitted round with strong planks placed horizontally, projecting 8 or 9 inches from the wall, and elevated the same distance from the floor, to keep the sow from lying close to the wall and killing the young pigs by overlying them. The planks also form a protection against cold in frosty weather. One corner should be floored by a raised wooden platform of 1-inch boards to keep the bed dry. The person who is to attend at farrowing should take charge from the first, and the place should be well bedded with straw. The sow takes up straw in her mouth and makes a nest within a few hours of farrowing. The operation may extend over hours, but the sow requires no assistance: she is very sick and quiet, and should lie all the time. It is rare to see a pig dropped while the sow is standing. * When restless, she is very troublesome. Sometimes the young are put at once into a warm basket to be safer than by the mother's side. They should have a suck as soon as possible, and be watched day and night for three days. A good stable-lamp may be left hanging at night after this for some time. The food of the mother should be sloppy, and for the first two or three weeks largely composed of sharps and bran, but afterwards made more nutritious by the addition of barley, oat, wheat, or rye meal. If whey is given to the mother without being boiled or soured it produces diarrhœa in the young pigs. The young grow very quickly

for the first few days. The ones sucking nearest the forelegs are usually the largest and strongest. Each has its own teat or teats, although they steal from each other when possible. They cannot draw milk at all times; only when the sow permits it. Then she lies flat on one side, and utters every now and then a subdued grunt.

Fattening Pigs.—A farmer or dairyman should breed his own pigs, then he secures the whole profit and reduces the risk of importing hog-cholera, or other diseases, which, as in the case of foot-and-mouth, might extend to his cattle. Young pigs vary much in price—12s. to 30s., or more, at weaning: 1 guinea is a good average, and breeding pays well at such rates. Pig-houses should face the south and be in a sheltered and dry position, and have an inner compartment and outer court, each 8 to 10 feet square, to hold five or six pigs. Six pigs, of 12 stone estimated dead-weight each, can feed at one time from an 8-feet trough. It is better to feed in the outer court rather than inside, as pigs then keep the place they lie in cleaner, by leaving their droppings outside. No bedding is required if the floor is smooth concrete with a fall inside of 2 inches to 3 inches towards the door, and if swept out every day. The outer court floor should have more fall into a sinkhole in the centre over a covered drain. Another floor is made by paving a layer of movable open jointed bricks above a good layer of dry sand, which drinks up the liquid that finds its way

into the open joints. Feeding-troughs are best made of fire-burnt clay, with a division for each pig, to prevent the weak being driven out and starved by the strong. At dairy-factories, where fifty or sixty pigs are placed in one large house and fed from long troughs, some weak ones are always kept back till the others finish, and in consequence do not thrive. Male pigs are castrated when about four weeks old and after fasting for 12 hours, but not when there is frost. Those for breeding are turned into a yard or field, and left for a few months to grow. A ring is put through the gristle above the nostrils to prevent their digging. Roots, cabbages, clover, vetches, or silage may be given uncooked and alone, or with a limited supply of other food.

Pigs going at large away from the homestead should be provided with a shelter shed. A convenient form is shown in the accompanying figure,



SHELTER SHED ON WHEELS.

9' × 5' × 3' to the Eaves. Cost about £3.

capable of accommodating five or six well-grown pigs. It can be easily moved to a new site when necessary, and placed so that the one opening shall be on the lea side to secure warmth.

Feeding.—After weaning, which should be done

gradually, as before described, pigs can be fed for months on sour whey as the only food, and do fairly well. Skim-milk should also be soured by being put into a tank or barrel tainted with the natural acidity which arises in a vessel left unwashed after containing milk. Sweet milk causes constipation. It pays well, while feeding with these or with buttermilk, to thicken with meal, boiled or steamed. A *mixture* of meal is best, and may be of beans, peas, gram, lentils, vetches, wheat (including bran, germs, and pollards), barley, oats, maize, indiana—the refuse from corn-flour works, viz., the outside or best part of the grain. The selection should depend on which are cheapest at the time. Usually small and inferior grain is taken. Costiveness is avoided by mixing bran with the food. The dung of a thriving pig should be soft and unformed. Roots are given, as small potatoes, mangels, turnips, carrots, parsnips (specially good), also cabbages. All should be cooked for fatteners, and raw potatoes should never be given to a pig of any kind. A little common salt is a necessary seasoning. Any “fallen” flesh (horse or other animal of the farm) improves the boiled mixture; but if there is much of this (as at a slaughter-house), or if the other foods are given without enough of meal, the pork will be soft and inferior. Leguminous seeds, particularly, make the flesh solid. Maize when given alone is an inferior food stuff, although when cheap it forms a suitable ingredient in a complex meal-mixture. All should be given slightly sour, and cool, but not cold.

Some extensive breeders disapprove of boiling the meal in preparation for pigs, and prefer to give it dry or after boiling water has been poured over it. Meal given uncooked must be supplied in a much drier condition than usual, else it will be swilled through the stomach too rapidly. It is difficult to find any sufficient arguments against cooking: that of greater mastication of dry food is not good enough. Fattening pigs are fed at least three times a day, but it is better to feed four times, and when newly weaned, five or six times daily. As much as is eaten up, and no more, should be given. Some coal ashes or earth thrown now and then into the outer yard for the pigs to eat improves their powers of digestion. Sometimes pigs are washed or brushed once a week. When kept perfectly clean they will not roll in the mire, unless for the sake of coolness when very hot. They go into mud to clean themselves. The mud cakes when dry, and in falling off carries scales and dirt with it.

Warrington says that "83 per cent. of the fasted live-weight of a pig (fattened for pork) should be butcher's carcase;" and also that "91 per cent. of the increase from 100 lbs. to 200 lbs. will be carcase." About 5 or 6 lbs. of meal eaten should give 1 lb. increase of live-weight. Pigs are the most economical meat producers on the farm. They consume more food per 100 lbs. live-weight than either sheep or oxen, and have much greater capacity for assimilation in the intestines, though their stomachs are

small. They consequently require concentrated and digestible food.

Crosses between the Berkshire and Scotch pig will, if properly fed and managed, in summer time when the weather is mild, weigh each 6 stones dead-weight at four months old; and at six months, 12 stones. They are usually killed for small bacon when they dress to 12 or 14 imperial stones, and sell at from 6s. to, at times, 7s. 6d. per stone. A good twelve months' pig should weigh 24 stones, about $16\frac{1}{2}$ score, or 14 lbs. less than 1 lb. of increase per day, for the last six months (182 days : 168 lbs.); while for the sixty-one days, between four months and six months, it lays on 1'377 lbs., or roughly, $1\frac{1}{3}$ lbs., per day, of dead-weight (61 days : 84 lbs.)

A pig lays on flesh fastest when from about 9 stones to 12 stones weight, and will then take per day about 10 lbs. to 12 lbs. of meal, and increase over 2 lbs. live-weight, or nearly 2 lbs. dead flesh. It is thus most profitable to kill when a pig is about 12 to 14 stones dead-weight. Any of the improved breeds should do about the same as the above, though it is the usual practice to give them rather more time, and allow them to run freely about while growing, and to feed upon home-grown green food, and thus be eight months old when at last, after closer confinement and feeding off, they reach the weight of 12 stones.

The price of mixed pig-meal, exclusive of grinding, should not average more than $\frac{1}{2}$ d. per lb. (£4, 13s. 4d. per ton), which gives the following cost of producing

a stone (14 lbs.) of pork, with labour estimated at 7s. 6d., on a 12-stone pig:—

Cost of producing a Stone of Pork.

Labour $7\frac{1}{2}$ d., and cooking food $1\frac{1}{2}$ d.,	£0 0 9
14 lbs. \times 5 lbs. = 70 lbs. grain at $\frac{1}{2}$ d.	
= 2s. 11d. ;	
<i>Ergo</i> , 83* : 100 :: 2s. 11d. :	0 3 6
Grinding grain per ton 8s., and carriage,	
say 6s. 6d. = 14s. 6d., or per stone	
of pork,	0 0 6 $\frac{1}{2}$
Average price of a young pig,	
£1, 1s. = 3 stones live-weight	
= $2\frac{1}{2}$ stones of pork at 6s. = 15s.	
21s. — 15s. = 6s. for the life ; 6s. \div 12	
(the number of stones) = cost of life	
per stone,	0 0 6
	£0 5 3 $\frac{1}{2}$
Deduct for offal 1s. per £1 of the price	
(12 stones at 6s. = £3, 12s.), viz.,	
3s. 6 $\frac{1}{2}$ d. \div 12 (stones),	0 0 3 $\frac{1}{2}$
	£0 5 0

This calculation leaves a net profit to the producer of 1s. per stone, or 12s. per pig, in addition to the manure. The great advantage in feeding pigs is in the utilization of light or inferior grains which

* The 83 p. c. of dead to live-weight is chosen in place of the 91 p. c. of increase of carcase, as the calculation is intended to show the average cost of producing pork at all stages.

cannot be marketed unless at a price below their feeding value, small or injured potatoes, or the refuse produce from the dairy, more especially whey or butter-milk. It ought to be possible to get a greater price for skim-milk in large towns or on rail than 1d. per gallon, which is all its value for feeding pigs.

One gallon of sweet-milk whey is worth $\frac{1}{2}$ d., and is equivalent in value to 1 lb. of meal if given to pigs along with solid food. Say that 550 gallons of milk are taken as a good yield per cow in a dairy. One gallon of milk weighs 10 lbs. 4 oz., and 1 lb. of curd is removed in cheese-making from 1 gallon of milk. About $\frac{1}{10}$ is left in whey, or 495 gallons \times $\frac{1}{2}$ d. = 20s. 7 $\frac{1}{2}$ d., or roughly, £1 per cow. When meal for pig feeding was rated at $\frac{3}{4}$ d. per lb., whey was worth 30s. per cow, and would be so again should a rise take place in the prices of grain stuffs.

The number of Pigs that may be kept with a dairy of 60 cows, giving sufficient meal to make good pork, is about 70, killed at six months old, weighing 12 stones each; 50 finished in the summer half-year, and 20 in spring and autumn; 10 young breeders and a boar. The extra pigs not required to feed should be sold at six to eight weeks old.

DISEASES OF PIGS

Are not so numerous as in the case of most animals. Pigs are much more difficult to treat when ill than other farm stock. If fat, they should generally be killed on the first symptoms appearing, if the flesh

is fit for food, as, at the best, there will be no improvement in condition for a time.

By improper housing, or exposure to cold and wet, pigs take rheumatism, inflammation, and cold.

Diarrhœa often follows bad feeding. Treatment—change to good food; give a purgative (Epsom salts 3 oz.) and 5 or 6 drops of oil of peppermint.

Foot-and-Mouth Disease is got by contagion from cows or other farm animals, to which pigs can also communicate it. It is not dangerous, though a heavy loss through retarding progress. The hoofs are cast. Salicylic acid lotions or carbolic acid and glycerine— $\frac{1}{2}$ dr. of acid to 10 or 12 oz. of glycerine—are applied to the feet, and Epsom salts (2 to 3 oz.), with soft food or milk, given.

Scrofula.—Tubercles form in the lungs, and the animal dies of consumption. This is most seen when pigs are in-and-in bred. It may be prevented by importing fresh blood.

Protrusion of the Rectum, from having too much flesh diet. Wash well and return; stitch across the anus from each hip; and feed altogether on milk and treacle for a time.

Measles, also called "pig typhoid," is the most common disease, noticed by a red rash, a cough, fever, and from the animal not feeding. Keep warm, open the bowels with castor or linseed oil, and the skin with sulphur (1 oz. daily), and act on the kidneys with 2 drs. of sweet spirits of nitre.

Hog Cholera or Swine Fever is the great scourge of the breeder or rearer of pigs not only in America,

but also in this country. It is most contagious, and extremely destructive of life. By a little energy in the application of the system of stamping out by immediate slaughter as soon as it is discovered, the country might be freed from the disease.

Symptoms.—Costiveness in the first, and diarrhœa in the second stages, with dulness, shivering, great thirst, and listlessness, the skin covered with red and black patches.

Treatment.—Slaughter without delay, and effectually bury the carcasses with an abundant supply of quick-lime about them. Disinfectants must be liberally used to destroy all germs of the disease.

It is difficult to administer a drench to a pig. A ready and simple method of administration is by an old shoe with the toe cut out, and then pressed well into the mouth to keep the jaws open. The drench is poured in at the shoe mouth and passes easily into the throat of the animal from the opening made at the toe.

CHAPTER XIII.—THE HORSE—THE FOSSIL HORSE—THE WILD HORSE—CART HORSES—THE CLYDESDALE, THE SHIRE, AND THE SUFFOLK PUNCH.

The Horse—Early History—Fossilised Remains—Sub-genus *Equus* and *Asinus*—Przevalsky's Wild Horse—Effects of Climate—Farm Horses—Clydesdales—Prices and Pedigrees—Points of a Clydesdale—The Shire Horse—Differences between Shires and Clydesdales—Names and History—Quotations from Walter Gilbey—The Shire Horse Society and Stud Book—The Suffolk Punch—Its Origin and Characteristic Points.

THE early history of the horse is written only on the pages of the rocks and of ancient deposits. Remains of the ancestor of the domestic horse have been found in the Swiss lake-dwellings, showing that it must have existed at very remote times.

Fossilised remains from the Eocenes in North America exist of animals belonging to the family of the *Equidæ*, and variously estimated to have been about the size of a fox or of a sheep.

The most ancient forms had four toes on the fore-foot and three behind, all touching the ground. More recent specimens exhibit three toes both before and behind, with an increase of size in the central, as compared with the lateral ones, still all formed for action in walking. Those of a later date have

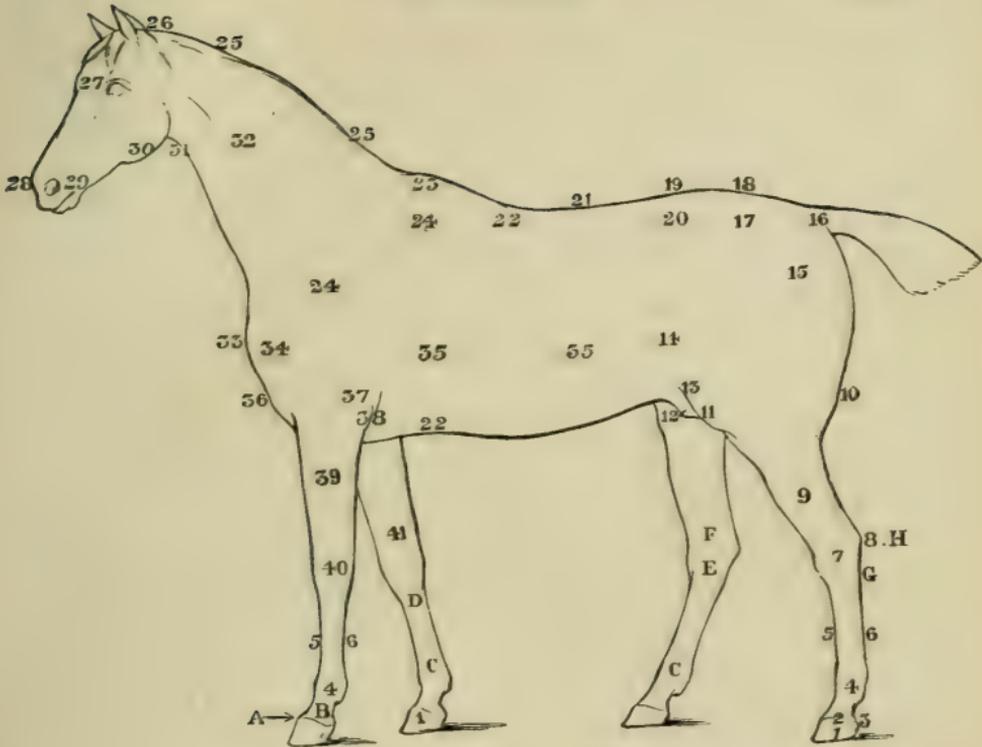
the two lateral toes functionally useless, and carried up from the ground with the middle toe well developed. In the horse of the present day, as well as in that of the fossiliferous remains of Pleistocene and recent times, the lateral toes are still further reduced, being represented by splint bones, which do not appear externally.

The true horse is specifically termed *Equus*. It is distinct from another sub-genus of the family *Equidae*, viz., *Asinus*, to which asses and zebras belong; there are in all seven well-known genuine wild forms of this sub-genus. *Asinus* is distinguished from *Equus* by the absence of warts or callosities on the hind-legs, by the contracted hoofs, and by the long hair of the tail being confined to a terminal bunch.

All wild horses, with one exception, have broken away from civilisation.

Przevalsky's wild horse,* *Equus Przewalskii*, is the only genuine one. It was found in the wild deserts of Central Asia by the famous traveller whose name it bears, and was described in 1881. In colour it is "whitish gray, paler and whiter beneath, and reddish on the head. The legs are reddish to the knees, and thence blackish down to the hoofs." Its head is large and heavy in proportion to its small stature. The long hairs of the tail begin half-way down from the base, being intermediate in appearance between the tail of a domes-

* See an account of it, "Nature," 21st Aug. 1884, and also in Nicholson's "Manual of Zoology," 7th edition.



FORTY POINTS OF A HORSE.

- | | |
|---|---|
| <p>1. Hoof.
2. Coronet.
3. Heel.
4. Fetlock or Pastern Joint.
 B. The Pastern.
5. Cannon-Bone.
6. Back Sinew or Tendon.
7. The Hock.
8. Point of Hock.
9. Second Thigh.
10. Haunch or Lower Buttocks.
11. The Stifle.
12. The Sheath.
13, 14. The Flank.
15. The Hip Joint.
16. Root of Tail or Dock.
17. The Rump.
18. The Croup.
19. The Loins.
20. Point of Hip Bone.
21. The Back.</p> | <p>22, 22. Girth or Chest Measurement.
23. Withers.
24, 24. Shoulder Blade (<i>Scapula</i>).
25, 25. The Crest.
26. The Poll.
27. The Forehead.
28. The Muzzle.
29. The Nostril.
30. The Jaw.
31. The Throat or Windpipe.
32. The Neck.
33. Point of Shoulder.
34. Shoulder.
35, 35. Front Ribs and Back or Short Ribs forming the Barrel.
36. The Chest or Breast.
37 to 34. The True Arm (<i>Humerus</i>).
38. The Elbow.
39. Arm (so-called) or Forearm.
40. The Knee.
41. The Chestnut.</p> |
|---|---|

SEATS OF COMMON DISEASES.

- | | | | |
|--|-------------------------------------|---------------------------------------|-------------------------------------|
| <p>A. Side Bone.
B. Ring Bone.</p> | <p>C. Wind-gall.
D. Splint.</p> | <p>E. Spavin.
F. Thoroughpin.</p> | <p>G. Curb.
H. Capped Hock.</p> |
|--|-------------------------------------|---------------------------------------|-------------------------------------|

ticated horse and that of the ass. The ears are horse-like, but there is no forelock, and only a short erect mane. It has warts on the hind-legs as well as on the fore-legs, and its hoofs are broad and rounded. In disposition it is timid, shy, and difficult of approach, and has been rarely seen. One specimen exists in a museum in St Petersburg.

A horse can endure great extremes of cold and heat. When the ground is covered with snow it scrapes with its fore-feet to get at its food, showing that its ancestors must have originally belonged to a cold country, where the habit must have been acquired as a matter of necessity. [European cattle do not scrape with their feet. Nevertheless West Highlanders are enabled to get at food covered up by snow when other breeds would starve.] Arabs have come to great perfection under very different conditions of temperature.

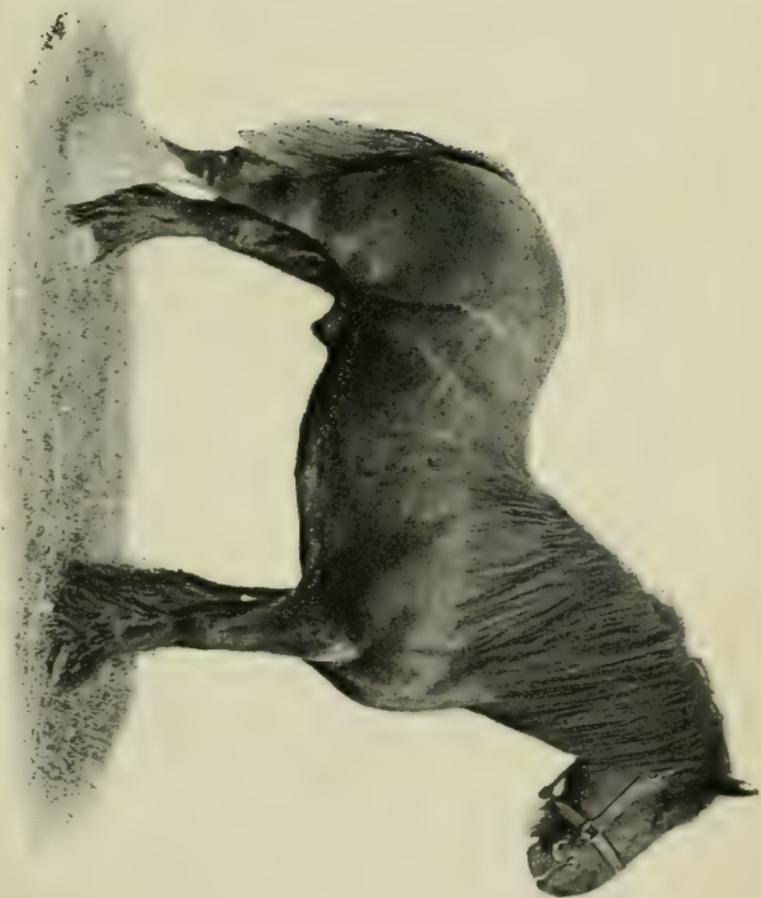
FARM HORSES—

CLYDESDALES, SHIRES, AND SUFFOLK PUNCHES.

British work horses are usually classed as belonging to three breeds,—the Clydesdale, the Shire, and the Suffolk Punch.

CLYDESDALES

Are the Scotch agricultural horses, and vary much in size—large or small ones being kept in the various districts according to the nature of the land or the



61.—CLYDESDALE STALLION, "DARNLEY."

While the Property of DAVID RIDDELL, won the Highland Society and the Clydesdale Horse Society Championships in 1884, &c.

Bred by Sir Wm. STIRLING MAXWELL, Bart.

kind of work expected of them. Though the inferior and medium specimens are not so dear as they were a few years ago, higher prices than ever are now got for really good blood.

Prices and Pedigrees.—It is reported that Col. Gilmour paid £3000 for Prince of Albion (6178), son of the Prince of Wales (673), a horse sold to the late Lawrence Drew of Merryton for £1500. The Prince of Albion is by the mother's side related to Darnley (222), perhaps the greatest rival of the Prince of Wales for the premier place as the best Clydesdale horse and sire of his day. The Macgregor (1487) and Flashwood (3604), two of the most celebrated horses of the present time, were got by Darnley. Darnley is said to owe much to the wonderful qualities of his dam, a debt frequently owed by great men as well as by famous horses.

Although foreign demand, resulting in an increasing number of horses being shipped abroad, has raised the prices of good Clydesdales, yet the owner of a really good horse has great inducements offered to retain him in this country. For example, the Glasgow Society prize horse of this year, Sir Everard (5353), may be calculated as follows to earn £700 to his owner during the coming season—May, June, and July :—

The Society's premium,	£150
Service fees of say 100 mares @ £3,	300
50 mares estimated to prove in foal, @ £5,	250
	<hr/>
	£700
	<hr/> <hr/>

The exportation of so many entire horses has reduced the natural supply of the best kinds of dray horses in the market, and complaints are now made that certain classes of horses are only to be got with the greatest difficulty.

Points of a Clydesdale.

Colour usually bay or dark brown, sometimes black or gray, more rarely chestnut.

Height, average, about 16 hands in the case of mares, and 16½ in that of horses.

Temper mild, with plenty of muscular vigour and nervous energy.

Head, medium size ; the face and jaw-bones not too large or loaded with flesh.

Nose bones, if not straight, slightly arched ; not "dish-faced."

Nostrils wide.

Eye bright and dark, full and prominent.

Forehead broad.

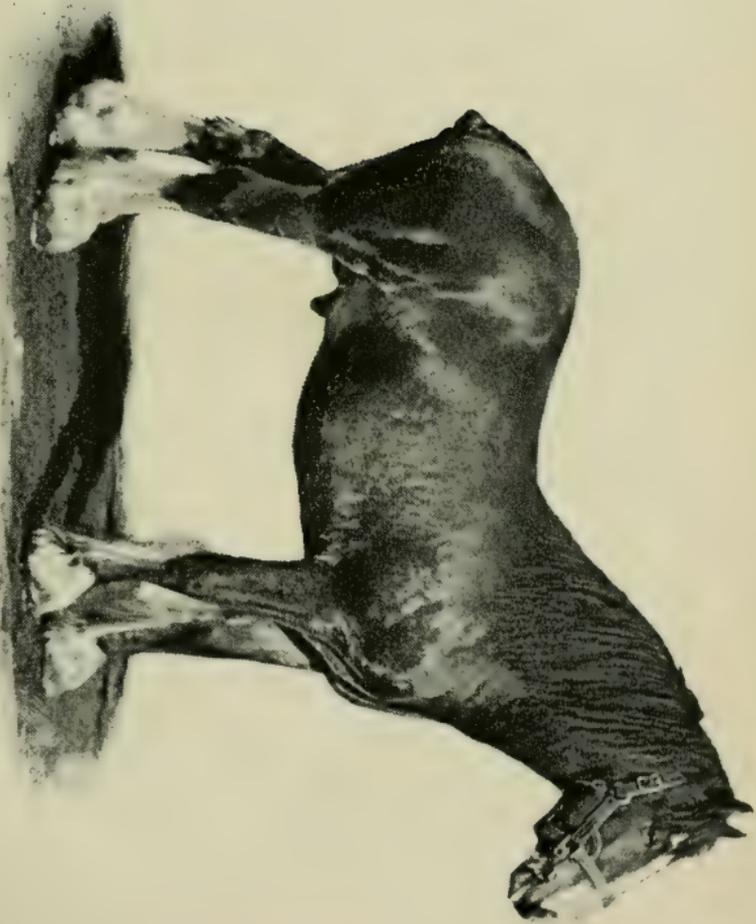
Ears a good size, neither hanging, showing sluggishness, nor "prick-eared," but with frequent motion, indicative of a good disposition.

Neck, medium length and thickness and slightly arched in the male ; and also in the female when she is in high condition.

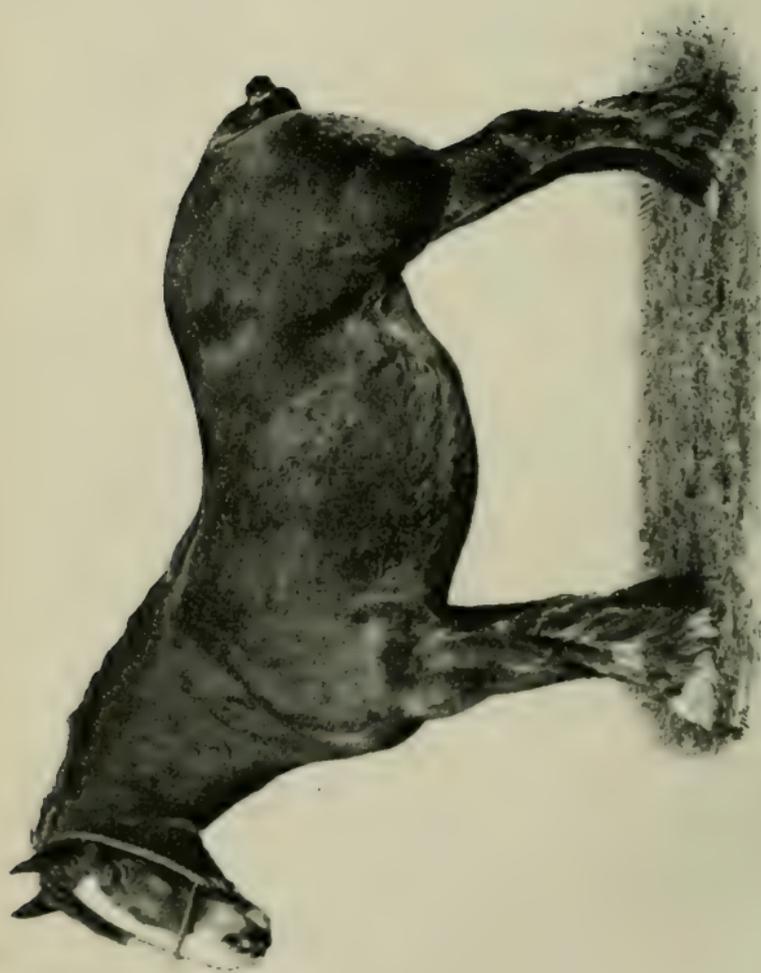
Back straight and broad, and not so long as to make it weak.

Tail not too drooping.

Ribs well sprung, barrel-like ; the last one a good length.



62.—CLYDESDALE STALLION, "PRINCE OF ALBION," 6178, AGED TWO YEARS AND SIX MONTHS.
The Property of JOHN GILMOUR, Montrave, Leven.



63.—CLYDESDALE MARE, "MOSS ROSE," 6203.
The Property of JOHN GILMOUR, Montrave, Leven.

Hindquarters long, well packed, and rounded.

Second thigh well developed and broad.

Girth round the heart good; the body is then deep, and the height is greater than it looks.

Chest broad and deep.

Shoulder (scapula) oblique, though not necessarily so much so as in a hunter.

The humerus should form a very obtuse angle with the *scapula*, else the animal cannot get its leg well forward in moving. The position is indicated in the accompanying Fig. 2, which, however, shows the *humerus* (*b*) to be rather too perpendicular; and that to be avoided where the horse stands over its fore-legs in Fig. 1.*

Forelegs straight, not bending back at the knee—"calf-kneed." This defect, however, minimises the bad results of short pasterns. The legs should also be strong, and not too far back under the body, showing that the humerus is rightly placed.

Knee-joints and *hock joints* large.

Muscle of the arm broad and well developed.

Bones in both fore and hind legs short, flat, clean (not knotty), but with plenty of substance.

Feathering, or long hair on the back parts of the legs, neither deficient nor too abundant, as spreading round in front; if fine, long, and silky, it is an indication, along with a fine skin, of good breeding.

* The figures are copied from a paper by James Howard, M.P., of Clapham Park, Bedford, in the "Journal of the Royal Agricultural Society of England" for 1884, who there first drew attention to the importance of the position of the *humerus* in the shoulder of a cart-horse.

FIG. 1.

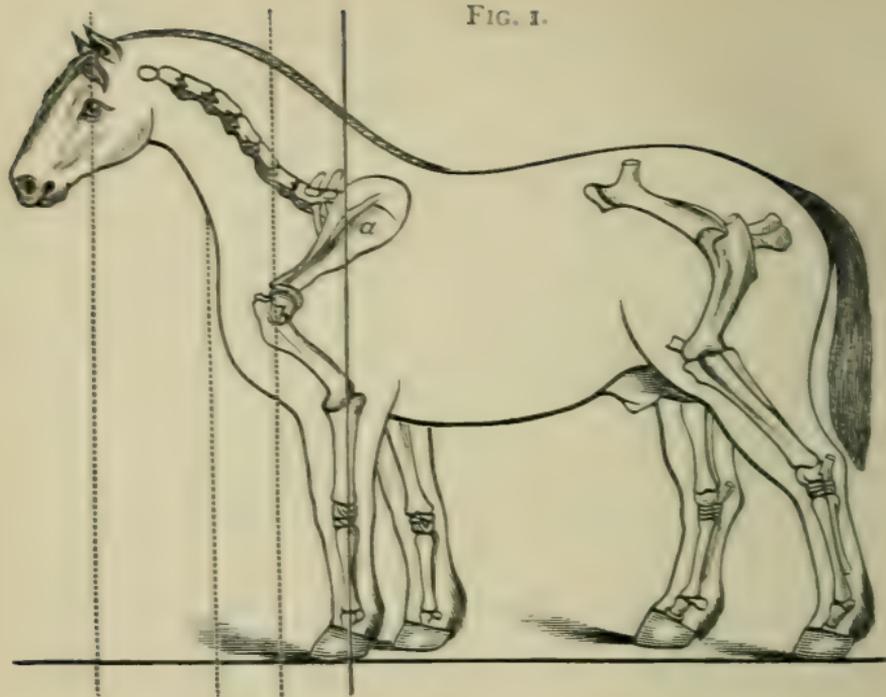
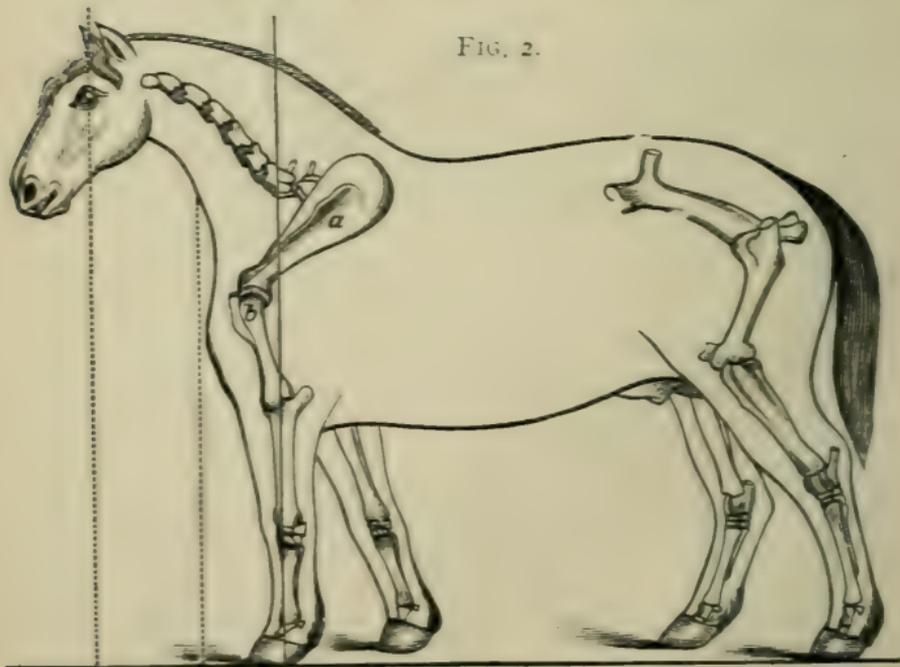


FIG. 2.



a, SCAPULA; *b*, HUMERUS.

White feet, though common, are objectionable, being softer than the others, though they are now so prevalent that some authorities go so far as to say that a white foot is an essential for a Clydesdale. The feet cannot be too large, if not thin and flat or down in the soles.

Fore and hind legs and feet all set on straight; they look better and are stronger. It is better to have a toe pointed slightly in than out when strength for work is the object. For show-yard purposes the opposite is the case, as an in-toed horse on being trotted out is apt to throw his feet outwards in moving. The tendency is to exaggerate the defect, whereas an out-toed horse when trotting "in a man's hand" tends to show to the best advantage.

The hocks broad in front and not too straight, else there is liability to thorough-pin; nor too crooked, as they do not look well although they are quite strong. Any defect in a hock constitutes unsoundness.

Pasterns medium length. If long, they are weak; if short, they are more liable to bony exostoses. Splints often exist without producing unsoundness.

The action is quite peculiar, being very free and active.

Step long; the animal walking, when unloaded, 4 miles an hour. Young horses will at times surpass this rate, but for an ordinary work horse it is quite quick enough.

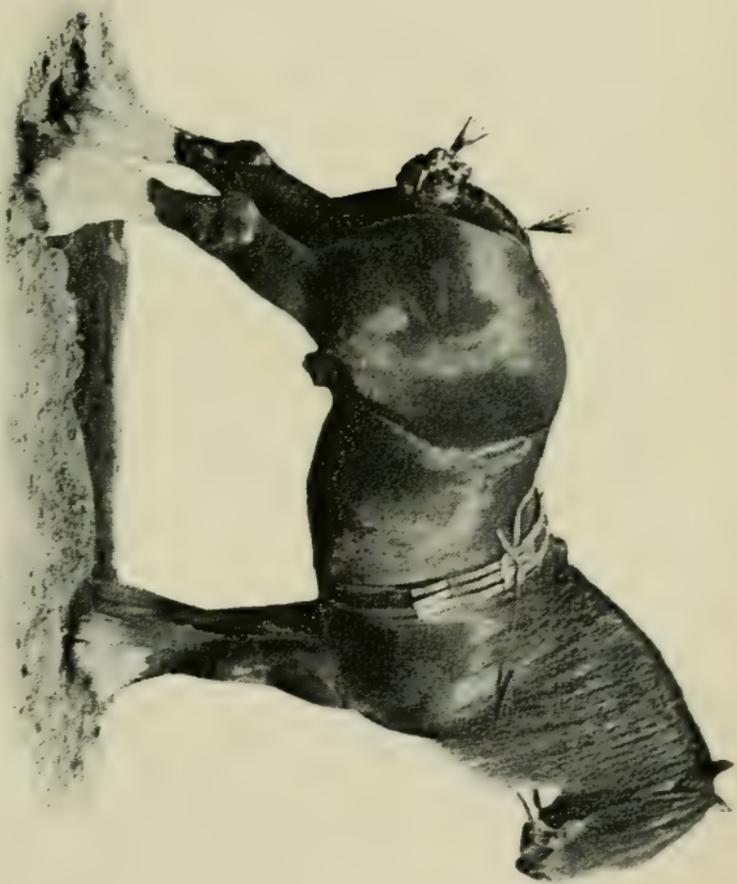
The sole should be almost inverted each time it is lifted in either trotting or walking.

THE SHIRE

Is the largest British breed of horses. The larger sorts, bred in the Fen country, are better suited to dray-work than to agricultural work. The points of the best specimens are very much like those of the Clydesdale horse. The ordinary varieties of the two breeds differ more in appearance than the better sorts, which have now been acknowledged in many cases to be crosses of good specimens of the two original breeds. The late Lawrence Drew believed in crossing Clydesdales with good Shire horses, as among the resulting advantages it remedied one of the greatest defects of the Clydesdale, viz., the want of size, and the want of depth of rib or body. Such a practice is quite in accordance with the best usages in the improvement of all breeds, equine or bovine. The fact that it has been practised on a considerable scale for many years explains why it may be continued with advantage: the results are not like those that follow crossing between two distinct breeds.

The differences in the ordinary form of Shire horse as compared with the Clydesdale are:—

Lower and more sluggish *action*; the *belly* or middle larger, the animal being a greater feeder; the *quarters* shorter, more like the Belgian horse, and the *plates* consequently steeper and flatter; the *hocks* wider between than in the Clydesdale, in which they usually incline slightly inwards; the *leg-bones* rougher and not so straight; the *pasterns* shorter,



64.—SHIRE STALLION, "STAVNTON HERO."

Winner of Twenty-three Prizes, including Three Champions, Sixteen Firsts, the Eisenham Challenge Cup, and the Gold Medal, Brussels Show, 1888.

The Property of WALTER GILBEY, Eisenham Hall, Eisenham, Essex.

and the *hoofs* more upright, giving a stilty look. Long pasterns are now sought for in the best horses, no doubt to try to counteract the general weakness in this point. The *space between the eyes* is frequently not so wide, and the *eyes* are not so prominent as in the Clyde. Roans and chestnut *colours* are most prevalent in the Shire.

There is more long hair on the legs, and it extends round in front. James Howard's paper in the Royal Agricultural Society's Journal for 1884 points to this as a defect, being more or less detrimental to the animal in certain kinds of work.

Names and History.—The Shire horse or its prototype, we are told by Walter Gilbey in his handsome little volume "The Old English War Horse,"* was written of 1000 years ago as "The Great Horse." It has been subsequently named the "War Horse," "Old English Black Horse," and the "Strong Horse."

It is within but comparatively recent times that horses have all but supplanted bullocks in the working of land, the original object of the English horse being as a help in the time of war. Cæsar's account of it shows that even at that early date the breed was maintained in a high state of proficiency, not only as regards the physical form and qualities, but also in the matter of training. At a later period it was necessary to maintain the size and strength of the war horse, to enable the animal to carry the heavy armour of the mounted soldiers of the time. To the efforts made

* Vinton & Co., 8 New Bridge Street, London.

to attain this object we are indebted for the massive frames and powerful limbs of the Shire horse of to-day. Records dated 1160 exist of the importation of horses with the object of improving the native horse of ancient Britain.

Gilbey says :—

“During the reign of King John—1199 to 1216—there exist distinct particulars of the importation into England, from the low lands of Flanders, Holland, and the banks of the Elbe, of a hundred stallions of large stature, and it is from the blending, nearly 700 years ago, of these animals with the English breed that some strains, at least, of our heavy draught horses must be said to date their origin.”

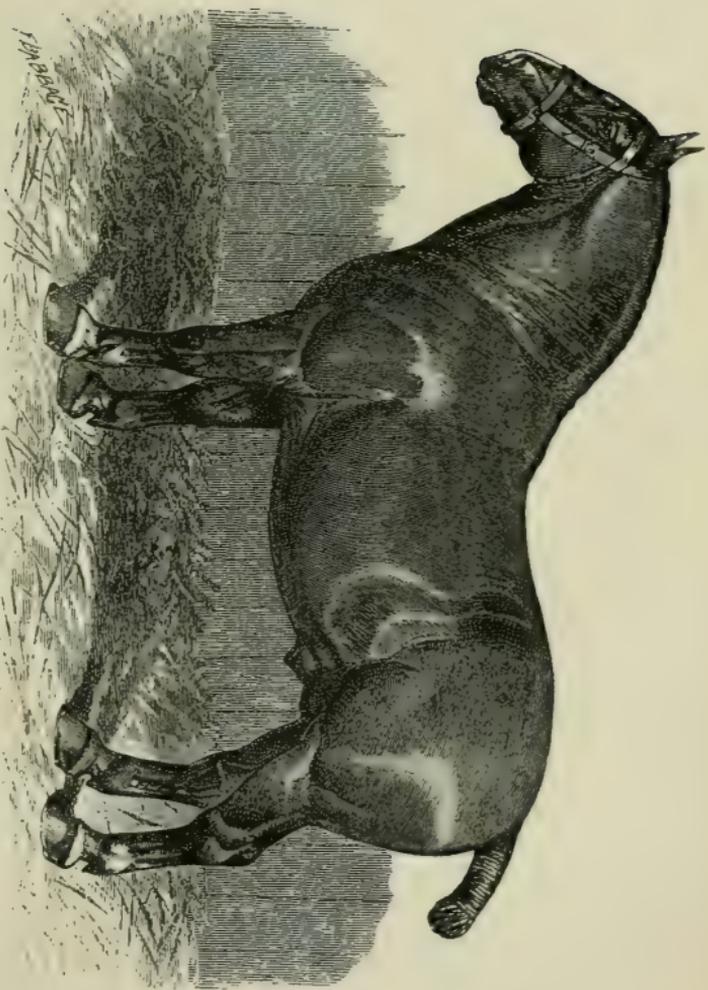
He further points out that the so-called “Shire” horse, because belonging to the *Shire* counties in the middle of England,—

“Has for centuries, beyond a doubt, been distributed in numbers through the district between the Humber and the Cam, occupying the rich fen lands of Lincoln and Cambridgeshire, and extending westward through the counties” (*shires*) “of Huntingdon, Northampton, Leicester, Nottingham, Derby, Warwick, and Stafford, on to the Severn.”

The Shire Horse Society, and the **Shire Horse Stud-Book**, which is comprised in 10 volumes, have done much for the advancement of the breed. The foreign demand for Shire horses to go to Germany and America has steadily developed, and with it the price has increased.

THE SUFFOLK PUNCH

Is named from its county, and from its compact and rounded form. The colours are chestnut (dark and light) and more rarely iron gray or sorrel. It is said



65.—SUFFOLK PUNCH STALLION, "QUEEN'S DIADEM," 1721.
First at the Royal Agricultural Society's Show in 1888.
The Property of A. J. SMITH, Rendlesham, Woodbridge, Suffolk.

that the colour was derived through a cross with imported Norwegian horses, brought like certain of the progenitors of the trotting hackneys by the early Norse invaders. The form and action of certain of the Norfolk hackneys of the day leave no reasonable grounds for doubting that however the Norfolk trotter and Suffolk Punch may now differ in size, style, and general appearance, they must have been intimately connected with one another at some distant period. Arthur Young, writing in the end of last century, mentions the Suffolk Punch as being one of two pure-bred varieties of cart-horses—the large black or old English horse being the other. The body looks much too heavy for the limbs, which are clean and fine, with little long hair. The back is at times hollow, but this allows of a finer style of neck and shoulder. Suffolks are slower in their movements than Clydes, and twist their legs and feet more when moving. They are steady pullers, and suited alike to farm and dray work.

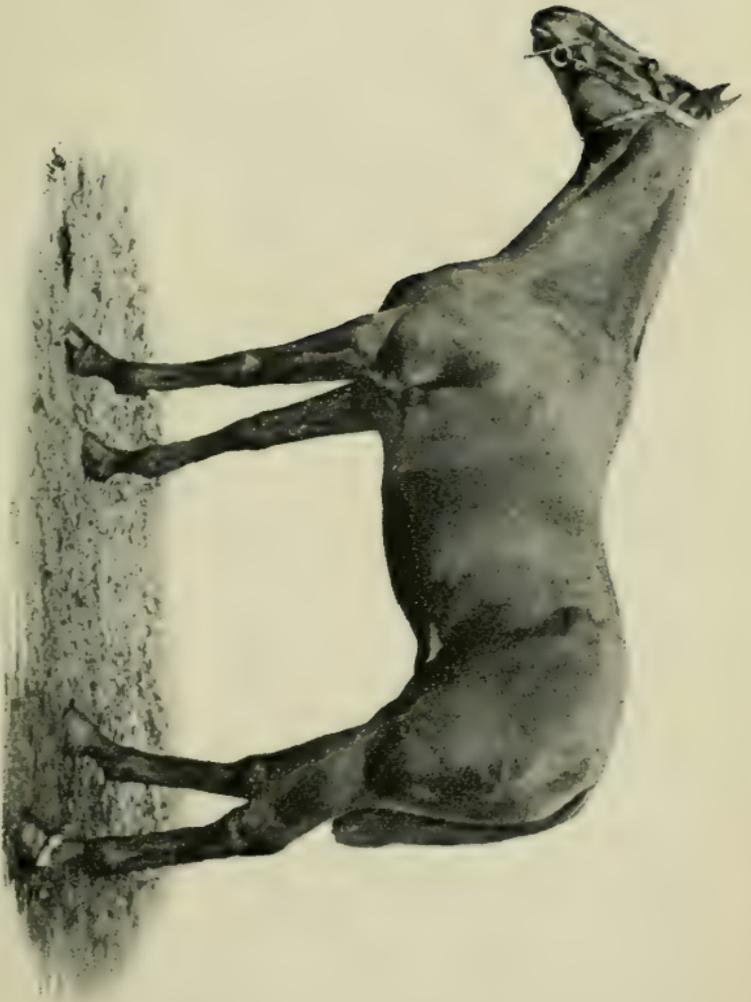
CHAPTER XIV.—THE HORSE— THE THOROUGHBRED, HACKNEY, AND CLEVELAND BAY.

The Thoroughbred—Racecourse and other Selection—Early Improvement—Importation of Roman, Spanish, Arabian, and other Horses—Failure of Early Crosses—In-and-In-Breeding—The Hackney—Origin and Development—The Modern Norfolk Trotter—The Original Trotter—Yorkshire Trotters—The American Trotting Horse—Export of Hackneys.

THE THOROUGHBRED *

IS in some respects perhaps the most interesting of our British live stock. It has been bred without admixture of alien blood for more than 100 years, and during that time it has been subjected to the most rigorous system of selection through individual trials of strength and endurance. No breed has been so effectually tested for the special qualities required of it than the thoroughbred. The show-yard test of the cart-horse is very different from this. The merits in that case are determined by external appearance and by inference, not by

* One of the most valuable and practical works on this breed is that by Wm. Day, "The Horse: how to Breed and Rear Him," Bentley & Sons, 1888, to which I acknowledge my indebtedness.



66.—THOROUGHBRED HORSE, "FOXHALL."

Winner of the Grand Prix de Paris, the Ascot Cup, the Cesarewitch, and Cambridgeshire Stakes, &c.
Bred in America, and got by "King Alfonso," by "Phaeton," son of "Stockwell," out of "Jamaica."



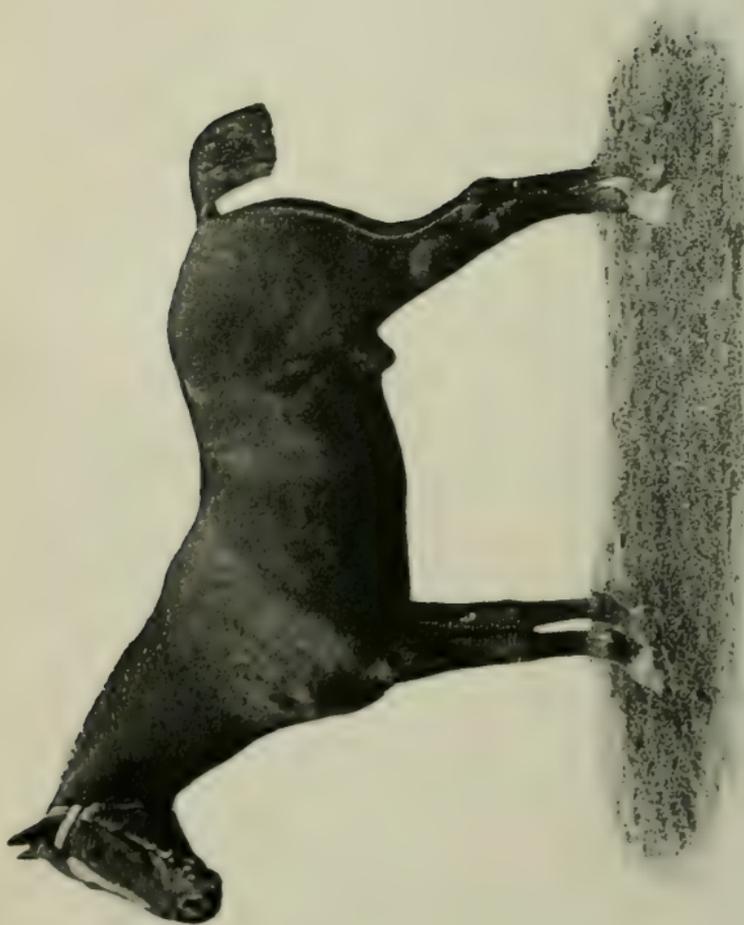
trial in the work for which the animals ought to be most prized. The endeavour to judge the qualities of a thoroughbred by external appearances only ends in failure and disappointment in most instances, even when attempted by the most skilled. An additional selection over and above this process of natural selection is apparently necessary when we realize that since 1877 the Derby has been won on five occasions by an unsound animal. Racing is recorded as far back as the beginning of the 13th century.

Of the early improvement and management of horses little is known with certainty. The Romans imported horses of lighter build than the native English horses, with the object of improving them for road-work after the formation of good roads. Athelstan got running horses from Germany. Spanish horses were next used before Arabians. What were called the "Royal mares" were imported by Charles II. About the end of the 17th and beginning of the 18th century the most famous of the Eastern sires were introduced, viz., the *Godolphin Arabian*, *Byerly Turk*, and the *Darley Arabian*. These horses mated with the Royal mares, and with the best of the native English horses of the time had a very large share in the establishment of the English thoroughbred. Going still more closely into the origin of the best thoroughbred horses of the present day, it will be found that nearly all can claim relationship with one or other of the three famous sires—*Herod*, *Eclipse*, and *Matchem*.

The superior qualities of the few have been taken advantage of in the improvement of many. The improvement has been great in the special direction and for the special purpose for which the racehorse is kept. It is true that the length of a race, which in olden times extended over 3 or 4 miles, has now been much shortened, and horses are trained to do short distances at high speed; but there is little doubt, nevertheless, that the staying power of the breed is as good as ever, and the pace in later years has greatly increased.

The first or early crosses with Turkish, Arabian, or Barb horses did not prove a success as regards the production of winners, but the improvement due to the impetus given by the cross became distinctly apparent in later crosses, and appeared after a time in the form of animals superior to either the Arab or the English horse of the day. Though this is admitted, no advantage could now be gained by crossing with Arabs, which are supposed to have remained at much the same stage of improvement for the last 200 years, while the English thoroughbred has greatly advanced. The differences between the two breeds are now too great for a cross to "nick" satisfactorily.

In-and-in-breeding of a close kind is not successful in the thoroughbred, being derogatory to pluck; but, on the other hand, there is no breed wherein the advantages of a good pedigree are more invariably seen.



67. HACKNEY STALLION, "RUFUS," 1343.
Champion at the Hackney Show, London, 1889.
The Property of HENRY MOORE, Burn Butts, Cranswick, Hull.

THE HACKNEY OR "NORFOLK TROTTER"
BREED

Is said by Lawrence to have sprung on one side of its ancestral descent from the Norwegian horse. It is consequently found in Norfolk and Yorkshire, where the Norse invaders had their strongholds in this country. The peculiarity of its action as indicated by its name is the most important difference between the hackney of the present day and the thoroughbred. They have for hundreds of years been crossed by imported horses from the same foreign stocks. The form, however, has also differentiated with difference in surroundings, and the difference in the objects in view held by their breeders. It is to the original native mares in each case that the trotting habit in the one and the running habit of the other are due.

The modern Norfolk trotter was remodeled from the earlier trotter of Norfolk and the fen country about the end of last century by the use of Shales' or Shield's horse, or Scott Shales 692, which infused much of the thoroughbred Arab and Barb blood, and gave fine bones, pace, and staying power to the heavy, round boned, and more or less cart-horse shaped trotter of the beginning and middle of the century.

The original trotter varied in size from the farmer's market cob to the regular cart-horse of the country, to which the Suffolk Punch is no doubt

directly related. There are no reasonable grounds for doubt, but that the free action of many of our cart-horses and the action of the hackney had a common origin in an early British horse. It was at one time a custom in Norfolk to trot the cart-horses when returning with the empty cart or waggon,—a fact which indicates that they were at one time lighter and more active than those of the present day. Their increase of weight can, however, be accounted for by the crossing which took place between the original breed (described as “small, brown-muzzled, and light boned”), and Lincolnshire and Leicestershire black horses.

Among the Yorkshire trotters the same process of improvement was carried out about the same period. Thoroughbred Arabian blood was largely used through the employment of a good horse named “Sportsman” and his descendants. It is owing to the presence of an abundance of Arab blood in the hackneys of Yorkshire and of Norfolk that it is now possible to cross the two varieties with satisfactory results, and to maintain them as they now exist in the same stud-book. At an earlier date, but so late as 1775, crossing in this way was not advisable, as it is recorded* in reference to Norfolk horses, that “not a single horse of any repute has been produced from these half-bred horses brought from Yorkshire or elsewhere.”

The American trotting horse is now practically

* In the first volume of the Hackney Stud-Book, 1884, to which I am also indebted for many of the details of the early history.



68.—НАСРЕНУ МАКЕ, "ЛАДУБИДЪ," 177.

Winner of many Prizes.

Owued by J. A. Матнек, Thornhill, N.B.



69.—CLEVELAND BAY HORSE, "FIDIUS DICUS."
The Property of H. V. WEBSTER, Northallerton.

a thoroughbred, but it derived its action from an origin common to the English hackney and itself.

Hackneys have been largely exported to all parts of the world, and in recent times have been taken to India as stud horses for breeding army remounts by the native horses. The Yorkshire variety seems to possess the necessary quality for the purpose in a greater degree than the Norfolk, having less of the cart-horse in its form and substance.

THE CLEVELAND BAY.

The old coaching or chapman horse is now mainly to be seen in Yorkshire, although at one time its habitat covered a much wider region. The breed was in a most flourishing condition for about two decades subsequent to the middle of last century, after which it declined. It, however, sustained its worst blow at the time when railways caused the reduction of the demand for stage-coach horses, and when it became fashionable to breed carriage and other light-legged horses by mating a thoroughbred horse with a farm mare. By this means also the breed became stained to some extent by the importation of foreign blood. Within recent years much greater attention has been paid to the preservation and improvement of the breed. The Stud-Book—the first volume of which was published in 1884—has proved a distinct source of interest, and a means by which the best qualities of the original

old breed may yet be brought prominently to the front. There is a tendency—due, it is said, to in-breeding, but no doubt also to the thoroughbred cross—to a lighter condition of bone than that natural to the old form of the breed.

Descent is claimed for the Cleveland from the war horse, and Cæsar's account of the British chariot warfare is quoted as referring to it. Those who are interested in the Shire horse are equally certain that the passage refers to that breed. The probability is that both claims are equally well founded, and that the differences which now exist, admitting that they are great, have been produced since Cæsar's time by crossing in different directions and with different objects in view.

Loyd's description of the Cleveland horse, quoted from the Cleveland Stud-Book, says :—

“From 16 hands 1 in. to 16 h. 2½ in. in height, he should be possessed of good, sloping shoulders, a short back, powerful loins, and long quarters. His head is rather plain than otherwise, and on the large side, but it is well carried, and his general appearance denotes activity and strength combined in a manner not seen in any other breed. His action is not remarkably high, but it is the kind of action for getting over the ground. In colour he is bay—either light or dark—with black legs, clear of hair; and black zebra-like stripes on the arm and above the hock are sometimes seen. These are known as the black points, and are supposed to denote special purity of breeding. White, save a small star or a few white hairs in the heel, is not admissible, a blaze or white foot proclaiming at once the admixture of foreign blood.”

The Stud-Book * points out that nearly every

* Edited by Wm. Scarth Dixon, and published by the C. B. H. Society, Marton, near Middlesbrough.

horse of note belongs to one or other of three great families,—the descendants of Dart (83), Barley Harvest (447), and The Hob Horse (316). Those who have carefully followed the previously detailed histories of many other breeds of live stock will remember that this is in no way an unusual circumstance, but is one of frequent occurrence.

CHAPTER XV. — THE HORSE — BREEDING AND BREAKING.

Breeding—Selection of the Mare—Treatment of a Farm Mare—She takes the Horse—Difficulties about Conception—The Foal—Young Cart Horses—Castration—Breaking—The Age of a Horse from his Teeth.

GOOD and sound animals of the right blood and with good tempers should be selected to breed from.

Three years old is young enough to put a mare to the horse ; if she is younger, or if she is too old, the foal might be small and weakly. The period of gestation is about 11 months. May is the best month for foaling, as there is then an abundant supply of green food, and the weather is mild enough for brood mares to lie out in the fields. At going out, shelters ought to be provided for a few nights to prevent their taking cold. Small but increasing amounts of green food should be given for a few days before, to accustom the digestive system to the change, and thus prevent colic.

A **farm-mare** should continue at moderate work, as ploughing, on till the day of foaling, but should not be put between shafts for some months before that event, as, owing to the enlarged size of the belly

as parturition approaches, there is risk of injury. The quantity of concentrated or rich food ought to be restricted in the case of a mare in high condition some little time before this. Wax is seen on the teats within twenty-four hours of foaling; after that the mare should be regularly watched, to prevent her doing injury to the foal at birth by lying down with her tail against the wall: beyond these precautions she rarely requires assistance. A roomy loose box is the best place for her occupation.

The foal should be got to suck immediately. If this is not possible, a little milk must be drawn into a spoon and put into its mouth, as a foal cannot live long without food. To see that the anus of the foal is open, and to give the mother frequent small drinks of cold water with a little oatmeal thrown into it, along with a suitable amount of digestible food, is all the further treatment that is necessary under ordinary circumstances.

No nursing mare ought to be put to work: this precaution prevents scouring and rickets in the foal. In any case, she should have a clear month before going to work, and each time after working she should be milked a little before the foal is allowed to suck. The milk which collects in the udder while at work changes in character from natural milk, and an alkalioid is developed which is injurious to the young.

A mare takes the horse from seven to ten days after foaling, and is then most likely to conceive. If "missed" the first time, she comes in season every three weeks during the summer, remaining in use

from four to eight days. By the second time she is in season there is a large flow of milk, which so far reduces the system and makes conception less certain. When going out of season she is most likely to "hold." One good jump is better than several, and she should be kept quiet and away from other horses for a few days. If this is attended to there is no necessity for douching her with cold water, which appears to be an unnatural and unnecessary practice under any circumstance. It also appears to be wrong to put a mare to two horses within two days.

As a mare approaches 20 years of age it is often a difficult matter to get her to conceive if she has never bred, or if she has not bred for some years. Conception is made more likely by the use of a cart horse on a thoroughbred mare, or of a thoroughbred horse upon a cart mare.* When a mare is in the habit of breeding regularly she will sometimes continue to do so till she is very old. †

A foal brought up by hand should have cows' full-milk. It is often spoiled through being played with, and thus becoming too familiar with its attendants, and losing the natural and necessary regard for the

* Cowe of Mains, Chirnside, possessed a mare (nearly thoroughbred) which in 1886, at the age of 23 years, "held" to a cart horse, after repeated trials extending over some years with thoroughbreds. In 1887, however, she was successfully served by a thoroughbred. Had it not been for a broken leg which ended fatally she might have continued to breed for a number of years.

† When at Bosby in 1886 the author saw a cross-bred mare, belonging to W. Mould of the Harrington Arms, which was breeding at the age of 32, and had bred 20 foals in 20 consecutive years. All were said to be good ones, and a number were weight-carrying hunters.

authority of its masters. In Norfolk after the foal is two weeks old, it is fed sometimes on skim-milk, boiled linseed and bean meal, getting up to two gallons of milk and four pounds of the mixture per day.

A foal is weaned when it is five or six months old, say early in October; then it should be housed at night, and a halter with a short dependent end should be put on its head, and left to lead by. The operation of haltering is attended with danger to the animal, due to the resistance which is usually made, and requires great care. A cattle-shed with bare walls and a few inches of dung under foot is the best place. A cart rope should be fastened round the neck, and the animal drawn up to a fixed point—such as a hole in the outer wall through which the rope is passed—and made to know that he is held. The struggle at first is often severe, and perspiration flows freely with the fright and the exertion. The foal must be kept in a warm place till thoroughly cooled. Gentle treatment and constant handling are necessary to give confidence. Leading should be done as often by the “off-side” as by the “near,” to accustom him to turn as readily to the one side as to the other.

Young cart horses should never be too highly fed, as this softens the constitution, and they get too fat and heavy for their legs. They should at all times be kept thriving to encourage growth, and to prevent disease and injury from internal parasites. A little linseed cake mixed with the oats is an improvement upon a feed of oats alone, and salt

should be within reach of all young stock, which should also have plenty of exercise to develop muscle. In the case of the thoroughbred the highest authorities say that they cannot be too liberally fed provided they have sufficient exercise.

Castration is usually performed when a colt is about one year old, and then there is least risk ; or it may be done at two years if a more masculine appearance is wanted. In some districts of England from four to six weeks old is considered a safer and better time. Sometimes the operation is done with the animal standing on its feet and simply backed into a corner, but he is more commonly cast by means of ropes. The great danger in this is the possibility of injury to the back, brought about by the animal struggling when down. The testicles are usually removed by firing, but sometimes by means of clams, or by torsion, or they may be simply cut away after the seminal arteries have been tied. Bathing well with warm water should be resorted to next day if the animal is stiff.

Breaking is attended with danger from rearing, kicking, bolting, or sulking on the part of the horse ; and carelessness, drink, or bad temper on the part of the man. Horses are more easily broken while quite young than when a few years older. They ought to run out the second winter, and be taken up for breaking in autumn, when about $2\frac{1}{2}$ years old. Heavy work strains and stiffens young horses. The backbone often gets bent and stands up, if an animal is made to draw too heavy

loads. Harrowing or light ploughing is a suitable and safe form of work for a young horse; but not so carting on the hard road till after he is five years old. Horses ought to be broken to every description of farm work when about three years old, or even before that time if convenient.

Mouthing is done by tying a horse up with a large bit and side-reins, but is far too little practised among draught-horses. After this has been done at intervals for some days, the horse should be taken out to an open field and long ropes fastened to his collar in the position of draught chains, so as to be pulled by men placed well behind, to accustom the animal to the chains rubbing against its hind legs while turning in the plough. It should be next yoked to a log by ropes, and when accustomed to this, put in double yoke with an old, steady, but active-stepping horse.

Breaking to the cart must come after all this, as it is often a difficult task, especially with nervous animals. The greatest care should be taken with all horses, although reputed to be quiet. A man on each side of the head should hold a long rein to keep the horse, if startled, from jumping on the top of one or other of them. Two additional men, one on each side, should fasten the attachments, the draught chains first. The kicking strap or rope should cross over above the root of the tail, and each end be made fast to a shaft. This is far more effectual than when it is located in the usual place, further along the top of the hind-quarters. A fifth man lets down the

cart behind when the horse has been got into position. A long pole is placed between the body of the cart and the axle-tree, and projects well behind to prevent the animal rearing.

A wild or intractable horse may be subdued by the Australian method of tying his head round to his tail, and driving him round until he submits to be guided. By adopting this method any horse may be more quickly and safely put through all the various stages of the operation of breaking, but time must be given in any case to allow a young and inexperienced animal to get accustomed to what is required of it and to practise it.

A young horse should be tired, but never fagged by too much work, else he may develop bad temper. In a display of this an animal which urinates is usually difficult to overcome. The mouth should not be subjected to sudden checking or tugging. An animal which has been thus ill-treated indicates it by trying to move away, and holding up its head on the approach of a man.

The shoulder and back, under the pressure of the collar and saddle, often get "fired," hot, and painful, especially in warm weather. *Remedy.*—Bathe after work is over with tepid water, rub dry, and soak with whisky, or white lotion—1 oz. sugar of lead and 1 oz. sulphate of zinc dissolved in a quart bottle of water. This is the best common remedy for broken or irritated skin.

A paste of fuller's earth plastered over any irritated or superficially injured part makes a service-

able, stimulating, and healing dressing, provided it can be left on till the cure is effected. This debars it from use, however, when the injury is the result of the rubbing or pressure of the harness, unless when the horse is laid aside from work.

While teething a young horse often has a tender mouth and refuses to eat. The gums should not be cut or fired as if the animal were suffering from *lampas*.

A young horse should not be fed too highly. If off food through being feverish from work, it is necessary to coax him by giving varieties of food, little at a time, and always new and fresh.

Young horses pastured along with cattle gallop after them at times and prevent their thriving. Some cattle get into the bad habit of eating the hair from the tails of horses and from those of the other members of the herd.

In the case of horses with small feet, paring the edges of the hoof now and then, and blistering the coronet, encourage the growth of horn.

Idle horses rub, bite, and break gates, and escape from their own pastures to do damage to growing crops. A few strands of barbed wire nailed along the upper bars of a gate form a safe and simple preventive of the evil.

The age of horses able to do work may easily be determined by the teeth, if not more than eight years old.

At 3 years the two central permanent incisors are up.

- At 4 years the next pair, or lateral ones.
At 5 „ the two corner ones are come, making
a full mouth; also the tushes in
the male.
At 6 „ the hollow on the top of each tooth
of the first pair is worn out.
At 7 „ the second pair is levelled.
At 8 „ all have usually got worn nearly
level, or “mark of mouth” is lost.

Indications of greater age are gray hairs about the head and deep hollows above the eyes.

To make an animal look young, the teeth are sometimes “bishoped” by low dealers—that is, artificial hollows are made in the crowns of them.



70.—HALF-BRED GELDING, AT FIFTY YEARS OF AGE.
Belonged to S. F. PERRIE, Leith.

CHAPTER XVI.—THE HORSE— MANAGEMENT OF FARM HORSES.

Winter Season—Work and Food—Medicines—Water—Mud-fever—Litter—Summer Season—The Soiling and the Grazing Systems of Feeding Horses—A Stallion—Possibility of Improvement.

WINTER Season.—Full work in the case of ordinary farm horses lasts for about seven or eight months in the year: three months, on from the latter part of August, including harvest, and autumn ploughing and cleaning, and nearly four months, beginning in spring, including part of February and on into June—this embraces spring cultivation and ploughing, planting of grain crops, and the preparation of the root land. In many instances the busy season extends throughout the whole year. This is now more often the case under recent practices, which adopt greater variety of crops in the rotation and an extended use of horse-power machinery, such as reaping-machines. On light land 280 working days per annum may be taken as a good record of work, and with a clay-land farm 260 days of full work is satisfactory.

The average cost of feeding a farm horse may be estimated at £25 per annum. The charge on

a farmer for the support of a man and a pair of horses, taking into account wages and sundry expenses,—farrier's and saddler's bills, and interest on capital invested in the horses and the implements they work,—amounts to about £100 to £110 yearly, or a cost of about 7s. 6d. to 8s. 6d. per pair per working day. Fourteen to 16 miles per day is a sufficient distance for a horse to walk on a hard road if work is constant. An animal will do its work more easily on a road with here and there moderate hills than on one which is level throughout, because the work done is then varied, and additional muscles come into play at times to break the monotony of the constant strain upon those which bear the burden upon a level road.

The food should be full and liberal, and consist of a mixture made equivalent to three bushels of dressed oats (40 lbs. per bushel) per week. Grains should be all bruised or broken, especially for old horses. Unless extremely dry and kept in a dry place, only a little should be prepared at a time, as the ingredients, especially oats, mould and spoil. The mixture should consist of several kinds chosen from the following, according to what is cheapest in the market:—Oats, beans, peas, lentils, barley, maize, a little malt or desiccated brewers' grains to assist the digestion, along with bran or linseed cake (restricted to one pound per day) to keep the bowels open. Dry bran prevents a horse bolting its food too fast. Though beans when given in large quantities tend to produce costiveness, a small amount

added to a food mixture has the opposite tendency. A little fenugreek meal acts as a relish or spice, and is a valuable adjunct.

Indian pulses are now more or less used as ingredients in the mixed *purchased* foods of the various farm animals. It is not safe to include them until they have been thoroughly washed, as Principals Williams of Edinburgh and M'Call of Glasgow have traced a disease to the use of some of them in the food of horses.*

The diseases, or at least one disease resulting from the consumption of the Muttar pea,—Williams's Liverpool horse disease,—is no doubt identical with the anthrax of India. It is a blood-poison, with the rod-like microbes of anthrax present.

As a horse has a small stomach, it should be fed at least three times a day—morning, noon, and night.

Cold bran mashes are better than boiled food, which is dangerous for colic, although it produces a fine glossy skin. Saltpetre (2 to 4 drachms) is given at times in a mash on a Saturday night, to prevent stocking of the legs, or Monday-morning-evil, in hard-worked and highly-fed horses.

The food for the slack season, whatever is the length of it, may be averaged at one bushel of oats per week.

A large horse at full work will eat, in addition to short food, 18 to 24 lbs. per day of "seeds" hay. A few lbs. may be saved if it is chaffed. Hay

* Described in the "Veterinary Journal" for 1885 and 1886 under the title of "Lathyrus-poisoning."

is dusty if much heated in the stack, and then it injures a horse's wind. Heated oats are liable to produce the same result, and, besides, horses do not care for them.

When clover hay is given *ad lib.*, 2 to 2½ bushels of oats, or the mixture, is considered to be enough. New oats are not good for horses till after the New Year; they make impure blood and produce liability to grease. Straw (usually oat, but at times wheat or bean) is often given during winter, and hay in spring when hard work comes on; but the best results are got by using a chaffed mixture of the two throughout the winter season.

Chaffed straw should be allowed to lie for some time before it is fed to horses, as when recently cut it is liable to produce internal irritation, which may result in diarrhœa.

It is good practice to give a few raw swedes, carrots, or mangels at night. Potatoes are apt to cause colic, and should not be given to horses. Furze or whin is sometimes grown as a forage crop to provide green winter food for horses, but it requires to be chaffed or thoroughly bruised between rollers; 30 lbs. may be given to each per day.

Medicines.—Two drachms of powdered sulphate of iron, mixed in a full feed once or twice a day, is a good tonic for a horse, and is frequently required along with careful feeding in the "fall," after he goes into the stable. The physical system of the horse seems to go down at this season with the change of

food. It is owing to this peculiar condition that roadsters often become weak, and fall on and injure their knees. Tonics are better than physic in the correction of ordinary derangements, unless worms have to be cleared away. If a horse does not thrive when put to grass, the presumption is strong that he is affected by internal parasitic worms in the alimentary canal. To destroy worms, $1\frac{1}{2}$ oz. of the oil of turpentine should be soaked thoroughly into dry meal, and administered along with 2 drachms of the extract of male fern and 1 pint of raw (unboiled) linseed oil. The ordinary purgative for a horse is a ball of aloes—6 or 7 drachms made up with 2 drachms of ginger. A horse should be prepared by feeding him entirely upon cold bran mashed for fully twenty-four hours before a ball is given. At times the preparation treatment alone is sufficient to restore a horse to its natural state. One of the safest, most simple, and effective drenches for a horse is 1 or 2 quarts of fresh yeast or barm.

Water should be given when an animal comes in from work in a pure and fresh condition, though not too cold, and before feeding, to encourage eating, and to prevent colic and the washing away of the food out of the stomach. It is safer to give it when an animal is warm, if not over-heated, than after he has been allowed to stand till cold and until the circulation becomes less active.

When horses are at rest in the stable they should have pure water within their reach at all times.

There is danger of inflammation if a horse's belly is wet when the animal is not accustomed to it.

Mud-fever is the result of too frequent washing of the legs, adopted because it is the easiest way of cleaning. If practised, the legs should be thoroughly dried, or the animal be made to walk a mile or two before going into the stable, so as to quicken the circulation and prevent chilling of the skin through the rapid evaporation of the water. If neglected, the irritation, which begins about the heels, may extend to the skin of the body, and make it necessary to throw the animal out of work for a few weeks.

The Grooming of farm-horses is far too little practised. They should be well rubbed down with dry straw on coming in, and thoroughly groomed when the hair has dried, to get rid of dust, which is to a large extent the remains of dried-up sweat. Good grooming, by increasing its comfort, is as good as an increase of food to an animal. To make it more easily performed, and to add to the animal's comfort, the hair from the under part of the body and the legs above the knees and hocks may be removed with advantage by clipping. The extremities, which require protection to a greater degree than other parts of the body, should be left with their natural covering. Horses thrive best when thus relieved of the surplus coat of hair. It is no uncommon sight to see an unclipped horse, which had got warm in the yoke, still wet on the following morning. This is an unnatural and unhealthy state of matters.

Litter.—Barley straw is objectionable as litter; 12 to 14 lbs. per day of wheat or oat straw is much better. Bedding should never be stored during the day under the manger. When a good market can be got for straw, moss litter may be substituted at a much cheaper rate. This costs about 35s. per ton, in 4-ton lots, carriage paid; and 1 cwt. is sufficient per horse per month while in the house. If moss is allowed to become too wet before it is removed, there is danger of injury to the hind feet through the ammonia produced from the urine acting upon the weaker parts of the horn, and causing sores to break out about the heels.

Summer Season.—If horses are too highly fed when on green food and not doing full work, they are much more difficult to support in winter than when they are kept in an ordinary way. Along with green food 7 lbs. of oats, in two feeds per day, is enough. When at hard work this may be doubled. Some horses do not care to eat much corn when on grass; the teeth seem to get affected in the same way as those of a man eating green apples.

There are two common summer systems of feeding: *First*, To soil, or cut and carry home the green food, and to turn horses when not at work loose into a large open yard with shelter-sheds. Clover, grass, vetches, and cabbages are all used in their season when most abundant. This is the more economical method if food is not plentiful, but it requires additional labour to that necessary when horses are grazed.

The Second system is to turn them out to pasture at night and while not at work. This is the easier and more common practice. The disadvantages of this method of treatment consist in horses, especially if young, galloping and cutting up the grass, casting their shoes, and breaking their feet, and rubbing down fences and gates; besides the risk of catching cold or contracting founder in the feet if carelessly turned out before they have properly cooled.

In the south of England horses often go loose in yards during winter. They get gentle exercise and plenty of fresh air to keep them healthy.

If a horse turn lame, he should not go to work, else he will become worse. Rest, cold water cloths, or fire and blister are the usual methods of treatment.

A winter out at grass without his shoes, and being allowed to get down in condition, but not too far, renovates an old or any horse of whatever breed. He takes sufficient exercise and goes so quietly about, that a weak part is allowed to strengthen. It is thought that frost also aids in the recovery of unsound limbs.

A horse highly fed before will become much poorer when turned out than if he had been moderately kept, showing the mistake of excessive feeding during summer.

A stallion will serve 80 mares in the season, and get on an average forty foals, if he is not made to travel too great distances to find the mares. Some valuable horses, when well cared for, may cover a

hundred. A horse with one testicle down can get foals, but he cannot do so if it is carried out of sight.

Possibility of Improvement.—The average English work horse might be much improved if farmers' clubs would make greater efforts to secure the services of good horses in special districts, and not leave it to chance or private enterprise, which in a matter of this kind is usually selfish.

CHAPTER XVII.—SHEEP—BRITISH BREEDS.

Sheep—Classification—Fecundity—General Points—Characteristics of Different Breeds—**Long-wools**—Border Leicester—English Leicester—Lincoln—Long-woolled Devon—Cotswold—Wensleydale—Kent, or Romney Marsh—Roscommon—**Short-wools**—South Down, or Sussex—Shropshire Down—Hampshire Down—Suffolk Down—Oxford Down—Clun Forest—Dorset and Somerset Horn—Ryeland—**Mountain Breeds**—Cheviot—Black-faced Highland—Herdwick—Lonk—Welsh Mountain—Old Tan-face Welsh—Exmoor.

SHEEP belong to the genus *Ovis*. They have been subjected to domestication for a very long period. They are classed in various ways in this country: Horned and Hornless, Black-faced and White-faced, Mountain and Lowland, Long-wools and Short-wools, Long-tailed and Short-tailed. Iceland sheep have remarkably small and insignificant tails. In the East there are sheep with rudimentary tails and large masses of fat on the rump. Others, again, have the fatty development in the tail itself. Two is the usual number of horns, but in the Western Islands of Scotland remnants of the ancient polycerated sheep exhibit four horns, or even a greater number at times. A general character of the sheep is the presence of only one pair of teats.

Fecundity, or the power of being prolific, differs much in different breeds, and in different specimens of the same breed. Some bear single lambs, some twins, and some triplets, while four and even five have been known to come at one time. Although the local surroundings, including the kind, quality, and quantity of food, have much to do in determining the issue, yet there is unquestionably an inherent propensity in certain ewes to follow certain habits in the matter of producing certain numbers of offspring. The tendency may have been induced by similar local conditions favourable to a particular object being continued through generations, and thus made accumulative. If sheep are well fed (but not too fat), and the young of those bearing twins bred from, the flock after a time becomes distinctly more prolific.

POINTS APPLICABLE TO MOST BRITISH BREEDS OF SHEEP.

(Exceptions will be named when they occur.)

1. *A good carriage* and springy style of walking.
2. *Neck* thick towards the trunk, tapering to the head, arching slightly, and not too short.
3. *Body* deep, and projecting well over the fore-legs; under and upper lines straight.
4. *Back* level and broad behind and before, except in Cheviots and Lonks, which have sharp shoulders.

5. *Ribs* well sprung and rounded.

6. *Shoulders* well covered with firm flesh. The parts immediately behind the shoulders well filled up.

7. *Thighs or gigots and also the foreflanks* well fleshed down.

8. *Rump*, or part near the dock, well developed, though not too large, as is sometimes the case in Cotswolds, Border Leicesters, and other heavy fleshed breeds.

9. *Legs* straight, not too long nor the bone coarse. The hocks are much better slightly out than at all in or "cow hocked."

10. *The Body*, and particularly the belly, well covered with the characteristic wool of the special breed.

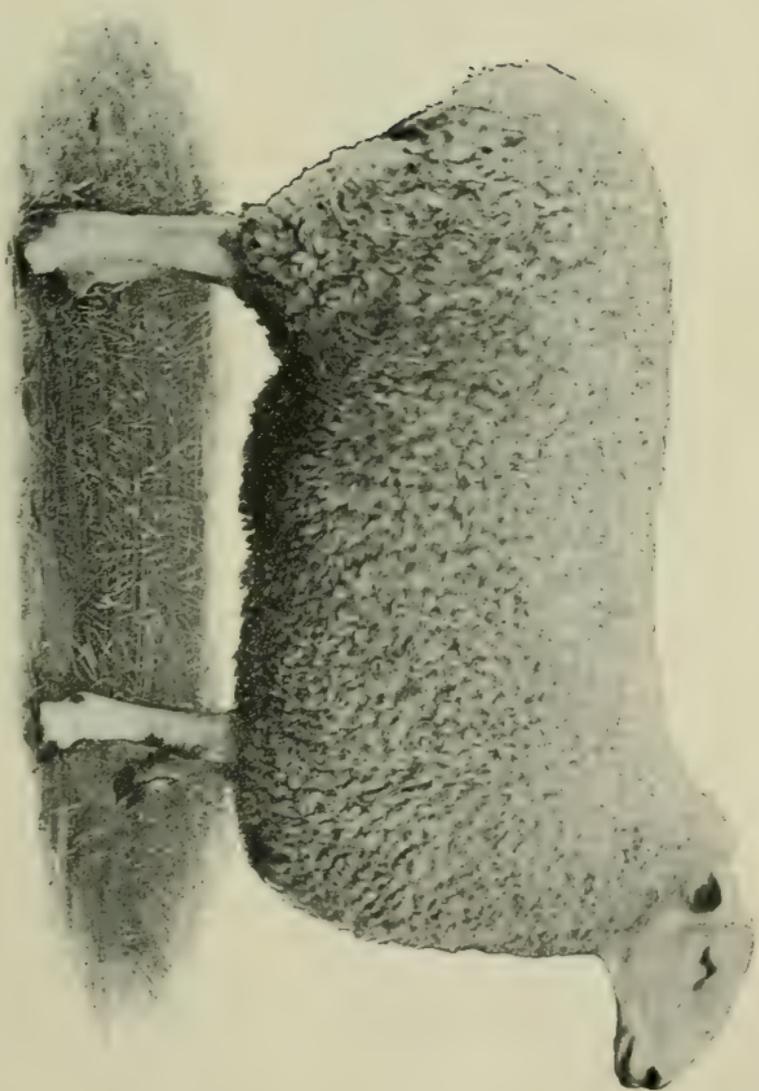
CHARACTERISTICS OF DIFFERENT BREEDS.

Long-wools, without Horns, excepting Mountain Sheep.

The **Border Leicester** was bred at first from Bakewell's Leicester by crossing with the Cheviot, but now ranks as a pure breed, and is one of the best of the Leicesters.

Special Points.

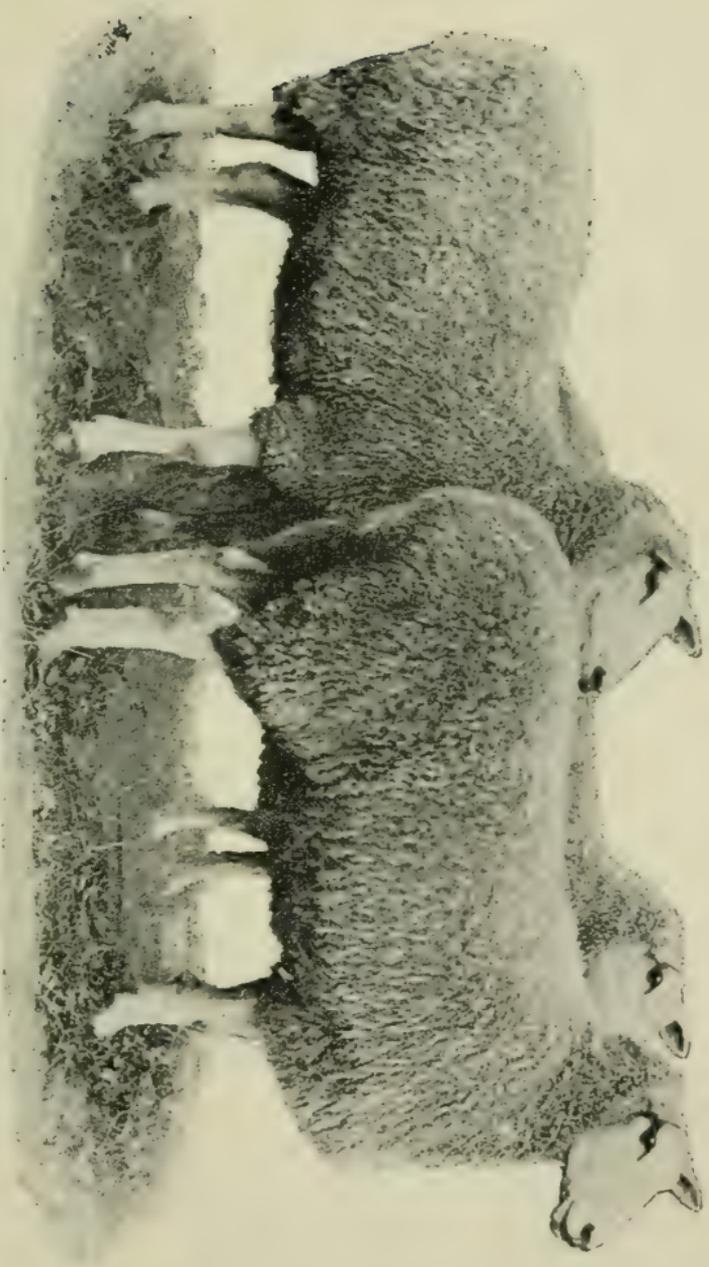
(1.) *Head* well set on, long, broad between the eyes, but not up on the crown, nor too heavy behind the ears, which would cause difficulty in lambing.



71.—BORDER LEICESTER RAM.

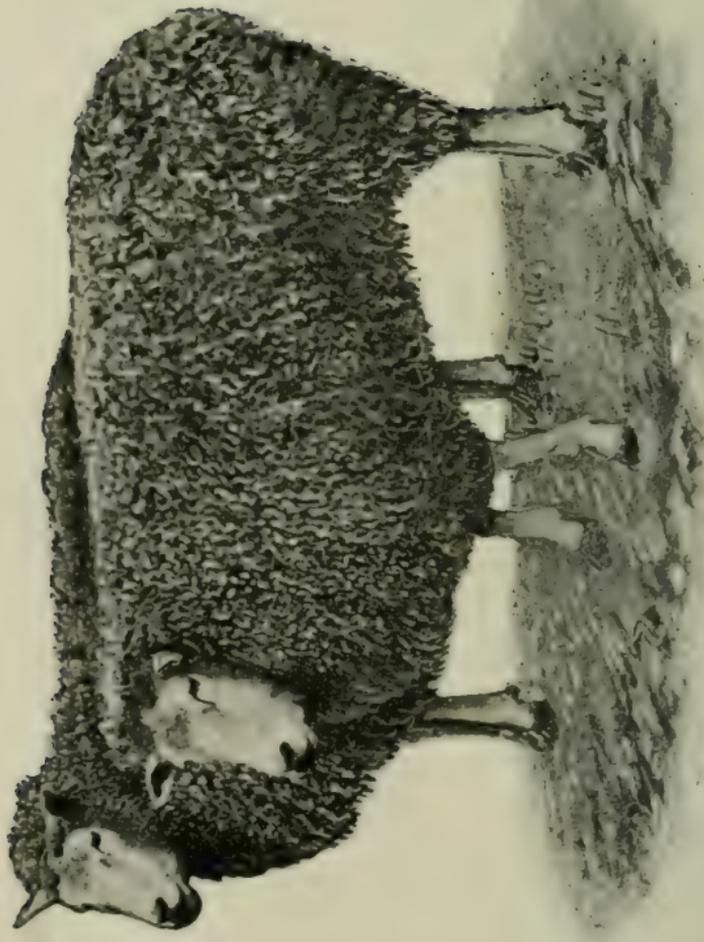
Sold at Kelso in 1886, for £50.—Tweeddale Gold Medal, Glasgow, 1888.

The Property of the Right Hon. THE EARL OF DALHOUSIE. Bred by CLARK, Oldhamstead Mains.

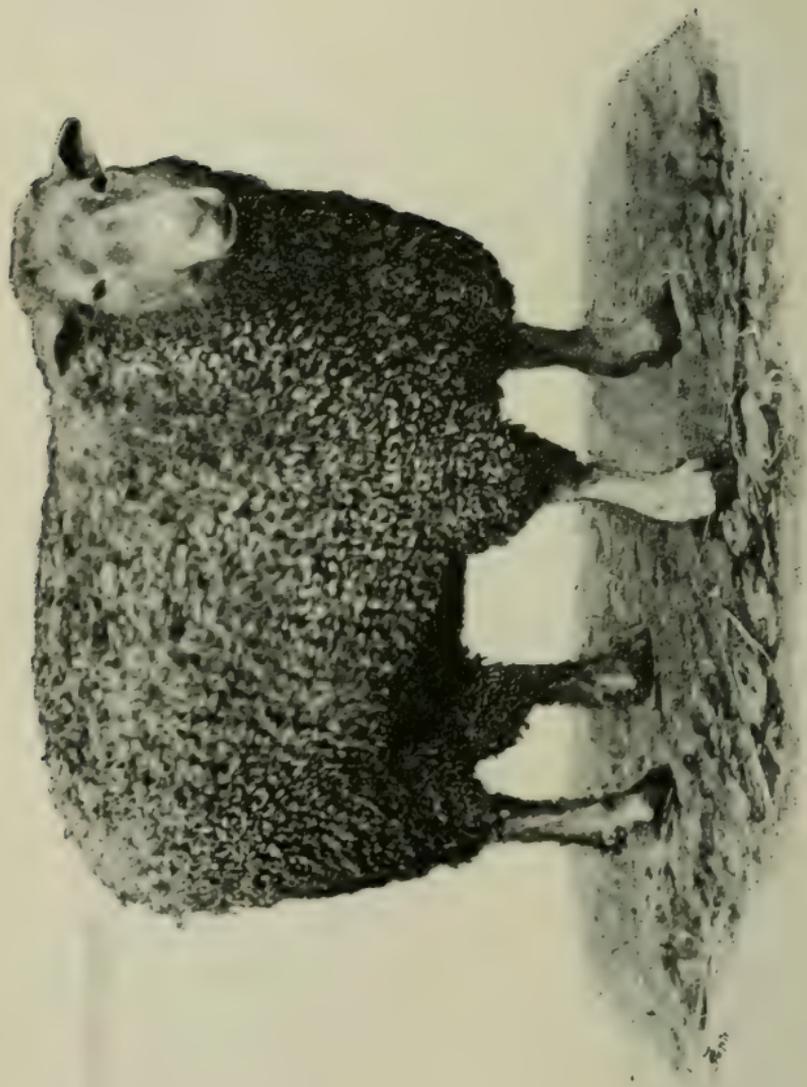


72. BORDER LEICESTER EWES.

First at the Royal at Nottingham, and First at the Highland Show at Glasgow, in 1888.
The Property of the Right Hon. A. J. BAILEY, M.P., Whittingham, Prestonkirk.



73.—ENGLISH LEICESTER EWES.
The Property of T. H. HURCHINSON, Manor House, Caterich.



74.—ENGLISH LEICESTER RAM.
The Property of T. H. HUTCHINSON, Manor House, Caterich.

- (2.) *Muzzle* large, open, and black.
- (3.) *Hair* on face and legs white and hard, but not so wiry as in the Cheviot, extending well back behind the ears.
- (4.) *Ears* not too large nor drooping, white inside and out. Black spots appear sometimes with age.
- (5.) *The belly* comparatively light, said to "carry little offal," giving a leggy appearance when without the wool.
- (6.) *The wool* long, soft, and in little locks, not too open coated.
- (7.) *Fat tews*, at thirteen to fifteen months old, weigh 23 lbs. to 25 lbs. per quarter.

The Improved English Leicester is the smallest of the Leicester breeds, and has been longer an improved breed than any long-wool except the Cotswold. Bakewell did this by in-breeding and selection. It has been much used in crossing to improve other breeds.

Special Points.

- (1.) *Mild tempered*, and thus suited to laying on fat.
- (2.) *Head* not too short, though smaller than in the Border Leicester; the face white with a blue tinge, and hair not so hard as in the Border Leicester.
- (3.) *Bones* very fine.
- (4.) *Hindquarters* often not so large as they ought to be.

(5.) *Great aptitude to fatten early*, both in the pure breed and its crosses.

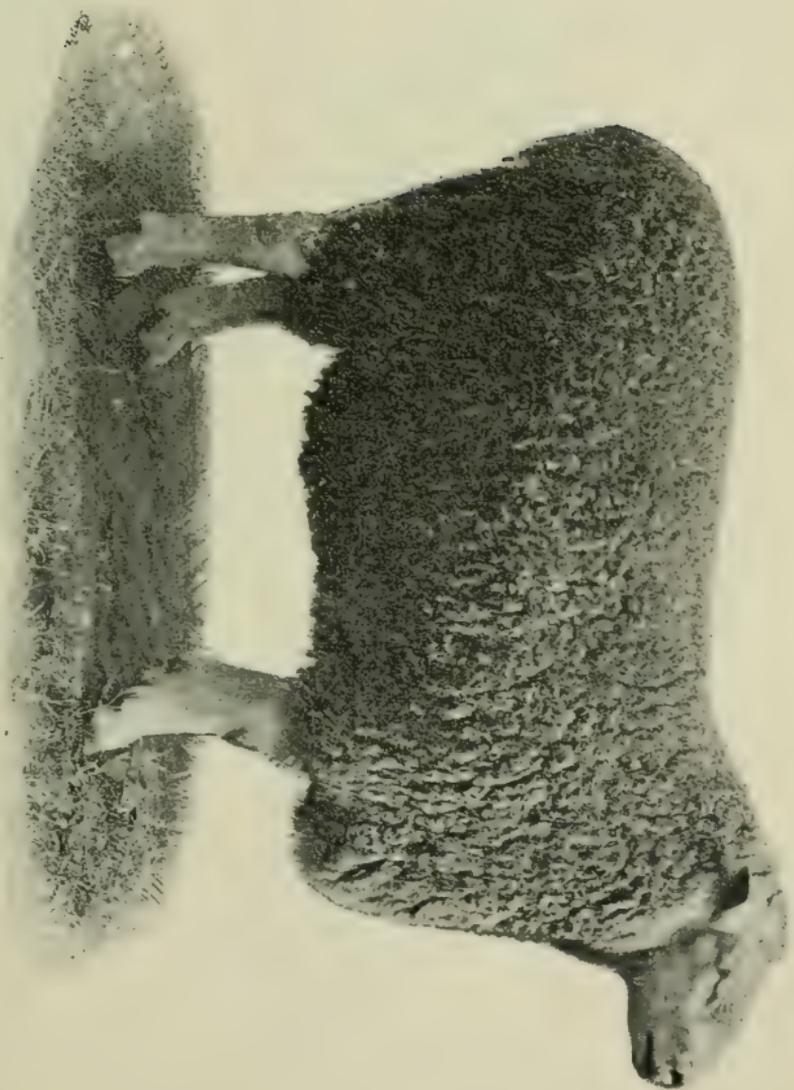
(6.) *Mutton* best when not over twelve months old (weighing under 20 lbs. per quarter), being greasy and inferior if well fed and not killed till two years old.

(7.) Ewes not first-rate milkers, and lambs inclined to be tender on account of the close-breeding.

The Improved Lincoln is white-faced, and is as large as any sheep in England,—a shade larger than the Cotswold,—and got by crossing the old Lincoln, which was famous for great length and quantity of wool, with the English Leicester. There is still a tuft of wool on the forehead, though not so much as of old. The fattening qualities have improved, although the wool has shortened in length, lessened in quantity, and deteriorated in quality and in lustre. The wool of the breed as it now exists is nevertheless of superior quality: The staple of well-bred tegs is about as broad as two of a man's fingers.

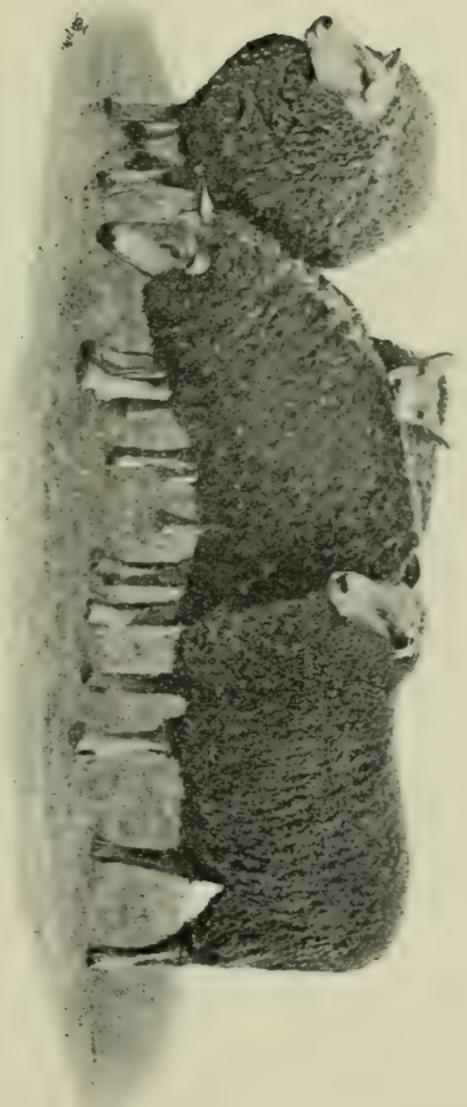
The Long-wool Devon is very like the Lincoln, but is not so large. It is coarser boned, and does not show so much breeding. The face is white, with a lock on the forehead, and woolled well on to the cheeks. It has a mixture of Leicester blood, and it has at times been dashed with the Cotswold, which it also resembles to some extent.

The Cotswold is named from the Cotswold Hills,

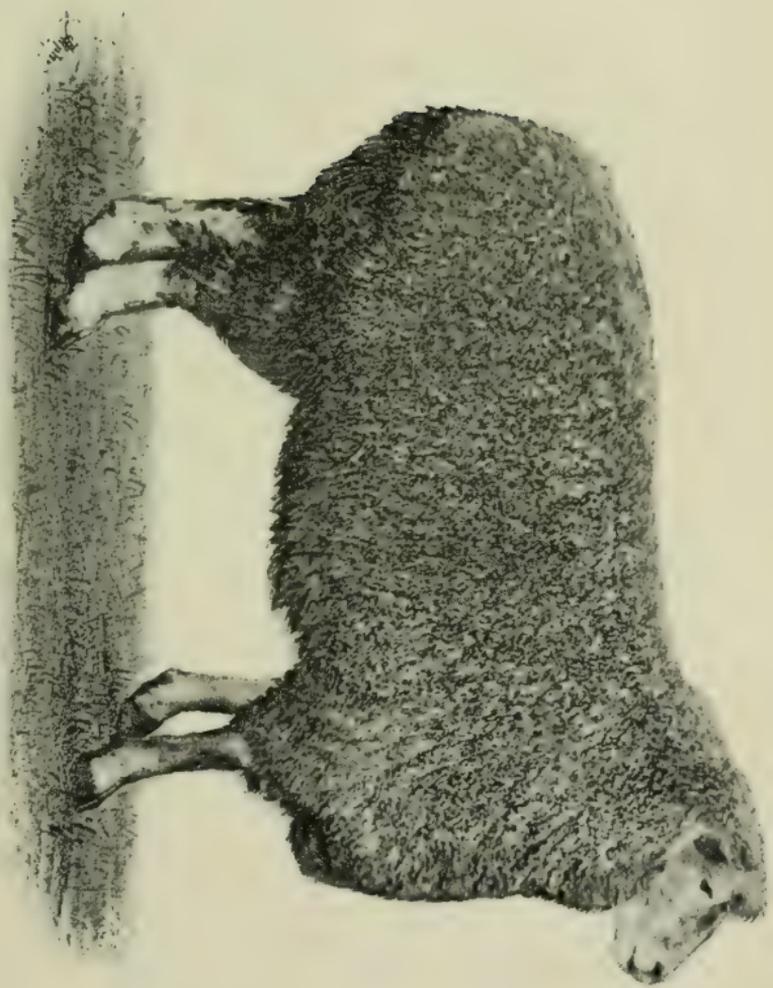


75.—LINCOLN RAM.

First as a Two-Shear Ram at the Royal Show at Preston in 1885; &c. &c.
The Property of ROBERT WRIGHT, Nocton Heath, Lincoln.



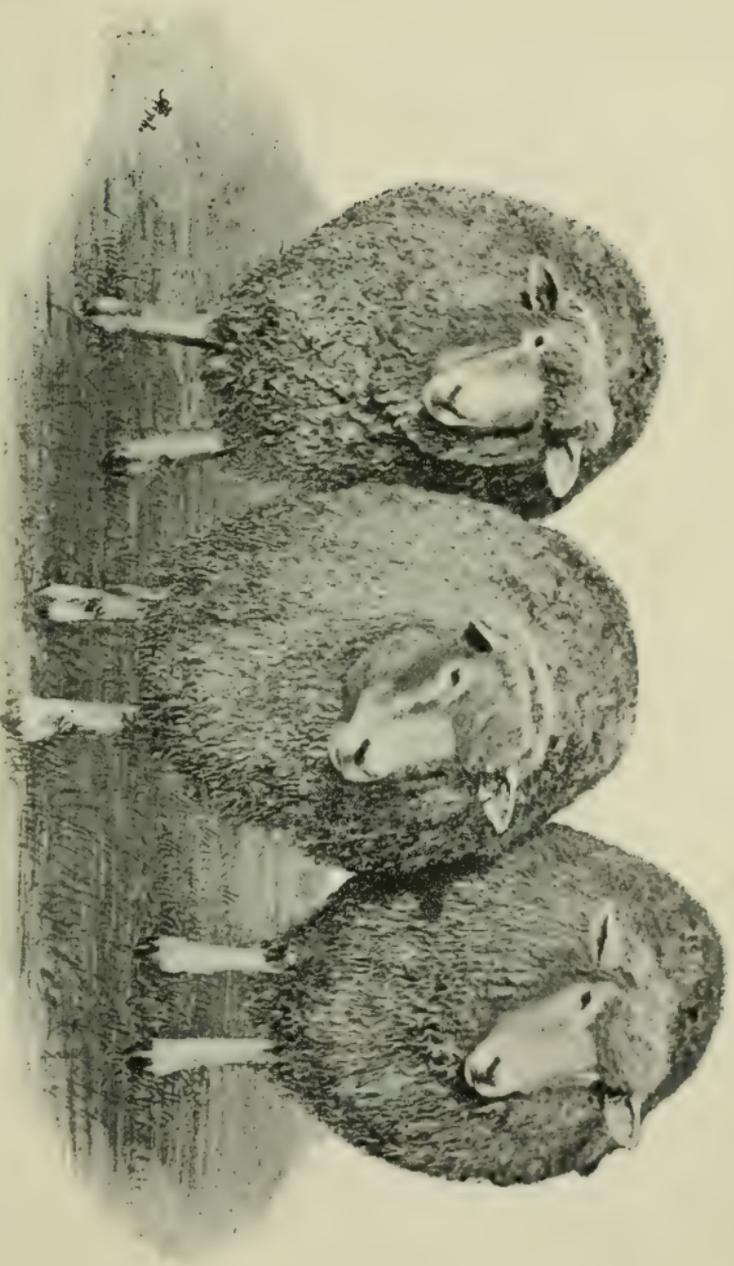
76.—LINCOLN EWES—FOUR OF A PEN OF FIVE SHEARLINGS,
First at the Royal Agricultural Show at Preston, 1885, &c. &c.
The Property of ROBERT WRIGHT, Nocton Heath, Lincoln.



77.—DEVON LONG-WOOL TWO-SHEAR RAM.

First at the Royal at Nottingham in 1888.

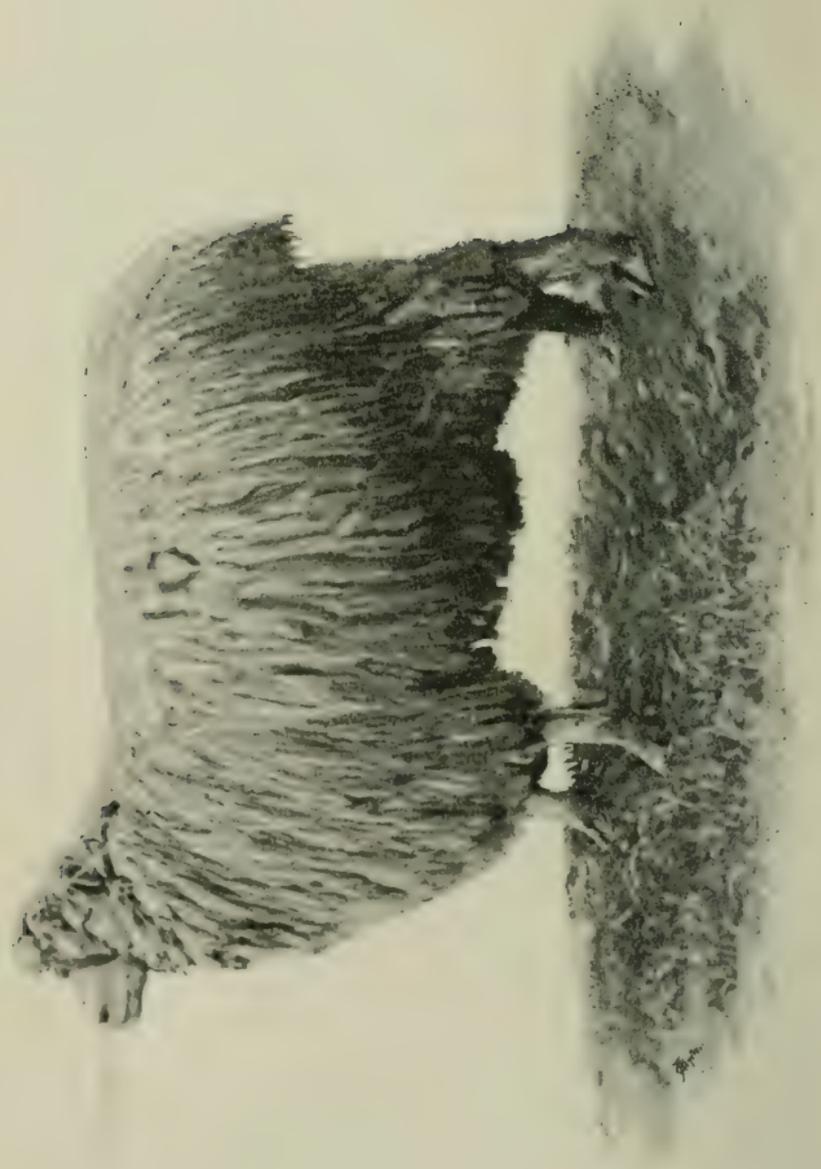
The Property of Sir J. H. H. Amory, Bart., of Knightshayes, Devon.



78.—DEVON LONG-WOOL EWES.—THREE OUT OF A PEN OF FIVE.

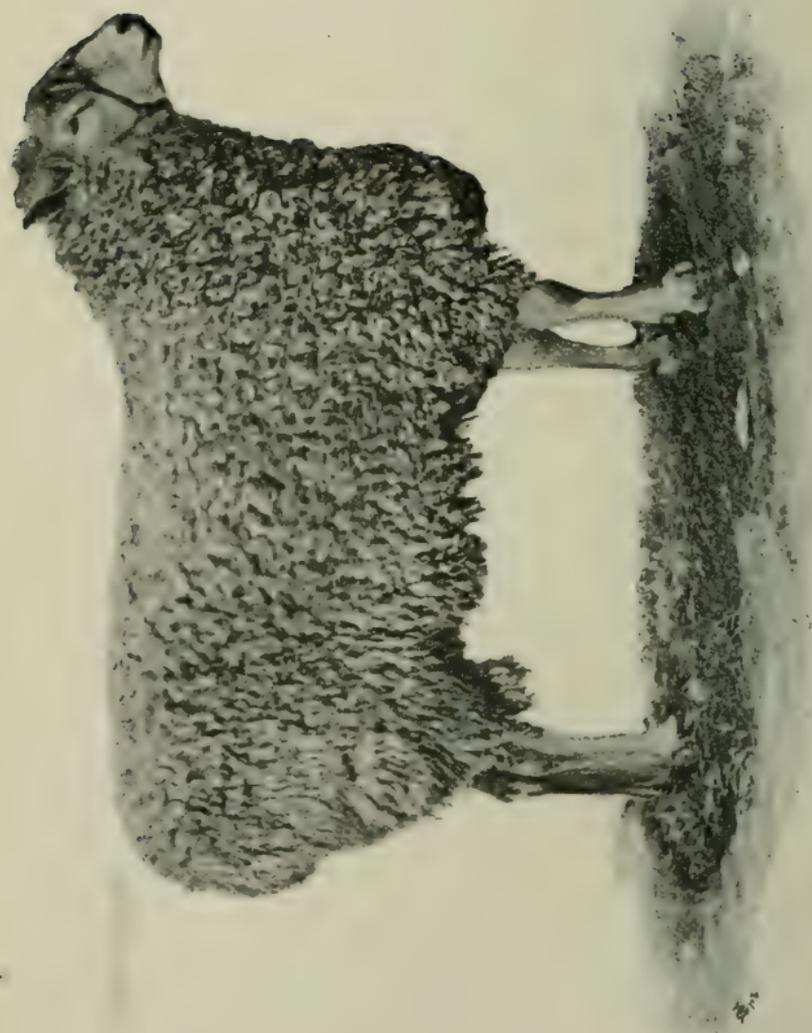
In 1888—First at Bath and West Show, Newport; First at the Royal, Nottingham;
First, and Champion Cup, at New Quay, &c.

The Property of Sir J. H. H. Amory, Bart., of Knightsbrayes, Devon.



79.—COTSWOLD RAM LAMB.

The Property of RUSSELL SWANWICK, Royal Agricultural College Farm, Cirencester.



80.—TWO-SHEAR COTSWOLD RAM, WITH TWO MONTHS' GROWTH OF WOOL.

First Prize at Vienna International in 1873.

The Property of RUSSELL SWANWICK, Royal Agricultural College Farm, Cirencester.

and is one of the oldest breeds, with very distinct characteristics. It, too, has been improved by introduction of Leicester blood, and is now large and hardy, and well suited to feeding on stiff land, even when pretty wet. The flesh is coarse when sheep are aged. At twelve to fifteen months old they ought to weigh 25 lbs. to 28 lbs. per quarter. Togs more moderately fed, and "run over" till two years old, get up to 35 lbs. or more per quarter.

Points.—Strong faces usually white, sometimes gray, with legs to match. Dark colouring makes the Cotswold more like a Down cross, and helps to sell the mutton. A large tuft of wool covers the forehead and ought to hang down almost to the nostrils. The ewes are fair milkers, and prolific when not too fat or the rump too large. The clip of wool averages 6 to 8 lbs. for ewes. The staple is long, neither close nor too open, and rather coarse in quality. The belly, and particularly the scrotum or "purse," should be well covered with wool.

Through being an old breed of good size, it is well suited to crossing with ewes of short-woolled and smaller boned and finer varieties, provided the heads of the rams are not too large, to avoid the difficulty the ewe might experience in giving birth to the lamb.

The Wensleydale is a large, high-standing Yorkshire-Leicester breed, with a characteristic blue colour in the skin of the face and ears, but which sometimes extends to the whole of the body, though

the shade is deeper on the bare or hairy parts. The dark colour is cultivated, because in the extensive use of the rams in crossing with the Scotch Black-faced breed it is found that dark blue rams throw dark faced lambs, a point which is considered valuable. The lambs bred in this way are called "crosses" in Scotland, where they are extensively kept for "hogging." In the east of Yorkshire and in Lincolnshire, where many thousands of them are annually bought and fattened during winter, they go by the name of "Mashams."

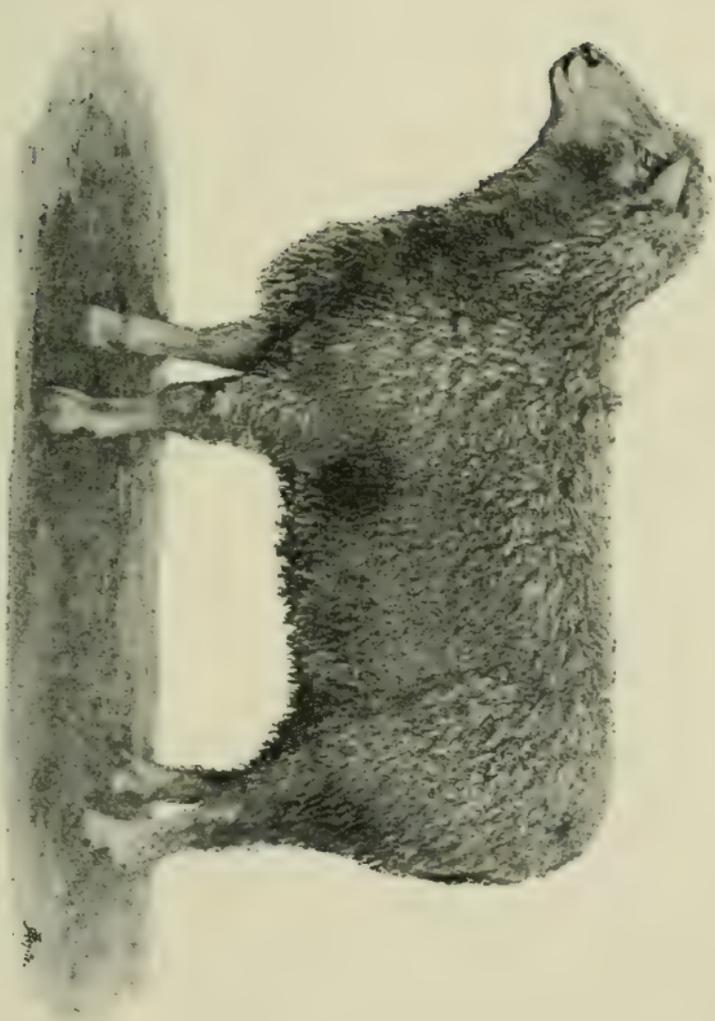
Wool of uniform open character, long, and divided into little knots or pirls, should cover nearly the whole surface of the body, including the forehead between the eyes, round the ears, and on the belly and scrotum. The back of the hind-legs down to the hoofs, and at times even the fore-legs, have downy wool on them. Hairy wool on the thighs is objectionable.

The head is of good size, and well carried on a long and strong neck, giving much greater style to the breed than is usual with most Leicesters.

The nose should be wide, and in the ram slightly arched; the back of the head flat and the ears large, but well set on and well carried. The breed is specially noted for the absence of patchiness or excess of fat. The crosses bred from it are slower in coming to maturity than those of Border-Leicester or the other breeds of long-woolled sheep; but the quality of flesh produced, the hardy constitution and active disposition, enable it to maintain the position of first favourite in many districts.



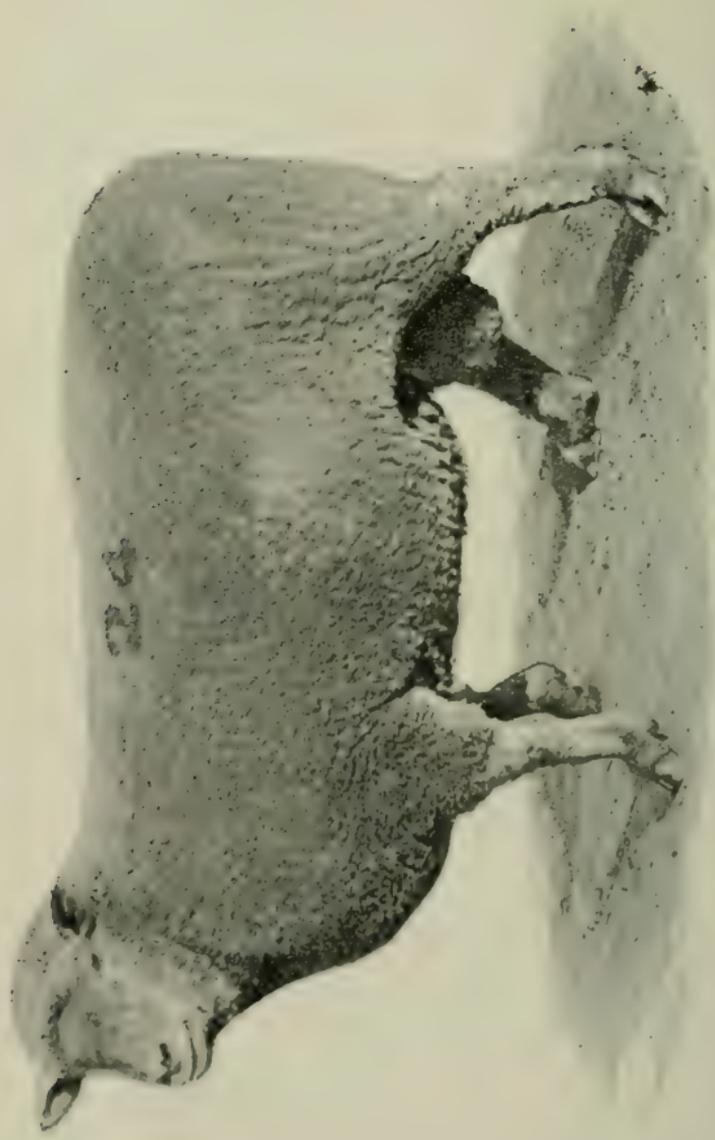
81. WEST OF ENGLAND FLEECE.
The Property of T. WILKINS of Capenhurst, Bodale, Yorkshire.



82.—WENSLEYDALE RAM, TEN YEARS OLD.

First as a Shearling at Royal and Yorks Shows.

The Property of J. BARKER MANTON, Leyburn, Yorks.



83.- SOUTHDOWN RAM, "No. 24."
Bred by HUGH PENFOLD, of Selsey, Chichester, sold in 1888 for 185 Guineas.

The **Kent or Romney Marsh** is a hardy white-faced breed, which is related to the Cheviot, and much resembles it in general appearance. It has been improved much by crossing with the Leicester. Kent sheep are frequently not fed in winter when on natural pasture, and do not lamb till April. A lamb to each ewe is thus a good crop. The wool is good, and it is one of the closest coated of the long-wools. The fore-lock is sometimes wanting, and on account of the various irregularities the type is not distinct, though the form of the best class is compact and symmetrical.

The **Roscommon** is an Irish breed, to be seen in Connaught. It was improved from the old form by selection and crossing with the Leicester. It is quite as large, if not larger than the Cotswold or Lincoln, and the mutton is said to be of finer quality. The fleeces are long, heavy, and silky.

Short-wools ; all Hornless except where stated.

The **Sussex or Southdown** is the breed through which all the other Downs have been improved by crossing with the old-fashioned varieties of the different districts. It is short-legged, and all round most compact and symmetrical, but particularly good in the hindquarters. The present form of the breed has been attained by selection from the original breed, which was light in the forequarters, and leggy.

The head is small and neat, woolled close up to

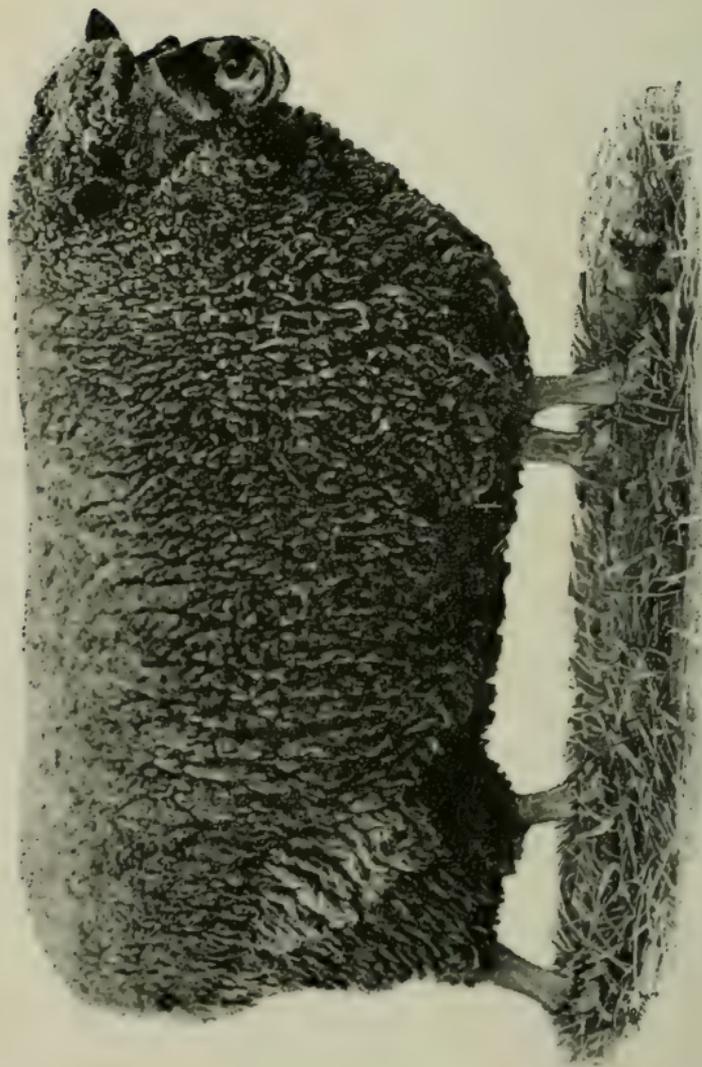
the ears and on the forehead ; naked ears are most objectionable. The face and legs are of a gray-brown colour.

The fleece from a ewe weighs about 3 or 4 lbs., is short, close, and of fine quality, and should be free of hard projecting fibres. Open, long, coarse wool has been imported in the attempt to increase the size by crossing, and it is very objectionable.

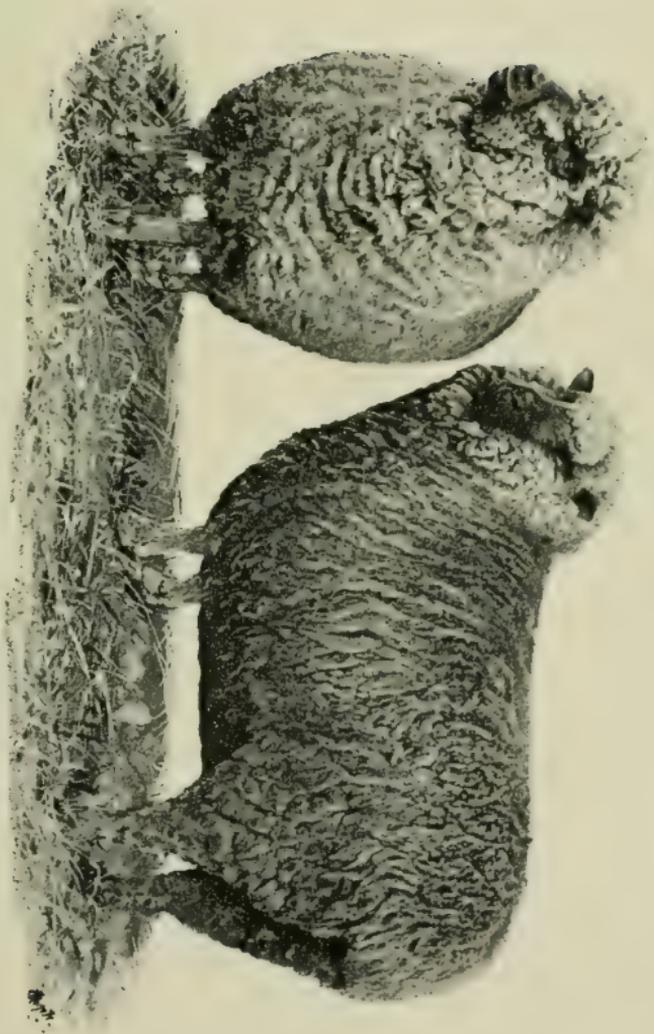
The flesh is of excellent quality, but can be easily made too fat. The average weight for well-kept tegs should be about 18 lbs. per quarter at twelve months, and the offal is little in amount as compared with that of other breeds. Fat wethers rising two years old, belonging to Lord Bathurst, and sold in Cirencester market in the first week of December 1884, dressed to 138 lbs. per carcase, or 34·5 lbs per quarter dead-weight ; and yielded 65·83 per cent. dead-weight to live-weight.

The original habitat of this breed was the region of the low chalk-hills of Sussex and the neighbouring counties. Away from this they are usually kept as ornamental sheep in parks, where they are at times made into five-year-old mutton. They are not good rent-payers, except in their native district, being small, and also liable to foot-rot.

The Shropshire Down breed of the present time has been produced by crossing the old form with Southdowns to give quality, and Leicesters to maintain the size. Now any imported blood is objectionable, as it spoils the type.



84.—SHROPSHIRE DOWN RAM, "WERTON PRINCE."
The Property of EDWARD CADDICK, Caradoc, Ross.



85.—SHROPSHIRE EWES.
The Property of EDWARD CADDICK, CARADOC, ROSS.



The face is longer and larger than that of the Southdown ; the nose slightly Roman ; and the ears larger, and showing a more sprightly appearance. The face and legs are of a blackish brown ; the latter often darker than the former, which is usually tinged with gray (more at some seasons than at others) round the nose, eyes, and on the jaw. White spots on either face or legs are objectionable, and black spots on the body are equally so. Transparent ears are bad, showing a want of the necessary hairy covering, and a tendency to softness through in-breeding.

The wool should be free from black, of fine quality, and closely set, although a little longer than Southdown ; and the skin underneath of a pinky flesh-colour. A good average fleece in an ordinary ewe flock weighs 7 or 8 lbs. ; those of ram tegs and highly fed ewes more. Heavy clips of wool are often coarse. Dead-weight, 20 to 22 lbs. per quarter at twelve months old.

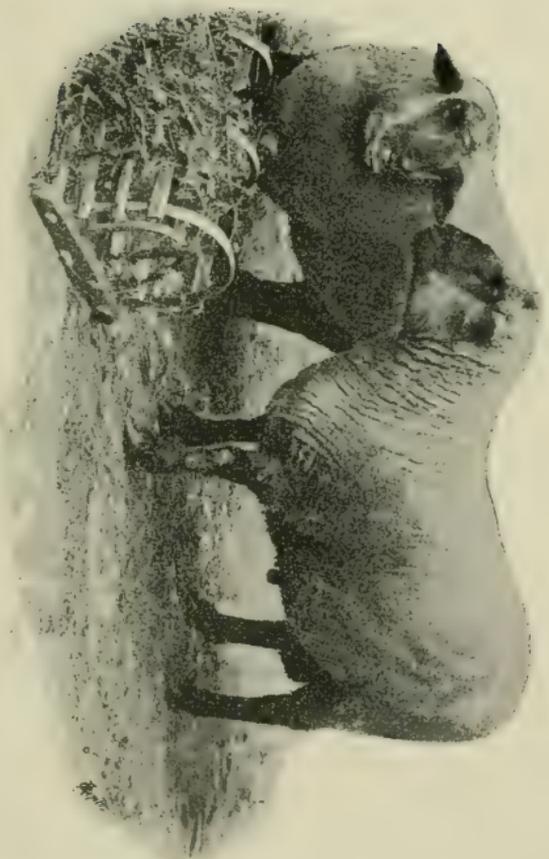
This breed has spread quickly in England within a few years. They were extensively tried in Scotland (about 1882) to cross with native sheep. The crosses, like the pure breed, are remarkably well covered on the back with flesh, and make excellent fat lamb, as they come forward early, but they have not been a success when kept as hoggs, being much smaller in size than the Leicester cross, which they were expected to supersede. Another disadvantage of the Shropshire for the purpose of crossing with sheep on hill pastures is that their lambs are too bare for

the first few days after birth ; they cannot resist the cold in very stormy seasons.

The **Hampshire Down** breed has its natural habitat on the chalks of Hampshire and the region lying immediately north and west ; hence called the **West Country Down**. It was improved from the old Wilts and Hants sheep by crossing with the Southdown and by selection.

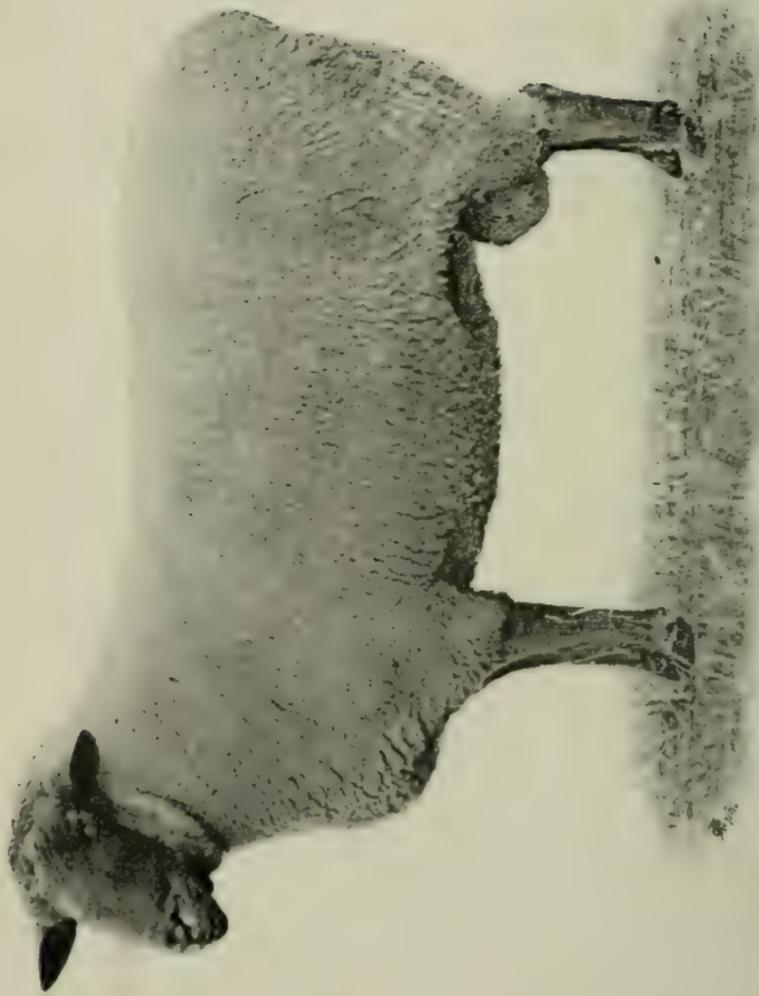
It is larger, coarser-looking, and lower set than the Shropshire, and not easily fed to "handle fat" when young, though often forced to great weights by high feeding. The ewes get perhaps 1 lb. per day of a mixture of equal parts of linseed cake and peas or Egyptian beans, until the lambs begin to eat ; then this is gradually taken from the ewes and given to the lambs. With abundance of natural food in addition, a ram lamb should increase from 19 lbs. at dropping, in January, to 150 lbs. live-weight on 1st August. Lambs can be got early, as the ewes come in season sooner than most sheep. If kept for tegs in an ordinary way, they should weigh 20 to 22 lbs. per quarter at thirteen or fourteen months old. The flesh is of fine quality, and all over firm to the touch.

Points.—Head large, with strong Roman nose, and free from "slugs," "snags," "snigs," or budding horns. Faces and legs almost black ; light faces indicate recent crossing with the Southdown. The wool should be free from black patches, and grow close up to and round the ears, close and fine all over the body, and shed white with a pink skin



86.—HAMPSHIRE DOWN RAMS.
From the flock of the COLLEGE OF AGRICULTURE, DOWNTON, SALISBURY.





87.—SUFFOLK RAM, "SAILOR PRINCE."
Winner of many First Prizes, and a Champion Prize in 1888.
The Property of EDWARD GITTUS, Snailwell, Suffolk.



88.—SUFFOLK EWES.

Won a number of First Prizes.

The Property of JOSEPH SMITH, Thorpe Hall, Hasketon, Suffolk.

underneath. The average weight of fleece is $4\frac{1}{2}$ to 5 lbs. for ewes.

Ears a good size, and more pointed than in the Southdown ; of a dark mouse colour behind, and free from light specks.

The forequarters are particularly good, and the top of the shoulder extremely broad. A conspicuous defect of the breed is a falling away behind the shoulder.

The Suffolk resembles much the Hampshire, but it is not quite so compact and low set, and the short hair on the face and ears is black, and it extends down the back of the head so that the ears are not surrounded with wool as in the case of the Southdown.

It was bred originally from the hardy, horned, black-faced Norfolk sheep by crossing with the South Down to give compactness and early maturity, and also with the Hampshire, to maintain size and weight. The breed has been so recently formed that uniformity of type has not yet been secured. Flocks in the eastern districts partake strongly of the old Norfolk characters, viz., dark face, light bone, and active habits. Those to the west are, as a rule, kept on better land ; they have lighter faces, greater aptitude to fatten, and get up to greater weight.

The Suffolk breed was not recognised as of sufficient importance to form a class at the Royal Agricultural Society's shows until 1886. Since that time it has made rapid strides of advancement. A Suffolk Sheep Society has been organized with the

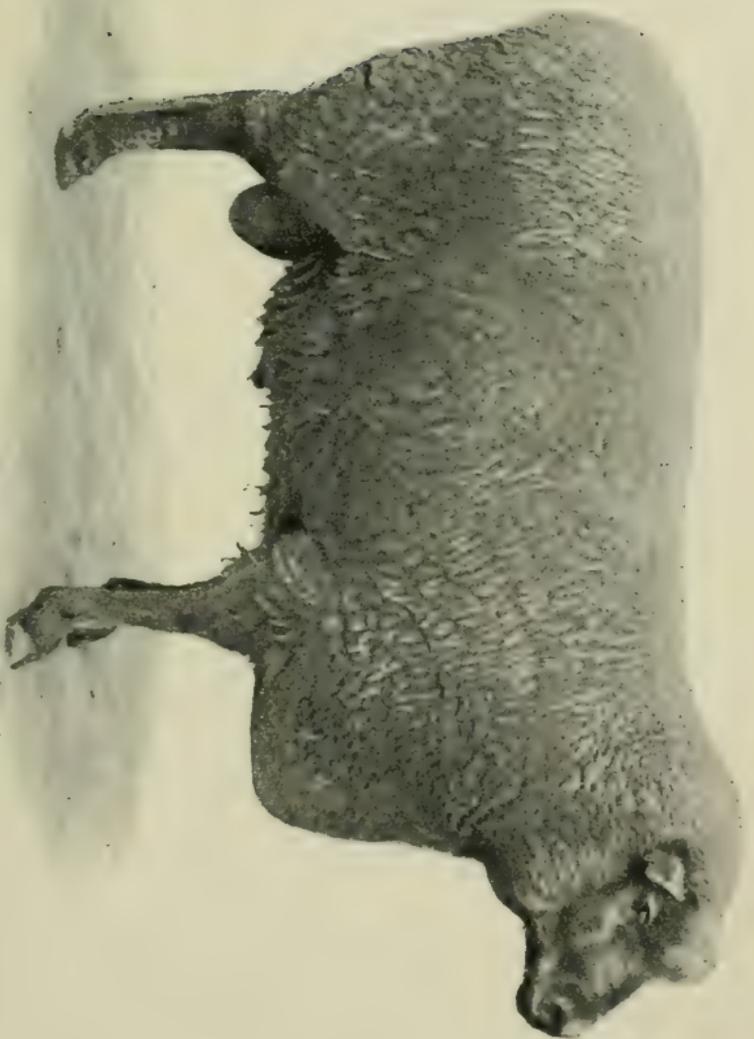
object of protection and improvement. The animal they have under their care is possessed of great strength of constitution and character, and abundance of bone and flesh; and the objects before them ought to be to equalize and refine the type by judicious selection.

The **Oxford Down** is a breed comparatively recently formed by crossing Hampshire ewes with Cotswold rams. It is the largest Down, although Hants tegs, being dropped sooner and consequently older, weigh more at the London Christmas fat shows. The mutton is good quality, weighing 20 to 23 lbs. per quarter at twelve to fourteen months old.

Points.—The face is not so dark, nor the shoulder so broad, as in the Hampshire. The type is not so well defined, showing more of the crossed origin. Rams from old-standing flocks cross well with hill-breeds and inferior sheep, but breeding from the produce of a recent cross is not to be depended upon.

Flocks of cross-ewes are sometimes kept for breeding fattening tegs. When they get light-faced, a pure Hampshire ram is turned in for a year, and when rather dark, a Cotswold is used in preference. A Shropshire ram on a cross-ewe produces a sheep with a much better covering of flesh along the back.

Oxford wool is longer and more open or loose than that of other Down sheep; fleeces of ewes average 6 or 7 lbs. each.



89.—OXFORD DOWN RAM, "LIVERPOOL FREELAND."

Royal Winner in the Two-Shear Class in 1885, and Champion of all Breeds at the Oxfordshire Show.
The Property of JOHN TRAFADWELL, Upper Winchendon, Aylesbury.



90.—SOMERSET AND DORSET HORN EWE HOGGS.
The Property of H. DAVIS, Preston Farm, Milverton.

The **Clun Forest Breed** belongs to the Clun district of Shropshire, the south of Radnorshire, and the adjoining portions of Montgomery. It is sometimes called in these localities the Radnor-forest or Kerry-hill sheep. It is bred from the tan-face sheep that at one time abounded in that region, by crossing with hardy Shropshire and black-faced Longmynd mountain rams. The Longmynds have been quite supplanted by them. The ewes are excellent mothers; crossed with a Shropshire ram they produce Easter fat lamb, which would weigh, if kept till early summer, 17 lbs. to 18 lbs. per quarter. Ewes and two-year old wethers get up to 28 lbs. per quarter. The wether-mutton is sold in the "West End" as Welsh, dressed with a tuft of wool left on the tail, which is naturally long, on account of the breed being semi-mountainous.

The wool is about the same weight as Shropshire, but a little coarser.

The **Dorset and Somerset Horn** is a white-faced breed, with a close, short fleece, weighing 4 or 5 lbs., and a tuft of wool on the forehead. The nose, hoofs, and legs are white. In size it is a little larger than the Southdown.

The great peculiarity of the breed is, that the ewes take the ram as early as April, and breed "house-lamb" ready for Christmas. They tup again soon after lambing, and thus give two crops each year. The ewes are often tuppèd for the last time by a Southdown ram, so that the lambs

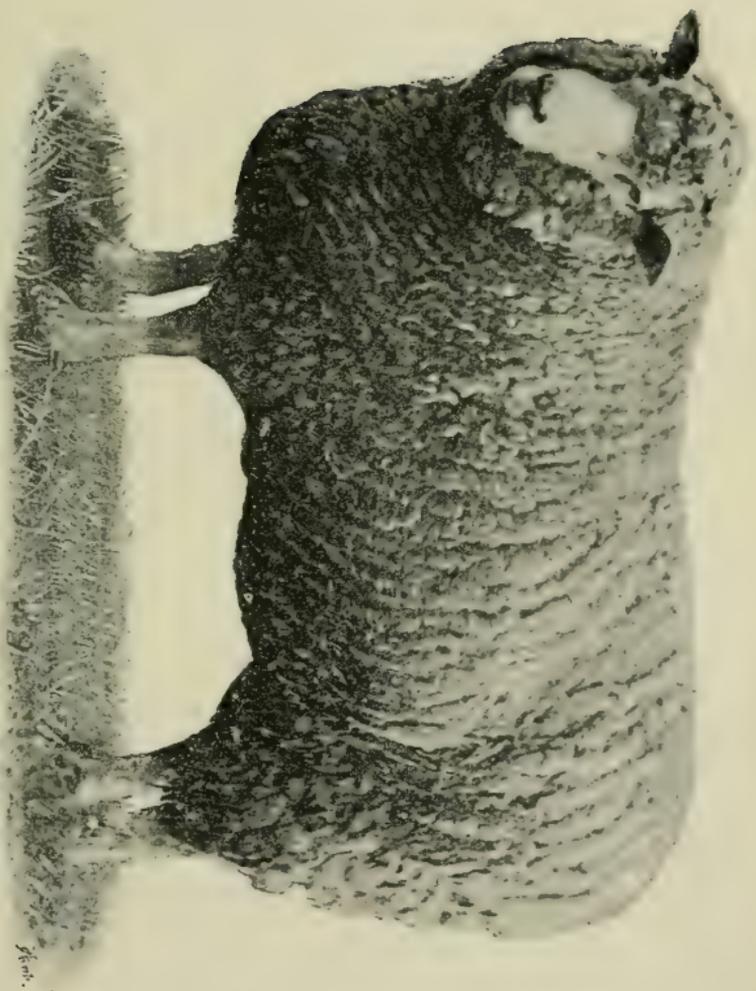
are got sooner ripe, and with dark faces and no horns.

Downs or Down-crosses are usually supposed to give the best quality of mutton, and there is consequently a run upon dark faces and legs, as butchers can more easily dispose of the mutton of dark-faced sheep.

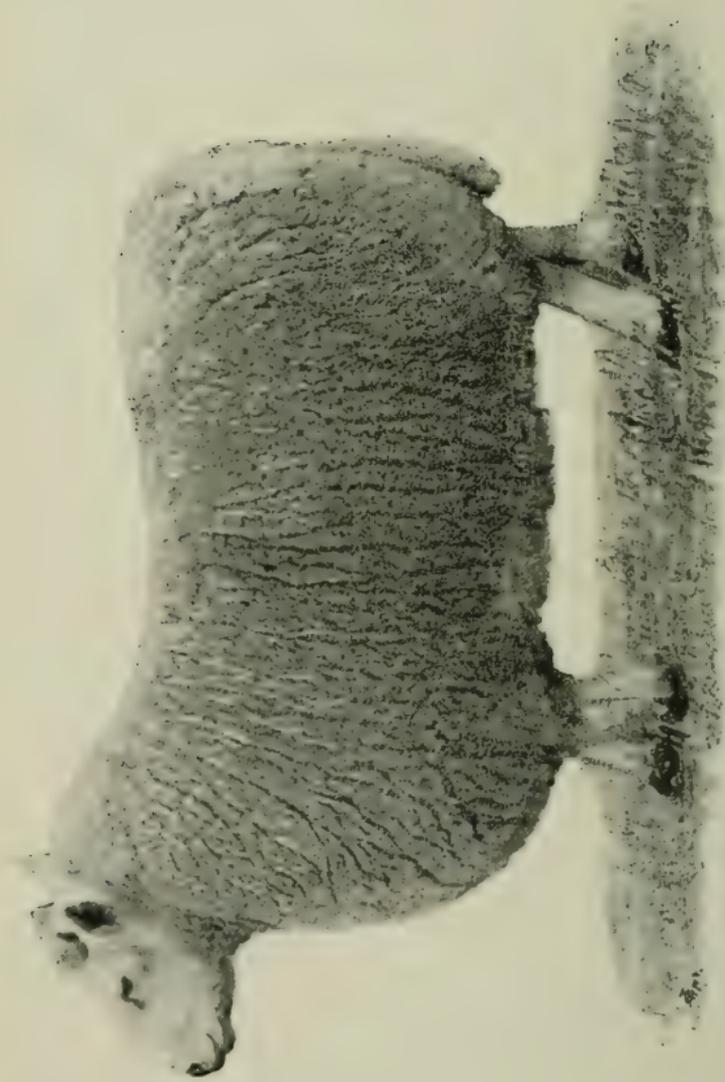
The Ryeland Breed (named from the Ryelands of Hereford, a poor upland district) is perhaps the breed of longest standing in England. Merinos are said to have been improved ages ago by crossing with Ryeland rams. The breed resists any attempt at improvement by crossing with other breeds. It is compact and hardy, and fattens readily when liberally fed up to 20 lbs. per quarter at twelve to fourteen months old. Pure-bred lambs and also crosses by a Ryeland ram on ewes of other breeds make excellent butchers' lambs. They are dropped in a fat condition, and when well managed they retain it in virtue of their natural hardiness of constitution.

Both rams and ewes are polled, have white faces and legs, and a tuft of wool on the forehead. The wool is short and exceptionally fine in quality, more like the wool of the Merino than that of any other British breed. The fleece weighs about 7 or 8 lbs. on an average in the case of well-kept sheep. The breed is almost free from foot-rot, unless when this is communicated to them by contact.

The Ryeland sheep were supplanted to a large



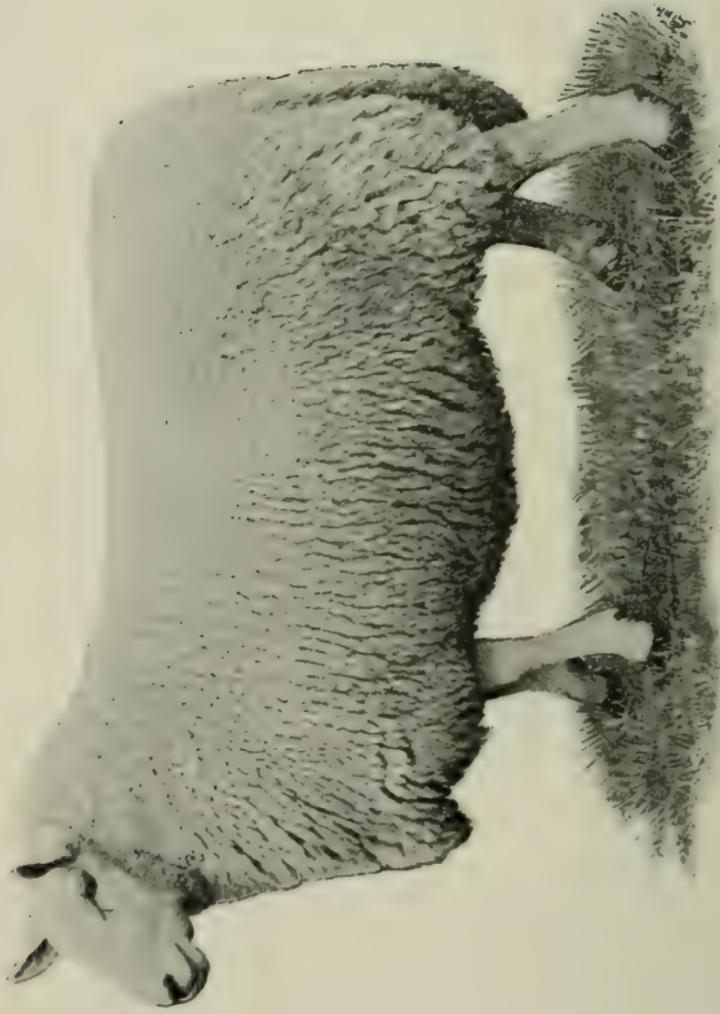
91.—RYELAND RAM, IN FULL WOOL.
The Property of FRANK SHEPHERD, The Brook, Colwall, Malvern.



92.—CHEVIOT RAM.

Many Highland Society and other Prizes, including First at Glasgow in 1888.

The Property of J. A. JOHNSTONE, Archbank, Moffat.



93.—CHEVIOT EWE—AS ONE OF A GROUP OF THREE.
The Winner of many Prizes, Highland Society and others, including a Champion Cup at Moffat, 1886.
The Property of J. A. JOHNSTONE, Archbank, Moffat.

extent some years ago during the rage for Shropshire and other improved Downs, but the tendency of recent times has been to breed them up again, and to greatly improve upon the original form by selection. It is estimated that there are only about thirty flocks of Ryeland sheep at the present time, twenty-five of which are located in Hereford and Brecknockshire, while, perhaps, two or three places may be found where they are bred in each of the counties of Monmouth, Gloucester, and Worcester.

MOUNTAIN BREEDS.

The Cheviot is named from the range of hills on the Scotch and English border, its native district. The ewes pasture on the lower and less exposed green hills all over Scotland. Cheviot wethers and Black-faced Highland ewes go to greater heights, or occupy positions on the black or more heathery land at lower elevations.

The face and legs should be well covered with short, hard, wiry, pure-white hair, which extends over the ears and well back behind the head.

Horns in the ram, though not always present, are not objected to, being thought a sign of hardiness, if "clean," and not thick like those of the Black-faced breed. The nose of the ram is highly arched or Roman. The nostrils are black, and the eyes dark, very full and bright.

The wool is moderately long, and should be close

set, not open or curly, but straight and free from "kemp" or dead hairs, covering well all parts of the body, including the belly, breast, and legs down to the knees and hocks. Ewes clip $4\frac{1}{2}$ to 5 lbs. of washed wool.

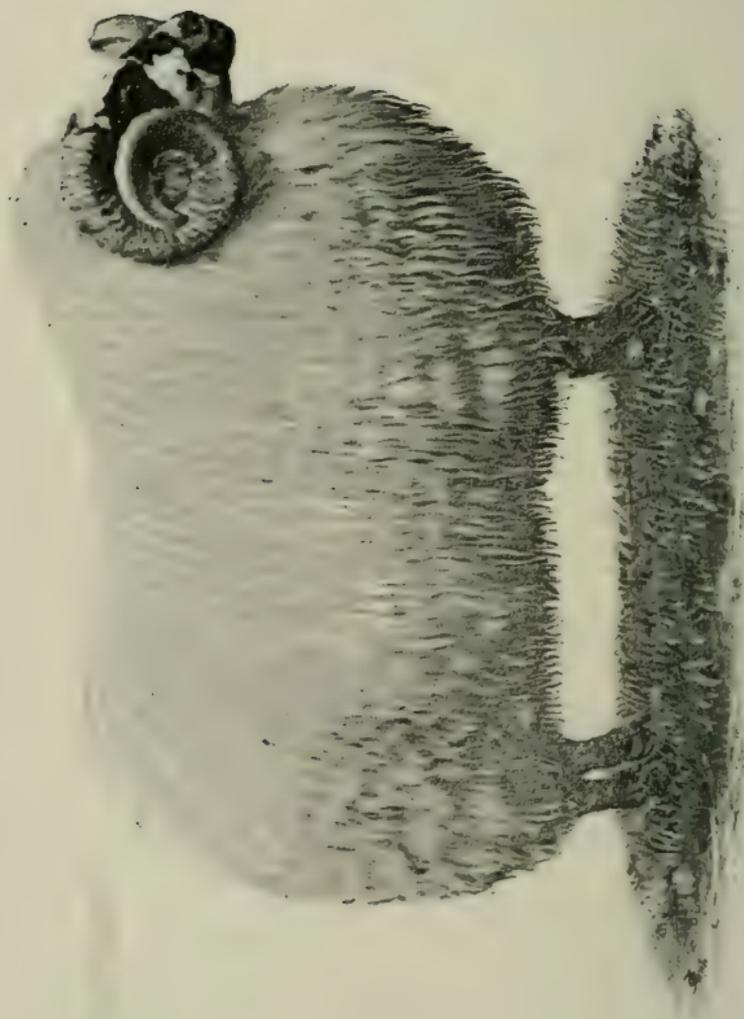
The tail is long, and should be very rough. It is cut so that the point reaches the hough. [The tails of mountain sheep are left long to protect the udders in cold weather, and because, on natural food, they are not so liable to scour and get dirty, as sheep on turnips and artificial foods. Shetland and Iceland sheep have not tails long enough to act as a protection, but there is an unusual amount of wool on the inner part of the thighs, which serves the purpose quite as well.]

The shoulders are high and sharp at the withers.

The fashionable form of Cheviot is now shorter, smaller, and more compact, and the wool closer and thicker set, since a series of bad seasons, down to 1879, showed that the larger varieties with loose open fleeces were not so hardy. The old, original Cheviot was a very close-coated, short-woolled, and remarkably hardy sheep,—more hardy, it is recorded, than the Scotch Black-Face, which is far from being the case in the breed as now represented.

The ewes are good milkers if not starved, as they are in bad seasons, when the natural food on which they subsist is late in springing.

Cast ewes fed on turnips for twelve to fourteen weeks, and wethers from the hills at three years off, weigh, killed and dressed, 70 to 80 lbs. : wethers a



94.—HIGHLAND BLACK-FACED RAM, "POTIPHAR,"
Champion Cup at the Highland Society's Show in Perth, 1887.
The Property of ARCHIBALD of Overshields.

year younger, and finished on turnips, come up to about the same weight.

Cast, draught, or cull ewes, at five years old, go from the hills into the low country and better food, to be "milled" or crossed with Wensleydale, Border Leicester, or Lincoln rams. The produce is called "Half-bred," or Leicester-Cheviot." Those kept for ewes produce "Three-part-breds."

Half-breds, when fat at twelve to thirteen months old, weigh 16 to 18 lbs. per quarter, and the flesh is leaner and of better quality than that of the Leicester.

The Scotch Black-faced Highland Breed is smaller than the Cheviot, much hardier, and thrives better on coarse pasture, as on black, heathery land. The wool is curly, loose and shaggy, down nearly to the ground, and more hairy and kempy than Cheviot wool. It is specially valuable in coarse manufactures, such as carpet making; and as it is less liable to foreign competition than other wools, it fluctuates less in price. The fleece averages $3\frac{1}{2}$ to $4\frac{1}{2}$ lbs. from ewes, and is usually clipped unwashed. Much is exported to America when the price is not over 6d. per lb. Then it can be imported with a much smaller duty than higher-priced wools. Black or blue spots on the neck, tail, or other parts of the wool-producing portion of the skin of a black-faced sheep are objectionable.

The face and legs are black or mottled (but the colours should be distinct, clear, and free from dun

or brown), smooth and glossy, and no wool among the hair.

The nose is strong and prominent, but not so much arched as the nose of the Cheviot, and the nostrils are wide and black.

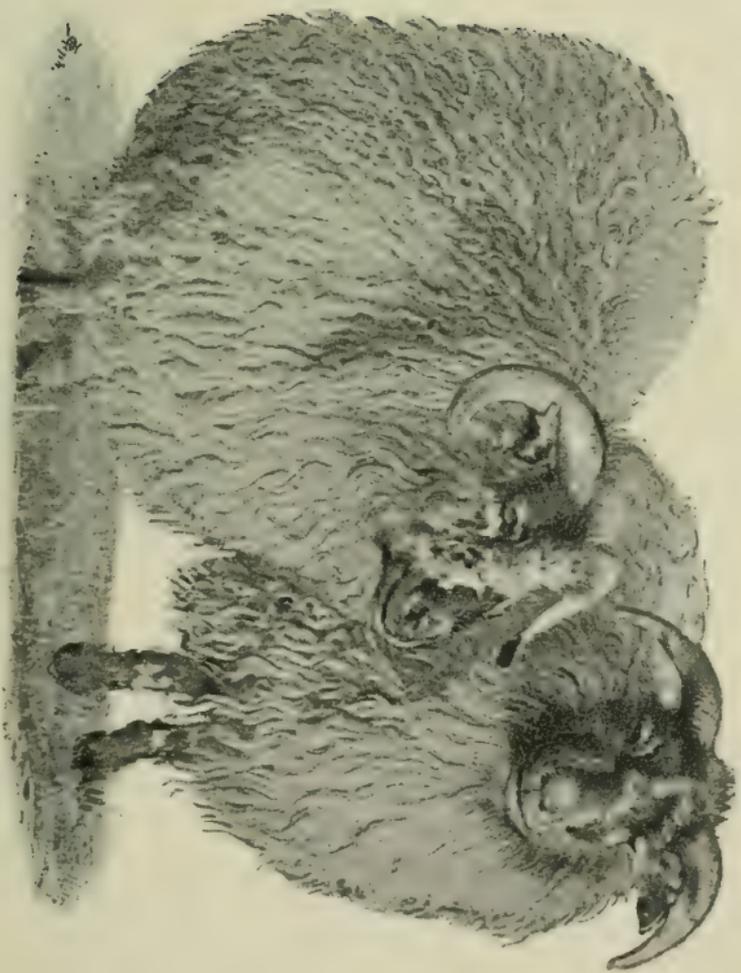
The horns of the ram are large, coming out level from the crown of the head, not rising above it or joining together at the base, but taking one or more spiral turns according to age. The corkscrew-like curl of the horn is in a forward direction, and should so incline, that room is left between the horns for the face.

In the ewe the horns are small, thin, flattened and curved, but not spirally twisted.

The ears are short and small, but hidden by the horns in the ram, and not much looked to in judging. The back is broad all the way, including the part at the shoulder. The tail is naturally short, not often hanging lower than the hock, and consequently does not require cutting. Old ewes should have rough tails. When they lose the wool and become "whip-tailed," they are not worth so much in the market.

The mutton is of the finest quality, especially from three, four, or five-year-old wethers, or young and tender lambs. A wether fat from the hill at three years off should weigh 16 to 18 lbs. per quarter.

The "Black-faced" sheep is wild and active, and when thriving best must travel about much; suiting it to its native pastures better than to a low district, where it is liable to be affected with foot-rot. The breed is supposed to have come originally from the Ettrick Forest.



95.—SCOTCH BLACK-FACED HIGHLAND EWES.
The Property of JOHN CRAIG, Invergellich, Perthshire.





96.—HERDWICK RAM, "DISRAELI," AND EWES.
Many Prizes.

The Property of JAMES SPENCER, Murrah Hall, Penrith.



PLATE I
FIG. 1

The produce of a Black-faced ewe by a Leicester ram is called a "Cross" or "Mule;" by a Cheviot ram a "Half-long"—the latter because a Black-Face is sometimes termed the "short" sheep, and a Cheviot the "long" sheep. As ewes these sheep of mixed breed are good milkers.

The Herdwick Breed supplies the hardies of hill sheep, and is found in greatest numbers on the mountains of Cumberland and Westmorland. A few flocks have been taken to Wales and other parts, and there is a distinct tendency towards increase in numbers.

It is recorded that the breed came to this country about the time of the Spanish Armada, and that "forty small sheep managed to save themselves from the wreck of a Spanish vessel stranded on the sandy coast of Drigg, and were claimed as jetsam and flotsam by the then lord of the manor."

From these foundlings the present breed has descended. Any attempt to cross the Herdwick with other breeds with the object of improving it has been unsuccessful. Horns may be present or absent on the ram, though not on the ewe. They are rather appreciated, though not considered essential.

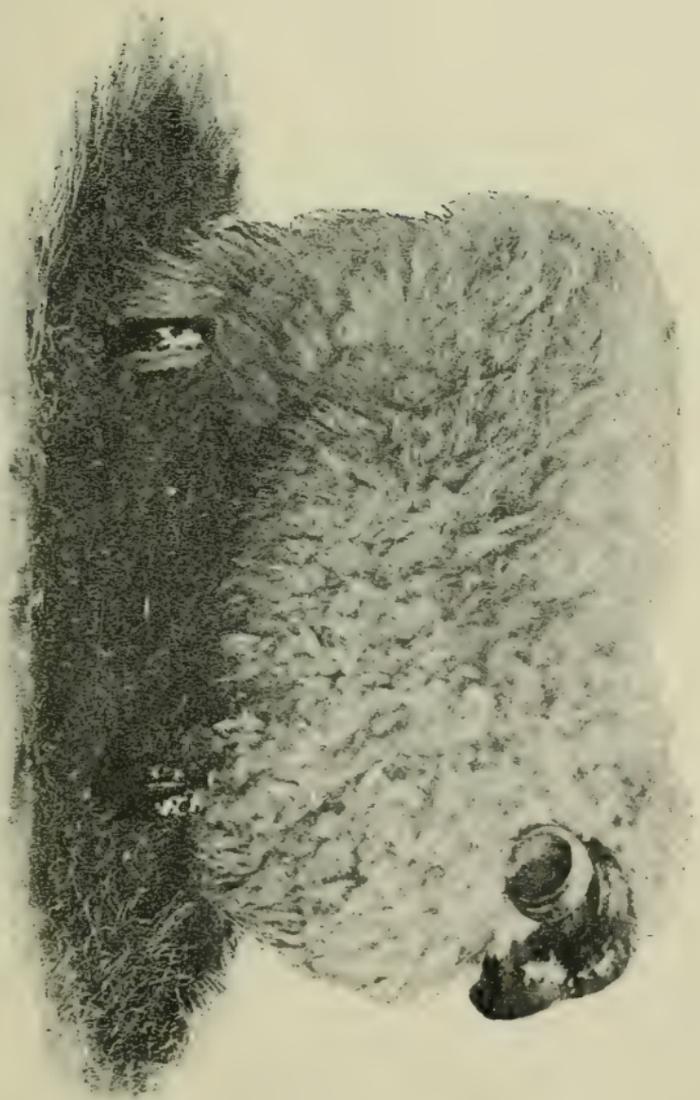
Black should be the colour of the heads and legs of the lambs when dropped, with the small exception of a white tip to the ears, and possibly a fringe of white hair round the hoofs. The white gradually extends from the starting points indicated, and from a ring which develops round the muzzle, till at three

years of age the face is left either white, like the hoofs, or steel gray in colour. These colours should be free from spots or speckles, or from a brown tinge. The wool is strong and coarse, and inclined to be hairy about the top of the shoulder. The poll should be well covered with wool, and the forehead with the forelock; the tail bushy and broad. There are some unique customs in the management of this breed which are not commonly met with among other breeds of sheep: *1st*, Such as smearing the teats of the ewes with plasters of pitch to prevent the lamb sucking; *2nd*, Painting the wool of the ram a bright red colour, so that the ewes as they come in season are enabled to find the ram in uneven hilly ground.

The wethers at three or four years old, and also fat ewes, may weigh from 12 to 18 lbs. per quarter, and the mutton is of excellent quality.

The Lonk Sheep is a native of the Lancashire, Yorkshire, and some of the Derbyshire hills. It most resembles the Scotch Black-Face, but is leggier, has a larger body and bigger head, a longer and rougher tail, and in the ewe stronger horns. In constitution it is not so hardy as the Black-Face, but has a shorter, closer, finer and heavier fleece—weighing $4\frac{1}{2}$ to 5 lbs. from ewes kept in moderate condition.

The rams have been used to cross with Black-faced ewes to try to increase the size and improve the wool, but it has not succeeded, the constitution of the produce being softened. The fat weight is slightly more than that of the Highland Black-Face.



97.—TWO-SHEAR LONK RAM, "CAPTAIN."
The Property of Mrs Dawson, Weston Hall, Otley, Yorkshire.



98.—TWO-SHEAR LOON EWEES,
The Property of Mrs Dawson, Weston Hall, Otley, Yorkshire.



99.—COLLIE DOG, "STEEPLE JACK, 18, 193.
Son of Champion "Sly Fox." Won many Prizes.
The Property of R. BARNETT, Cecil Street, Strand, London.

Welsh Mountain Sheep are very hardy, and equally representative of the breed whether they are horned or hornless, white-faced or white, with more or less of a brown tinge, which is also seen on the legs. They are very active and difficult to fence, on account of their jumping proclivities, when brought down to the low country to breed the last crop of lambs, as is usually the case with mountain sheep at five years old. The mutton is very fine, but the weight small—12 to 14 lbs. per quarter.

The wool is coarse but not very close: weight per fleece between 2 and 3 lbs. from ewes.

The Tan Face is a very old Welsh mountain breed yet met with, but in smaller numbers than formerly, in Radnorshire, about Abbey-cwm-hir* and St Harmon, and shown as a distinct class at the Radnorshire Agricultural Show, annually held at Pennybont. A short-legged, hardy little breed, with close fleece of fine wool on the back and sides, but rather coarse underneath.

Exmoor Sheep somewhat resemble Dorsets, but are more hardy. They have white faces, with black nostrils, and the horns slant more back. The wool is close and fine, weighing 4 or 5 lbs. a fleece. Exmoors are larger than Welsh sheep. The mutton is also very good.

* Cwm-hir (pronounced) *coom hère*, Welsh for long-valley.

CHAPTER XVIII.—MANAGEMENT OF SHEEP ON CULTIVATED LAND AND LOW COUNTRY PASTURE—THE EWE AND LAMB.

Tupping Time—Winter Pasture—Ewes not in Lamb—The Lambing Pen—Parturition—Early Treatment of the Lamb—Food of the Ewe—Lambs' Food—Castration—Washing—Shearing—Weaning.

“**T**UPPING” or “**Ride**” time commences usually, where the climate is moderate, about the first week of September, or at any later period, varying with the district, till about 22nd November (Martinmas), when hill-rams go to the ewes. The date is often governed by the time the ewes begin to come in season : for instance, Hampshires will tup in the beginning of August, whereas hill ewes frequently do not “come in” before the end of October.

Cast ewes (four-year-old) and “culls,” or those unfit for breeding, are “drawn” out when the lambs are weaned, or at any more suitable time before the ram goes among them. By being put on good food, such as rape or mustard, for ten days before tupping time ewes get into an improving condition and produce more doubles. The object may also be accomplished by giving each $\frac{1}{2}$ lb. of oats daily, if the green food cannot be had.

The ewes and rams should be all arranged together according to their different qualities and characters,

so that the flock may have a type of its own. One ram goes to sixty ewes, or more if he is kept by himself, and a "chaser" or "teaser" lamb, with a cloth sewed on to his belly, put out to find the ewes as they come in season.

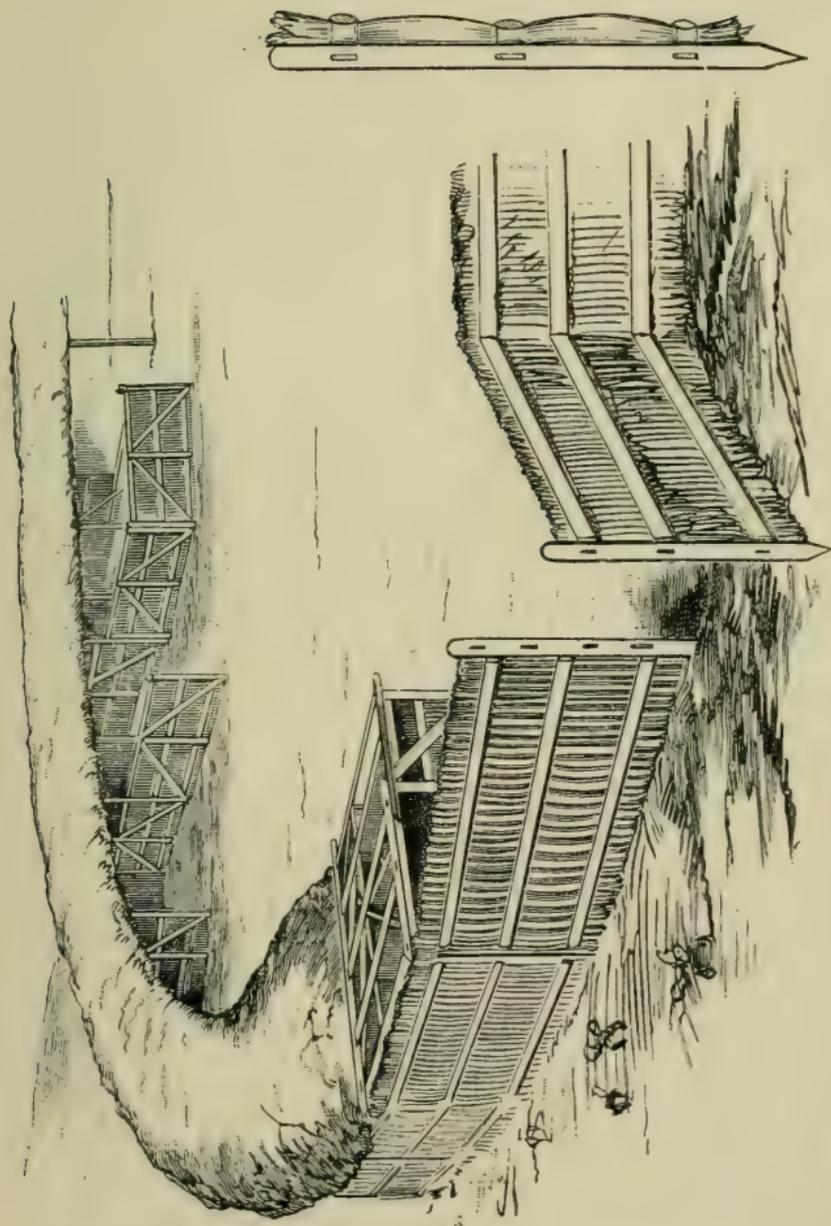
A shepherd should notice if ewes "come back" at the end of sixteen days. A mechanical way of finding this out is to use three colours of paint, usually blue, red, and black. The breast, or sometimes the inside of one fore-leg of the ram is rubbed with blue at first for rather more than two weeks, red is used for the next period of sixteen days, and black for a third period. The ewe's rump is marked while being tugged, and according to the colour of the last marking the time of lambing is approximately known. A ewe marked twice should be put beside another ram for a third trial, as she is less likely to hold to the first ram than to another. This is often accomplished by putting several lots together. Ewes go with lamb between twenty-one and twenty-two weeks. At the end of six weeks, when the tups are taken up, the ewes should run over stubbles and poor pasture, or follow fattening sheep to clean up the remains of turnips or other rejected food: they should be kept thriving, but not made fat.

Ewes going on pasture during winter should have $\frac{1}{2}$ ton of roots per 100 per day up till lambing, and 1 ton per day, or 22·4 lbs. each, after lambing, along with 1 or 2 lbs. of hay or good oat straw in racks. This should be slightly increased should snow cover the ground. Ten days before lambing

begins each ewe should have $\frac{1}{2}$ lb. of a mixture of concentrated artificial food,—such as crushed peas, Egyptian beans, and cake, with oats (whole), and bran, varying in quantity to suit the condition of the bowels. Heavy milking ewes, those with double lambs, should have this increased, but not to more than 1 lb. The mixture is gradually taken off as the lambs learn to eat more. Some give no extra food, and some give too much, and set it down to bad luck if the lambs do not thrive. It is as great a mistake to have stock too fat as too lean : there is more risk in producing young of small size, and there is less milk for them. On an ordinary farm, 25 lambs to every 20 ewes is a good crop ; 30 lambs is very good. With extra care, and by breeding only from ewes that have been born as twins, even 35, or in the case of small and exceptionally successful flocks, even 40 lambs may sometimes be got.

Sheep not in lamb (eild) may be noticed near to or in lambing time—

1. By their jumping and playing in good weather.
2. By being less bulky, and no lamb being felt when the ewe is turned up, and the tips of the fingers pressed against the lower part of the belly.
3. By having no "show" or increase in size of the udder.
4. By the appearance on the bare parts about the udder of a considerable amount of yellow waxy excretion that does not look like cleaning off ; and
5. By the wool being more firmly attached near to the udder.



SIDE VIEW OF A LAMBING PEN. After a sketch by Commander M. J. Harrison, R.N.

The lambing pen is an open, well-littered yard made of hurdles thatched with straw to give warmth

and shelter to the young lambs in stormy weather. Small covered pens, each $4\frac{1}{2}$ feet square, are ranged round the north, east, and west sides, at the rate of 30 to 35 for 200 ewes. The cost of the labour of erecting one of the size named is from £2, 10s. to £3. It should be placed on dry ground, in a sheltered place if possible, and on a slope sufficient to let surface water run off.

Ewes "coming near their work" are brought in at night, so that they may be more carefully tended. Ewes do not lamb nearly so frequently at night as late in the evening and early in the morning. Lambing is more easy in moist than in dry weather.

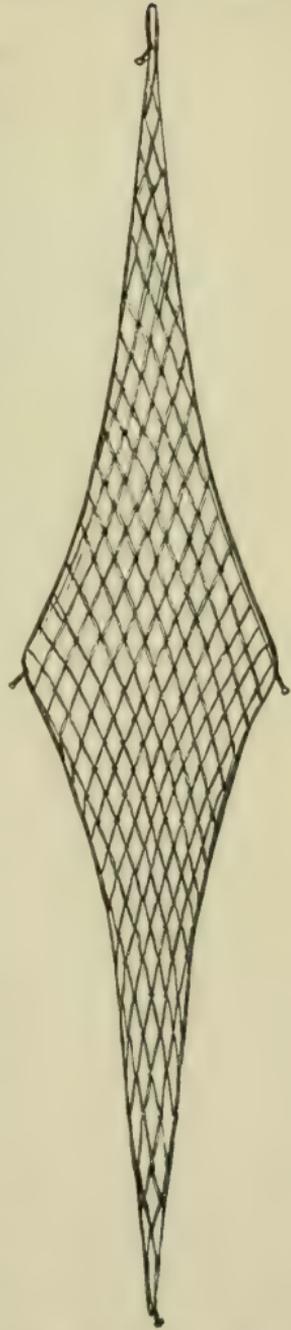
The shepherd lives in a wooden house on wheels, fitted with a stove, and placed close to the pen to enable him to give his whole attention to the flock.

During parturition assistance by hand should never be given too soon. Should the head appear, immediate action is necessary to prevent the death of the lamb by strangulation. When parturition is natural, the two fore-legs come first, then the head. A steady pull is usually successful. In false presentations lambs have often to be turned round before they can be got out. Turning is most easily accomplished when the ewe is held up by her hind legs by an assistant. The hands, after washing, should be oiled with carbolic oil, one part of pure carbolic (Gresser's, not the crude or brown carbolic) to seven or eight of sweet oil. Half an ounce to one ounce of the mixture should be put into the vagina afterwards, to prevent inflammation

(the result of injury, or the presence of putrid matter, as when the lamb is dead), which causes "straining." Inversion of the uterus (commonly called the "lamb-bed," or in Gloucestershire, the "wither" or "wether") is thus prevented. When this does occur, it should be washed with tepid water (cold water gives pain) and pressed gently back, with the hand held flat, taking care not to pierce the organ with the fingers. The oil should in such a case have a few drops of laudanum in it to help to soothe. To retain it in its position, a 1-inch mesh-net made of strong twine may be put on round the hips and covering the tail, the ends passing along the sides of the animal, and terminating in fastenings to a rope tied round the heart-girth after the fashion of the cow-breeches already described at page 160. If the net is not to be had, locks of wool may be tied tightly across from each hip, or the lips of the vulva may be stitched together.

Early Treatment of the Lamb.

—When it is necessary to bring into the house lambs that have been chilled, they should not be



NET BREECHES FOR A
EWE.

put too near a fire, because a sudden change of temperature gives an injurious shock to the nervous system. The full cows' milk, without water, given warm (blood heat), should have in it a little gin or sweet nitre to aid urination. Stricture, the result of cold, is most common in male lambs, and is relieved by gently rubbing the belly with the hand while the lamb is held up by the fore-legs.

A motherless lamb, while young, should be fed five or six times a day to prevent scour. The giving of a little cows' milk to a lamb while it is sucking its mother often causes diarrhœa or constipation, and results in cold weather in swelled and stiff joints.

In "twinning on" a double lamb to a ewe which has a dead one, the skin of the latter is often put on the living lamb for a day or two to give it the smell with which the ewe is familiar, and can distinguish it if she has been allowed to lick her own lamb. Should she not have licked it, another lamb may be at once substituted for the dead one without any precaution further than that of rubbing its body over with the slime adhering to the skin of the dead lamb. Whisky rubbed on her nose and on the lamb destroys her scent sufficiently to deceive her soon after lambing, when the instinctive fondness for the young is strongest.

Food of the Ewe.—About the end of March or beginning of April, ewes on arable land are removed from around the ewe-pen, where they have had sprouting white swedes, or late sown green-round

turnips, which stand the winter well, to encourage the flow of milk. The lambs are allowed to run loose in front of the ewes by the hurdles being made so that they can pass through.

One acre (15-ton crop) is usually set aside per week all winter for every 200 ewes, or 24 lbs. each per day. Shelter is got from thatched or wattled hurdles set up thus +. The ewes are put for a week or ten days on to early pasture ("seeds"); next on to rye for three weeks to finish before the end of April; then on to clover, vetches, or some other forage crop; swedes or mangels follow, and later on cabbages are thrown to them on the field to supply a change of food.

Lambs are allowed to become accustomed to eat cake and corn before being weaned by enclosing their troughs within hurdles, through which they alone can pass. This is most important in feeding for fat lamb. Store male lambs are castrated at two or three weeks old, but not during frost, which would make them stiff; nor in a very hot sun, which might cause excessive bleeding if the testicles are pulled. Lambs at times faint after castration, but soon recover. Marking by taking nips from the ears, if not done before, is now performed, and the tail docked to keep the sheep clean, should the solid droppings at any time become abnormally thin.

Three common ways of Castration:—1st, The scrotum is either slit or the top cut off by a knife, and the testicles drawn away by the teeth of the operator.

2nd, By iron clams and the actual cautery after the scrotum has been cut into. If a lamb is stiff next day it should be bathed with hot water in the region of the wounded part.

3rd, By hazel-wood clams spread with lard inside, dipped in powdered sulphate of copper, placed on to grip the necks of the strings supporting the testicles, and left on for half-an-hour to prevent bleeding after the testicles have been cut away. The top of the purse or scrotum is removed in this instance.

The two latter methods are not so liable to cause inflammation, and there is no danger, as in the case of drawing, of rupture, or bleeding in the region of the kidneys, causing a lamb to pine, though it does not die at the time. The third method is the safest, but takes much more time than the others. It is the most suitable when old lambs or old sheep are to be castrated.

Washing, which should be done ten days before clipping, is usual in the case of most Lowland breeds of sheep, though not practised with the Scotch Black-faced breed. It is never done in salt water, as this spoils the wool for keeping. There should be a watertight box in the centre of the pond for the man doing the washing to stand in, in place of in the water. He gets hold of a sheep and keeps it moving about until the "yolk" or "cik" is washed out. Yolk is an excretion from the skin chiefly, but possibly also to some extent from the wool itself, which keeps the wool soft and greasy to touch. It contains

much potash, and is most abundant on the Merino breed. Hill sheep, as Cheviots, are simply thrown into a large pond and made to swim through it once or twice.

Clipping or Shearing is dependent on the weather, and, in the case of lean sheep, on the "rise" of new wool. Unless for special purposes, sheep are clipped in the new growth of wool.

Eild sheep, or those not giving milk, are shorn first: on from the beginning of May in the south, and ewes three or four weeks later. Exposure to cold by early clipping greatly diminishes the flow of milk, and might also cause death from inflammation.

The new wool left is not so close as in sheep of higher condition. Show sheep are clipped in early spring, but are kept under cover. Fat sheep clipped for the early spring market have woollen sheets put on them if the weather is at all cold. Neglect of this is punishable by a fine.

Lambs are not shorn the first year, except in a few districts where they are highly kept, and are a good size when summer comes.

Twenty-five to thirty stock sheep of a large breed is a good number for a man to clip in a day: the cost is 3s. per score when done by piecework. If restricted to twenty per day, as in fat sheep for market, which have to be clipped over the back, and done bare and well, the cost is 4s. per score.

At this time the sheep are usually "buisted" or marked by a large iron letter dipped in hot Arch-

angel tar, darkened in colour with a little lamp-black. As the wool gets pretty long, these markings become first indistinct and then unreadable, and paint or red keel is rubbed on some part of the wool, after mixing either with water, or, if wanted to be more permanent, with linseed oil.

After all earth and dung ("clarts") are removed, each fleece of wool is carefully rolled inside out, except in such cases as that of Black-faced wool, where it is rolled the other way. The neck end is last rolled on, and made into a band by twisting, to tie the whole together. The wool, while warm, should be at once packed in bags, as the operation is then more easily and better accomplished.

Certain lands and climates produce better and finer wool than others, whatever be the breed of sheep. The Australian fine-woolled Merinos imported into this country grow it much coarser than in Australia, and produce young which grow it coarser still. Rich and heavy soil grows strong wool; light soil, as Down land, a finer quality. Wool "wauks," "mats," or "felts," *i.e.*, sticks very close together on the backs and necks of lean sheep in wet winters, and is thereby lowered in value. The best wool is got from sheep that constantly thrive; there is then no break in the staple, as takes place when sheep get very poor.

Weaning, in the south of England, is done about the beginning of May and onwards; in the north, the time is the end of June and beginning of July and later. Lambs should have the pastures often changed, if

turned out in a field at the breadth, and should never follow ewes or other sheep, as they pick up parasites which have come from these, and are seriously injured. Sheep doing badly from ordinary causes, such as grass scour, may almost invariably be "set going" by a change to sainfoin. Ewes with the extra feeding taken off run over the poorest and barest pasture to dissipate the milk, which causes swelling of the udder for a few days. It is quite unnecessary to milk afterwards by hand, as was at one time the custom even in hill districts. Ewe-milk cheese is very fine, and of a rich green colour; but as ewes are milked from behind, the operation is not one of the cleanest either for the milker or for the produce.

When lambs are to be fed on a bulky, well-grown forage crop, as clover, rape, or vetches, they should at first go on for a few hours each day, and be turned out into a grass field at night for a time. This should also be done in wet weather if possible, especially if the land is at all inclined to be heavy. There is risk of hoven, ending fatally, if the lambs are put on to wet clover suddenly; or of impaction, ending in "stomach staggers," if the clover is very dry and forms the sole food, or if there is not a proper supply of water. Sheep drink much in dry weather, and those giving milk more than others.

CHAPTER XIX.—MANAGEMENT OF SHEEP CONTINUED—FEEDING.

Penning on of Sheep on Roots and Forage Crops—Troughs—Urinary Disorders—House Feeding—Amount of Food—Experiments by Lawes and Gilbert—Calculations of Yield per Week according to Food consumed.

SHEEP in the south are penned between two sets of hurdles, the first moved forward at least once a day, and the ones behind every second day. The grass is thus eaten off at once, and, if properly attended to, need not be eaten so closely as to injure its future growth. It is then left to grow again without any further bleeding and consequent check to growth, which ensues each time it is nibbled by sheep. When the crop is of a moderate size, larger breaks are given, and the hurdles are not so often lifted. In Scotland and the north of England, sheep get all the field at once. No doubt this is more wasteful, but there is less expense, and Scotch sheep are more active than the representatives of the large English breeds, and require to be at liberty to move about.

In the end of September or beginning of October (and in some few districts even earlier) fattening tegs, and on arable farms stock tegs, go on to soft

turnips, such as whites and graystones. If not quite ripe, these are pulled a few days before the sheep reach them. This makes them sweeter and prevents indigestion, which shows itself in an outbreak of scour. Soft turnips are followed by yellows, green-rounds, and swedes, then mangels in spring and early summer. Roots, unless when thrown on the grass in spring and summer, should, as a rule, be cut as they go farther, and the practice pays in the end. If tugs are made to bite turnips they break their milk teeth in frosty weather, and cannot then feed satisfactorily. A mixture of concentrated artificial food (bruised cake and grain) prevents scour and other diseases in fattening tugs. It is best to begin with little, and increase to about $\frac{1}{2}$ lb. at the New Year (average $\frac{1}{4}$ lb. to $\frac{1}{3}$ lb.), then increase in the proportion of $\frac{1}{2}$ lb. per 100 lbs live-weight till the time of sale. Concentrated food is at times mixed with chaffed hay or straw. One ton of hay may be set aside per acre of roots, that is, 1 ton of hay to 15 tons of roots, or a little over 1 lb. of hay per sheep per day.

Turnip-troughs should be almost square, in cross-section, and ample in size. There should be a second set of troughs for the "artificials," and which do not require to possess such capacity; the cross section of the latter might be in the form of a right angle. Troughs, when not in use, should be turned over to keep them clean and dry. A length of 8 inches to 9 inches is the necessary allowance of trough-space for each sheep, in the case of the larger breeds. As

sheep stand on both sides of a trough while feeding, each will have at least 18 inches of space. One man can easily cut roots for, and take full charge of 200 sheep, or attend to 400 if the roots are not cut.

Stock tugs should have little, if any, artificial food, which if given in quantity would injure them for breeding.

Urinary disorders appear in some districts among sheep on roots, especially swedes and mangels, late in spring. All the food then requires to be changed, and linseed cake given, along with $\frac{1}{2}$ drachm of nitrate of potash per day. And, to induce warmth, the back should be covered with a piece of strong canvas cloth, 2 feet to $2\frac{1}{2}$ feet square, which has had boiled linseed oil brushed on to one side of it to make it waterproof. The best preventive of this affection is a liberal supply of pure water, of which the animals will drink freely as the dry weather of spring comes on, and as the proportion of moisture in the roots decreases.

Sheep feed faster in a well-ventilated house or shed than in the open, especially in stormy weather; but the cost of building precludes this, except for rams or show sheep. When large numbers are kept together in a house, they are very liable to foot-rot. In that case it is well to have a platform, a few inches high, covering most of the centre of the floor, and to sweep it clean every day.

Two hundred sheep are as many as ought to be placed together on roots. In Gloucester and some other districts, where the sheep are heavy, that num-

ber would be divided into two or three lots by low hurdles, or a 4-inch mesh-net. Recently an ingenious and handy adaptation of the "Corrimony" wire-fence has been added to the means for fencing sheep folded upon turnips.

Amount of food.—A Cotswold teg, or one of any of the larger breeds, from eleven months old (1st January) till fat, will eat, along with the other food mentioned, 24 lbs. of roots per day, if fed three times—younger ones eat less in proportion. Lean sheep eat more for their weight than fat ones. A Cotswold cast ewe will consume up to 35 lbs. per day.

One average acre of 15 tons of turnips will keep 200 sheep for one week, at 24 lbs. per day.

Experiments by Sir J. B. Lawes and Dr Gilbert showed that Cotswolds give the largest average increase per head per week, also per 100 lbs. live-weight. Hampshires came next, after Crossbreds, then Leicesters, and last of all Southdowns,—the increase in all but the Leicesters being in inverse proportion to the quality of mutton. Under cover, three sheep, of 100 lbs. live-weight each, consume approximately the same amount of food as two sheep of the same age and breed weighing 150 lbs. each. The mixture consumed per 100 lbs. live-weight per week was $4\frac{3}{4}$ lbs. cake, $4\frac{3}{4}$ lbs. hay, and about 70 lbs. roots = about one-seventh of the live-weight, after deducting the moisture of the food. The increase was nearly 2 per cent. live-weight = 2 lbs. per week for a 100 lbs. sheep. A usual increase

is 1 lb. live-weight to 8 or 9 lbs. solid food, moisture being deducted. About 58 per cent. of the fasted live-weight of sheep, moderately fat, is butcher's carcase (Warrington); very fat sheep give 6 to 8 per cent. more in the case of fine breeds, like Southdowns. Lean sheep give about 50 per cent., and old ewes, unless of the more fleshy breeds in good condition, often little over that proportion. In ordinary sheep passing from store to fat condition, 68 per cent. of the increase is carcase.

The following calculation shows the amount of mutton produced from the food already recommended. The amount is reduced to percentage to correspond with Lawes's 8 lbs. or 9 lbs. dry food example. A little more food is allowed for sheep kept outside. This drawback is so far made up for by the advantage gained from giving a *mixture* of concentrated food.

Food per day, per 100 lbs. live-weight, would thus be $\frac{1}{2}$ lb. cake and corn, 12 lbs. roots, and 1 lb. hay; or per week—

$3\frac{1}{2}$ lbs. cake.

7 lbs. hay.

10 $\frac{1}{2}$ lbs. — 1 $\frac{1}{2}$ lbs. moisture (= 14 p. c.) = 9 lbs. dry.

84 lbs. Roots—76 $\frac{1}{2}$ lbs. do. (= 90 p. c.) = 7 $\frac{1}{2}$ „ „

Total, 16 $\frac{1}{2}$ lbs. dry.

This should give 2 lbs. increase of live-weight = 1 lb. in 8 $\frac{1}{4}$ lbs. dry.

By adding .50 per cent to the foregoing figures, we get about what a Cotswold teg would do from 1st January till it is killed at thirteen to fifteen months old, weighing 25 lbs. per quarter. With 150 lbs. live-weight the increase would be 3 lbs. ; and if we apply the 68 per cent. rule in passing from store to fat condition, the mutton would equal about 2 lbs.,—a good performance per week for a sheep of one of the larger breeds.

Cost of feeding a Hampshire teg for 16 weeks during the finishing process.

Food.	(1) per day.	(2) per week.	(3) in 16 weeks.	Price per ton.	Total cost.
Cake and corn.	$\frac{1}{2}$ lb.	$3\frac{1}{2}$ lbs.	$\frac{1}{2}$ cwt.	£6, 10s.	3s. 3d.
Hay.	1 lb.	7 lbs.	1 cwt.	£3, 5s.	3s. 3d.
Roots.	20 lbs.	140 lbs.	1 ton.	£0, 6s.	6s. 0d.
Total cost for 16 weeks,					12s. 6d.

To calculate the return of produce from the dry food consumed—say an increase of 1 lb. of live-weight for 9 lbs. dry material eaten.

Dry Matter—

In 140 lbs. of roots @ 10 p. c.

dry, = 14 lbs.

In $10\frac{1}{2}$ lbs. hay, corn, etc., @

86 p. c. dry, = 9 lbs.

Increase of
live-weight.

Dry matter consumed weekly, $23 \text{ lbs.} \div 9 = 2\frac{5}{9} \text{ lbs.}$

To find the yield of mutton :—

			lbs.	lbs.
100	:	68	::	$2\frac{5}{8}$:
				1'74

Percentage
increase
in finishing.

Live-
weight.

Dressed
mutton.

Weeks. lbs.

Thus—Increase in 16 = 27'8 @ Total return in 16 weeks.
 5s. per 8 lbs., . . . = 17s. 5d. (nearly).
 Cost of feeding, 16 weeks, 12s. 6d.

Net profit, 16 weeks, 4s. 11d.

The calculation assumes that the cost of shepherding and the average loss from death are more than counterbalanced by the value of the manure produced.

The above figures do not show the actual profit to the farmer by the transaction, as much depends upon the cost per lb. of the flesh of the lean sheep when bought; whether the purchase price was more or less than the sale price. Here again is to be seen the importance to the farmer of a knowledge of the live-weight, in place of trusting to his good luck to make a fortunate guess "by hand and eye" at the weight of the animals. The ordinary farmer only attempts this guess once annually, consequently he has little practice, and is most likely to make a mistake.

Sheep, either rough or clipped, are sometimes sold by the farmer to the butcher by the lb., "sinking the offal," viz., 6d., 8d., 10d., or 1s. per lb. of dressed

carcase, according to the quality and range of prices in the market. The butcher gets the head, feet, skin, and intestines, including "web tallow," all into the bargain. The web tallow, or store of fat which surrounds or encloses the bowels and stomach of a fat sheep, often weighs 10 lbs. to 14 lbs., and in the case of Down breeds even more.

CHAPTER XX.—MANAGEMENT OF SHEEP CONTINUED—EXTERNAL PARASITES.

Dipping—Ticks or Kades—Grass Ticks—Sheep Lice—Black Flies—Maggot Flies—Scab Mites—Winter and Summer Dips—The Dipper—Dipping Materials—Pouring—Smearing.

DIPPING is practised at various times during each of the four seasons; on a dry day and with the wool dry, as immediately after clipping, or better a fortnight later, when the wool has grown a little, to enable it to retain the material; lambs should also go through at the same time. Dipping is also practised in autumn or spring, depending on the custom of the district. Ewes and tups should either be dipped after tugging time or one clear month before it, to prevent "firing" the rams. The object is to ameliorate or prevent altogether the attacks of parasites, viz.,—the kade or tick, *Melophagus ovinus*; the grass-tick, *Ixodes ricinus* and *reduvius*, and perhaps other species; the louse, *Trichodictes sphaerocephalus*; the black fly, *Anthomyia* (several species); the flesh or maggot fly, four species, *Musca cæsar*, *M. vomitoria*, *M. canaria*, *M. cadaverina*; and the scab-mite or itch-mite, *Dermatodictes ovis*—an acaris.

Ticks (English), **Kades** or **Keds** (Scotch), are slightly-flattened, 6-legged insects, resembling flies

without wings, which move about in the fleeces of sheep, and live by now and then biting and sucking blood. They may be kept very much under by timely dipping, if not got rid of altogether. They are always most abundant on sheep in poor condition, and in winter when there is little sun, and they do not come out to the top of the wool to bask, and get skaken off. On man they bite a few times and produce considerable uneasiness and itchiness, and then die.

Grass-Ticks are 8 legged, and fix themselves by burrowing their heads into the skins of sheep and other animals, as dogs, rabbits, etc., and also men. They do not often move about, but gorge themselves with blood, increase to the size of a large pea, and then drop off into the grass to pass one stage of their existence independently of the sheep as a host. It is consequently impossible to destroy them altogether, or even to keep sheep quite free from them at all seasons on land where they exist. This is more especially the case in spring and sometimes in autumn, when the young ones are about in the grass, and find their way to the bare parts of the skin about the head, neck, and legs.

Sheep Lice are much smaller in size than the two pests described, and much lighter in colour, except about the head, which is dark brown. They exist usually in greatest abundance on the head and hairy parts of the body, causing great irritation, and preventing sheep from thriving. With a little care, and the comparatively new practice of dipping

sheep over the head, they can be quite destroyed. Most well-managed flocks are free from them.

Black Flies, such as swarm in thousands about the hats and heads of people in summer, do not bite, and cannot break the healthy skin, but live by sucking any raw surface, as an accidental cut made while shearing, or the heads of rams that have been fighting. When very numerous they irritate and unsettle sheep, and prevent wounds healing, especially if these be about the top of the shoulder, when the animal can do little to protect itself.

Maggot Flies, sometimes called blue-bottle flies, do damage by laying their viviparous ova, during warm showery weather, on any part of the wool which has been wetted or soiled with such substances as animal excreta. In a few hours after the sheep are thus "fly-blown" or "struck," the maggots are hatched, if the day be hot, and immediately find their way to the skin, which they devour rapidly—growing in size and strength until they are enabled to cause death within a few days. The presence of maggots may be easily noticed by the wool on the parts attacked becoming dark and damp on the surface, by the restless and uneasy movements of the sheep, including turning round and attempting to bite the affected part, lying down often, then rising and running a little, and taking shelter by itself at the back of a wall or among rank undergrowth. A sheep may at times clear itself of its tormentors by rubbing in a loose sandy bank or scar; but the shepherd has usually to dress each

carefully, at least twice, with a strong smelling solution, which at the same time destroys the maggots without doing injury to the raw parts—no ordinary dip is strong enough to kill maggots. Sores should be kept soft with carbolic oil. The spirit or oil of tar is very useful if there is no broken skin, or to sprinkle on the top of the wool or on any dirty part to prevent a second attack in very bad cases ; but it darkens the wool, and causes much irritation on a raw surface. Maggots may be almost certainly prevented from appearing through keeping sheep clean by clipping away all dirty wool from behind, and dipping in time with a strong smelling solution containing a quantity of carbolic acid and sulphur. Where it is important to have the scrotum well covered, ram lambs are not kept in the dip the usual time, as it has a tendency to make the wool fall off those parts. Frequently they are not dipped, but a strong solution of dip material, with a strong smelling fly-powder added, is rubbed over the backs with a Banbury brush. Sprinkling the backs with a mixture from a rose-can is a common practice when large numbers of sheep require to be protected. They are first packed close in a fold, so that the dipping stuff when showered on cannot fall to the ground. Maggots have been known to effect much improvement in a bad case of foot-rot by feeding on the diseased part, but they must be noticed, and their cleaning action stopped before they have gone too far.

Scab Mites are microscopic, and very much

smaller than any of the other parasites. When they are present, patches of the wool get white, and the sheep by biting half-pull so much wool, leaving a rough and speckled surface. When felt with the hand, there is a hard brittle scab on the skin at the roots of the wool. This scab must of necessity be cleared out, to prevent the spreading of the disorder, which is most contagious, and would ultimately prove fatal if not attended to. "The Highlands of Scotland," or north of the Forth and Clyde, was at one time the stronghold of scab. In some places it still lurks. There is a fact about it which has not yet been scientifically explained, and which should be interesting to farmers buying Scotch Highland sheep, viz., that after a long drive or railway journey, where sheep are packed close and heated, scab is liable to break out in a few weeks, although there has been no such thing seen for years in the flock they came from. The rule is, to dip Highland sheep about ten days after coming off rail, and then there is not the slightest danger.

The common winter dips are preparations of arsenic, and other poisonous substances,—for instance, Bigg's dip is mostly sulphide of arsenic, got largely from the chimneys of chemical works. Commercial arsenic (As_2O_3), boiled with a little bicarbonate of soda to make it dissolve, does the work well, but hardens the wool. Oil, melted butter, or grease are used to counteract this action and waterproof the fleece.

Summer dips are mostly carbolic, with an admix-

ture of sulphur, smelling strongly to unsettle flies. Carbolic is not only able to kill the living forms, as other dips do, but to destroy the eggs by coagulating their albumen. The so-called non-poisonous dips belong to this class. M'Dougall's and Cooper's are two commonly used in summer. Most dips require to be dissolved in hot water, which is an inconvenience. Little's dip is an example of dips that dissolve in cold water, but these, as a rule (Blackie's dip being an exception), are more easily washed off the wool by rains; the extra convenience often overbalances this. Sheep affected with scab are dipped in a bath containing tobacco-juice and powdered hellebore-root, which has been boiled for fifteen minutes, in addition to the usual dip material.

A dipper consists of a fold, tank, and dripper. The tank may be built of bricks drawn with cement, and have a concrete floor. The old-fashioned tub into which sheep were turned on their backs was a mistake. Heavy sheep got injured in lifting. Now, the best form of tank is made wide enough to let a sheep swim through without being able to turn easily: a suitable size is 15 to 20 feet long at the top, 5 feet deep at the plunge-end and for one-third of its length, then slanting out to the dripper at the other or exit end. Sheep are not lifted, but pushed forward and plunged over the head. They close their lips and swim slowly through. They should be in till the wool is thoroughly soaked; the men employed are very apt to let them go too quickly.

The excess of dipping solution runs off the sheep and back to the tank by the floor of the dripper, which has a fall towards it. For a few minutes after dripping the sheep should go for a time into a fold, or bare place where there is no grass, to avoid poisoning the pasture, especially when an arsenic dip has been used. The cost of dipping, which is usually done by contract in southern England, is about 1d. each, all over a flock, including lambs. The cost of dipping material for Scotch sheep is from £5 per 1000 (or a little more than 1d. each), down to half that price, but large discounts are often given by some agents.

A home-made dip, specially intended for waterproofing the fleeces, may run up to 3d. per sheep, as follows:—

20 lbs. of a mixture of equal parts of soft soap and pitch-oil (the former boiled before mixing) @ 2d. per lb.	£0 3 4
10 lbs. tobacco powder @ 7d. per lb.	0 5 10
4 gallons Gallipoli oil @ 4s. per gallon	0 16 0
Cost of material to dip 100 hill sheep,	<u>£1 5 2</u>

The principle in pitch-oil is carbolic acid and some chemically-allied substances. The pitch-oil and soft soap alone make a good, cheap summer dip.

Pouring is running a concentrated solution of, say,

5 gallons per score, against 20 gallons in dipping, into "sheds" or partings made by the hand, at intervals, in the wool along the back, sides, and belly of the sheep. This is more effectual than dipping in a case of scab, but is more expensive, and unnecessary for ordinary purposes.

Smearing* with a mixture of equal parts of American or Archangel tar, and grease, or better, butter, is a method of waterproofing the wool and destroying parasites that was at one time very largely and successfully practised in exposed hill districts, especially in the Highlands of Scotland. It encourages more the growth of wool than any dip yet used, but wool is now so low in price that the increase will not pay the extra cost of the operation, and many have given it up. It darkens the wool, and often gives sheep, especially if lean, a "back-set" until the tar lifts a little from the skin. Smearing should not be practised before the middle of October, as a strong sun melts the smear, and it runs towards the points of the wool, and, besides, the sheep become fevered. In the process the smear should be laid well to the skin at the bottoms of partings made in the wool, and as little as possible on it. The usual practice in preparing the material is to mix in a tub, a fortnight before the operation, as much as will be sufficient for 40 mountain sheep, viz., 9 pints (Scotch†) of tar with 9 pints of

* The writer is indebted for many of the facts on this subject to Stephen Brown of Killilan, Wester Ross.

† A Scotch pint is about equal to $\frac{3}{8}$ gallon imperial.

butter, melted to enable it to mix, and well stirred together. Tar is a mild blister if applied alone to an animal's skin, and the grease is intended to dilute it. Hard grease, such as butter, also gives it consistency. A man smears 20 sheep per day, and receives 2s. 6d. to 3s. for the work, besides food; the cost of smearing is nearly 10d. each, as follows:—

9 pints of tar @ 8d.,	£0 6 0
40 lbs. butter @ 6d.,	1 0 0
Labour @ 3s. 6d. p. score, including rations,	0 7 0
	<hr/>
Cost of smearing 40 sheep,	<u>£1 13 0</u>

CHAPTER XXI.—MANAGEMENT OF SHEEP CONTINUED—INTERNAL PARASITES.

Internal Parasites—Tape-worm producing Gid—Liver-fluke producing Rot—Diarrhoea resulting from Worms—Husk or Hoose.

INTERNAL Parasites.—Besides these external pests, sheep are subject to numerous internal parasites. One stage of the development of *Tænia cænurus*, a tape-worm found in the dog, is passed in the brains of sheep, causing “gid” or “sturdy.” The remedies are of more consequence to farmers who keep lean stock, and to ram-breeders, than to those who can send an affected animal at once to the fat market without much loss. A ram that has been cured of “sturdy” is none the worse afterwards for breeding purposes. The seat of disease is on the surface of the brain, at its base, or, in the author’s experience, frequently in the “lateral cavities.” These cavities are situated one on each side of the forward brain, and there, in common language, a “water-bag” grows, containing many young tape-worms. This presses against the brain, causing absorption of the contiguous parts of that organ, with usually a thinning and softening of the skull in one or other of the hollows on the crown of the head immediately in front of a line drawn between the

ears. There the skull is comparatively thin. Partial paralysis accompanies the formation, and the sheep gets blind on and turns to the opposite side to which the "water-bag" inclines. Boring with a trochar and canula, to extract the bleb and its contents, is easy in this case. When the disease is far back in the brain the skull is thicker over the affected part, and there is not sufficient time, before death occurs, for the bone to absorb and become soft. In Scotland this form of the disease is known by the special name of "thorterill." Piercing then leaves little fractured pieces of bone, from the skull, on the surface of the brain, which, although the disease is cured, cause suppuration, usually resulting in death within a few days. Principal Williams, Edinburgh, recommends the use of a little circular saw, called a trephine, to remove a minute round piece of bone. The skin is bared from the skull immediately over the spot to which the movements of the sheep direct suspicion. All detached pieces are washed carefully out before the external covering of the brain is broken. Piercing in the usual way through the brain to reach the bag is then done with comparative safety. In districts much subject to this disease the skulls of dead sheep should be broken up and buried with quicklime in a compost heap to insure the destruction of the young worms. The dogs ought to be dosed regularly with $\frac{1}{2}$ drachm to 1 drachm of areca nut. This frees them from tapeworms, and lessens the risk of sheep picking the embryos up while feeding on grass.

Liver Rot.—Though there have been enormous losses in this country from “rot” in sheep, the full bearing and nature of the working of the liver fluke (*Distomum hepaticum* or *Fasciola hepatica*), which is the cause of the disease, does not yet seem to be quite understood. These worms are seldom more than an inch long, are broad, thin, and flat, and attach themselves by a sucker on the under surface. Sometimes hundreds have been found in the liver ducts of one sheep. Professor Leuckart in Germany, and A. P. Thomas in this country, traced, almost simultaneously, the life history of this parasite through all its different stages, and published accounts of their investigations in 1882.* They find that it lives for a time, and changes its form in the body of a minute shell snail (*Limnæus truncatulus*), which thrives in an excess of wet.

The sequence of changes in the animal system is originated by irritation, and consequently inflammation, beginning in the biliary ducts, and extending through the liver, preventing it performing its proper functions in aid of digestion; the stomach then becomes disordered, poor and imperfect blood is formed, and time is all that is necessary to exaggerate the consequences into a persistent anæmia ending in death.

The great means of prevention are, to drain, and in stiff clays to lay the arable land up in high ridges to aid surface drainage, besides keeping sheep off flooded land, having lumps of rock salt about

* See the Journal of the Royal Agricultural Society for that year.

the pasture, and giving liberal feeding. One fact in connexion with this disease is not generally known. The presence of flukes in the liver, even in large numbers sometimes, does not necessitate the appearance of the serious symptoms described. Few sheep are killed in Galloway, a large district in the south-west of Scotland, without flukes being found in the livers, and frequently in large numbers: yet "rot" to any extent is very exceptional. Rot certainly has done much damage, and will continue to do so in wet seasons, but there are good reasons for believing that much of the death from so-called "rot" was from a very different cause, to be described under lung disease.

Scour or Diarrhœa in sheep, but more especially in lambs, is often caused by various parasitic worms attaching themselves to the inner surface of the stomach and bowels. There they set up irritation, and live by absorbing what ought to go to nourish the sheep. *For a cure*, no better or simpler remedy can be had than turpentine. A sheep is very easily choked, and turpentine is one of the most dangerous drugs to administer, not only from its highly irritating and searching nature (causing death by spasmodic closing of the mouth of the windpipe should it enter), but from the fact that it will hardly mix with any ordinary drench. The administration must be done with great care. The turpentine ($\frac{1}{4}$ to $\frac{1}{2}$ oz.) should be thoroughly soaked into a little dry meal, and this again mixed in cold gruel, oil, or even water, and may be given with perfect safety.

Should the scour be the result of an over-feed of succulent grass, or a sudden change of green food, the purgative and the astringent action of the turpentine is generally what is wanted. Laxity of the bowels, when there is no positive derangement of system, is easily remedied by altering the concentrated food from cakes which contain large quantities of oil, to the seeds of leguminous plants, as beans, peas, lentils, etc., which are deficient in oils, and have a costive tendency.

“**Husk**,” or “**Hoose**” is a bronchial catarrh, the result of the irritating action of a number of long, white, round, hair-like worms (*Strongylus filaria*) in the bronchial tubes. It is most common amongst lambs, if they have been pastured on land recently eaten over by sheep, as they pick up the eggs (*ova*) with their food. The attack is evinced by a peculiar husky cough which exertion makes worse, and by an unthriving appearance and mucous discharge from the nostrils, which often contains the worms or their eggs as direct evidence; in weak specimens the result is frequently death. To prevent the occurrence of this malady sheep should be kept in good, thriving condition, and young stock should not be put on land previously soiled by sheep. *Remedial treatment* is directed towards the destruction of the worms. A turpentine drench has been long considered efficacious; $\frac{1}{8}$ to $\frac{1}{4}$ oz. being given to a lamb at a time, and this repeated twice, with an interval of three days between two administrations. Turpentine is a most poisonous and dangerous drug if

given too frequently, or in too large quantities, to sheep, as it sets up inflammation in nearly all of the important organs of the abdomen, and most sheep thus treated will die within a few days after evincing by dulness, restlessness, and the grinding of their teeth, that they are suffering severe internal pain. Ale or any other purgative given only aggravates the condition, and hastens death. Injections of tepid water may be employed to allay pain and relieve the constipated condition which accompanies turpentine poisoning.

The recent and more approved method of treatment is the injection, directly into the trachea, of $\frac{1}{2}$ to 1 drachm of a turpentine and carbolic acid mixture, fully detailed at page 101.

CHAPTER XXII.—MANAGEMENT OF SHEEP CONTINUED—DISEASES.

Lung Disease—Trembling, or Loupin' Ill—Braxy—Temporary
Blindness—Foot-rot—Blotches—Dew-rot.

LUNG Disease.—Cattle are subject to a contagious lung disease. Goats have also been found liable to a disease of the same nature at the Cape, and the writer has proved to his satisfaction that sheep also take lung disease one from the other, and die, under certain circumstances, in great numbers. It appears to have very much the nature of a bad cold, and is most severe on old ewes. Should it break out in a flock in summer time, or in fine mild weather in winter, deaths are not numerous, but in a cold and stormy season, which aggravates it, one-third to one-half is no unusual proportion to die.

The symptoms are a violent and painful cough, which seems to give no relief. When seriously affected, the animal falls off from the others, and gradually stops feeding. The breathing becomes increasingly heavy and laboured, with heaving at the flank, and moaning in the later stages, evincing the presence of acute bronchitis with severe pain. The ears droop in a peculiar manner, and the head

hangs down, while foam appears at the mouth, and a tough yellow mucus at the nose and eyes. None recover after these acute symptoms set in, and death supervenes generally about the third or fourth day. The *post-mortem* reveals a highly congested state of the air-passages, and large portions of the lungs, usually the upper lobes, are found to be solidified, so that they sink on being immersed in water.

The most efficacious treatment is, to inject by the intratracheal syringe, shown at page 101, 2 to 4 drachms of the injection mixture there detailed, and to cover the backs by sewing to the wool with stocking yarn pieces of strong canvas, 2 feet or 2 ft. 3 in. square, which have been waterproofed by brushing one side with boiled linseed oil, to keep rain off and heat in; the sheep should also be liberally fed and kept perfectly quiet in a well-sheltered place. Any attempt to drug or fumigate simply increases the number of deaths. A few usually die of consumption some months after the acute stage of the disease has passed. It is necessary to state that Principal Williams and various other authorities believe that the origin of the disease above described is entirely parasitic, the special worm being said to be *Strongylus filaria*.

The author freely admits the great injury that these thread worms produce in an irritated condition of the air-passages, and that they might determine, in some cases, whether the affection would be severe enough to destroy life, or mild enough to pass off after a time, without much or any notice, should

outside conditions be favourable to recovery ; still, at the same time, he has not the slightest doubt of the existence of a contagious lung disease in sheep, which is, however, so varied in its ultimate results by other and external influences—as climate, general treatment, and parasitic action—that it has not been generally recognised or acknowledged. To the public the difference of opinion as to whether the disease is solely parasitic or contagious is of little moment, as the remedial treatment recommended in either case is the same.

There exist weighty reasons for the statement, that much of the so-called death from “rot” in the United Kingdom in 1879 was due to this disease, and not to the liver fluke at all, although in many districts the latter was very prevalent and most destructive.

Trembling or Loupin’ Ill is a deadly disease which is only known by a Scotch name, although ailments with much of the same symptoms have occurred at times in England. It prevails most on certain grassy hills, land growing hard or mat grass (*Nardus stricta*) being particularly liable to it. Zündel, V.S., Strasbourg, describes a disease in lambs in which an organism is found very similar to that of Loupin’ Ill, and which, he says, “resembles the microscopic plant *Plcospora herbarum*.”

It is spreading in Scotland, not rapidly, but surely. It has been diagnosed by Professor Williams as caused by a microscopic organism, which he found in the fluid around the spinal cord. As

in the case of the microbe of anthrax, this form of lower life can be cultivated under suitable conditions, as in chicken or mutton broth or jelly. By such cultivation its virulence is gradually attenuated, and it is hoped that inoculation with the weakened germs will, in time, prove a preventive of the worst consequences of the disease.

The symptoms are a loss of power in the limbs and sometimes high fever, with affection of the brain. Usually the animal eats, and seems to be perfectly well in health, but is unable to rise. Others, again, drop down instantly and die, usually on being suddenly started. Spring and early summer is the most deadly time. The disease has been long known in many parts, but its cause was quite unaccounted for till 1881. Principal Williams made his discovery while working at the instigation of the Highland and Agricultural Society of Scotland. It had been noticed that in years when ticks (*Ixodes*) were most abundant there was most death from trembling, and on examination the ticks were found to contain the same organisms as did the spinal fluid. This is suggestive, but the full chain of facts necessary for confirmation of the theory has not yet been worked out. Brotherston, botanist on the Highland Society Loupin' Ill Investigation Committee, advances the theory that it is caused by ergot, a dark, horn-like, parasitic fungus which appears on certain kinds of grass present in pasture.

The preventive means which have already proved useful in practice are advocated by both investigators,

viz., cutting, or burning at the proper season, all excess of rough herbage, and the pasturing of cattle along with sheep, especially during early summer.

The best treatment of affected animals, not actually prostrate, is to keep them in a perfectly quiet place, and to prevent excitement to allow neither man nor dog to go within sight of them.

When down, fat sheep should be killed at once ; poor ones may first be bled, if there is brain affection, then well fed, turned from one side to the other, and moved on to fresh ground regularly. Very few recover after becoming unable to walk.

Braxy is a blood disease often described as *Anthrax*, although it is quite distinct, as inoculating with its virus does not cause death in the same way. It prevails much on certain lands in Scotland, usually in autumn and sometimes in spring, when there are sudden and severe white frosts at night, and the grass is of a rank growth. The succulent green herbage or "tath" from the droppings of cattle is very liable to produce the disease. It runs its course in a few hours, so quickly that no ordinary remedy is of much use. The blood becomes thick and dark, and stagnates in certain parts before death ; so that bleeding, which is usually tried, is often impossible. Bleeding and moving the animal about is almost the sole chance, and that only in the early stages. The flesh of animals that have died of braxy is very dark-red, particularly in the region of the abdomen, and has a high and peculiar smell and flavour. Ham made from the hindquarters of a

braxy sheep is considered to be rather a delicacy by those who have learnt to appreciate it in youth. Principal Williams considers it to be "nothing more than an acute form of indigestion, with inflammation of the bowels, and flatulence, arising from eating food in a more or less fusted and decomposing condition." It may be prevented, or greatly lessened, by not pasturing cattle along with sheep on land subject to it, or at least doing so only in the early part of the season; and by keeping sheep from all quickly grown grass during times of danger, or only allowing them into it in the middle of the day, when there is no frost on the pasture.

Temporary Blindness is most frequently met with after a long spell of wet, cold weather. A dim, opaque scum forms over the pupil of the eye. This would disappear naturally in time, but as the animal cannot see to feed, it falls off in condition, and may get into a hole. Bleeding at the eyes is usually practised, and has the desired effect within a few days. A pen-knife is inserted between the frontal bone and skin, immediately below the inner corner of the eye, and a large vein, which bleeds profusely, is thus severed.

Foot-Rot.—It was noticed that dipping with arsenic much improved sheep suffering from foot-rot, and from this sprang the custom, for prevention as well as cure in mild cases, of driving sheep once a fortnight through a box containing a solution of arsenic. The drying and hardening action on the horn is injurious if repeated oftener. In very bad

cases, all horn that has separated from the inner part of the foot by suppuration must be carefully removed with a sharp knife, and the raw, exposed surfaces, which would grow proud-flesh if not attended to, dressed with a caustic or acid mixture, such as that of Joseph Ewing, Dumfries, because arsenic is hurtful to a large open sore. A flock of sheep may be seriously injured in condition, and made to appear as if they were foundered, if driven through a strong solution of arsenic when their feet are in a raw state. The arsenic box should be 12 feet long, 1 foot deep, 8 inches wide at the bottom, and 14 inches at the top, but the ends only 3 inches deep. The sheep then easily step into it when it is placed level on the surface of the ground, between two rows of hurdles or paling, wide enough for them to pass through. The solution (strength, one pound of arsenic, dissolved by boiling with a little carbonate of soda, in five gallons of water) is put in the trough, 1 to 1½ inches deep, so that it cannot rise above the horny part of the foot, else it would blister the skin, and cause the hair to fall off. The sheep, having first had all long or loose horn cut away, are driven quietly through to prevent splashing of the liquid against the uncovered skin. Crude carbolic acid—strength, 3 or 4 parts to 100 of water—is sometimes used instead. The box should have a tight-fitting lid to close when not in use, to prevent the poisoning of stray animals drinking from it. Lime in the powdery, caustic state is sometimes laid down to help to maintain

the feet in a normal condition at gateways or places where the sheep often walk. A common cause of foot-rot is dung or some foreign matter getting at the tender structures of the internal foot on account of some softening, decay, or weakness of the outer horny box; suppuration and fungoid growth follow.

True foot-rot is not considered to be contagious, but the writer is inclined to believe that there is sometimes a derangement in the systems of sheep, showing itself by symptoms almost identical with those of foot-rot, which may one day be found to be contagious, or, at all events, induced, without any external cause, in a whole flock by unsuitable or possibly excessive feeding.

The feet of sheep that have been affected are always more susceptible in future; thus the disease is very difficult to get rid of when once well established.

Blotches, causing lameness, originate in wart-like growths, which in the first stages are hard and scaly externally, and gorged with blood within. They appear in some seasons about the coronet and lower parts of the legs. The affection is not contagious, although it breaks out in a flock suddenly, and at times attacks more or less seriously the greater number of them. It is thought to be produced by some irritating cause which shows its effect most frequently when sheep are on pasture in autumn, and usually disappears when the flock is put on roots. Sheep fall off much in condition, and in

some of the more aggravated cases die of blood-poisoning, pus having found its way into the blood by absorption of the fœtid discharge which comes from the sores in the later stages of their development.

The remedies are to remove the sheep from the conditions under which the malady broke out, and to dress the affected parts in time with strong caustic, or acid applications, or to apply the hot iron.

Dew-rot is a cause of lameness which appears in April, and even to a greater extent in autumn, in damp, foggy weather, or when there are sudden changes of temperature at night, resulting in frosts or heavy dews. It appears at first in the form of white blisters between the digits, or on the anterior surface of the coronet. The hair falls off the affected parts and they are left bare, and in a short time become open sores. If not at once treated by using a stimulating embrocation, after opening them with a knife, the inflammation and irritation spread until the whole foot-structure is involved, and the ultimate condition becomes something like an aggravated form of foot-rot, the whole of the horny parts sloughing off. When it takes this serious form, the proper treatment is to poultice with tar, bran, or linseed cake (ground and "burst" with hot water) to reduce the inflammation, allay pain, and keep dirt from the wounds.

Sheep thus affected fall very much off in condition, but there is no fear of death, if proper precautions are taken. This disease is reported to have appeared in Gloucestershire, for the first time, about 1870.

Some places are more subject to it than others. The pastures are frequently worst which have not a good aspect, as those lying away from the sun. Instant and constant attention is positively necessary to prevent the development of the mature form of the disease; and the whole flock must be removed immediately and put on arable land which is not under pasture. Dew-rot very frequently appears among ewes that are going with the ram, and are consequently better fed at the time. A rapidly-improving condition may make the system more susceptible to the disease, as is the fact with many other diseases. Sheep that are being forced, in cases of high farming or for show purposes, are always more liable to give the shepherd trouble than those fed in a moderate way; and the death-rate, as a rule, is much higher.

Another common cause of an excessive death-rate is from allowing sheep, through bad management or want of proper food, to get into an unthriving condition, or, in common language, to get a "backset."

If hogs are kept, more particularly late into spring, on a turnip crop which has not been properly cleaned of weeds while growing, a very alarming death-rate frequently occurs. There is a pretty wide-spread belief in Gloucestershire, both amongst farmers and shepherds, that chick-weed (*Stellaria media*), if abundant, is most hurtful to young sheep.

CHAPTER XXIII.—TWO TYPICAL EXAMPLES
OF THE STOCKING OF FARMS IN
SOUTHERN AND MIDLAND ENGLAND.

Data of Use in the Calculations.*

*H*ORSES.—3 are kept per 100 acres arable on light land; 4 kept per 100 acres arable on heavy land; cost per annum for feeding each horse, £25; with shoeing and sundry bills extra, £30; one man and pair of horses cost £100 to £110 a year.

Grass used at 3s. 6d. per week for 22 weeks, = £3, 17s., which would pay the rent of $1\frac{1}{2}$ or 2 acres. One acre at least of good old pasture should be set aside per horse.

Hay, 24 lbs. per day for 7 months = nearly $2\frac{1}{4}$ tons per horse. Consuming value, taken at half the sale value, = £2 to £2, 10s. per ton; or use 1 ton of hay and $1\frac{1}{2}$ tons of good oat straw. (A little straw might, if not chaffed, be rejected by a horse accustomed to eat hay.)

* The prices current in 1885 are still retained, consequently allowance will require to be made, in adapting the figures to the present time, of a reduction of say 12 to 15 per cent. in some instances.

Litter, $1\frac{1}{2}$ tons to 2 tons for the winter season. Averaging the yield of oats at 52 bushels per acre, 2 acres are consumed per horse when 3 bushels are given per week in winter and one bushel in summer. So much of this might be sold, and beans, bran, and other suitable feeding stuffs bought to take its place.

Sheep.—2 ewes with $2\frac{1}{4}$ lambs (a fair crop), or $2\frac{1}{2}$ lambs (a good crop) are kept per acre on medium pasture in summer.

Roots, $\frac{1}{2}$ ton given per day to 100 ewes on grass till lambing time, and 1 ton per day after lambing, or = 1 ton per day for 4 months, or 120 tons \div 15 (average in tons per acre) = 8 acres per 100 ewes.

Ewes not on grass, also clipped sheep or hoggets after Christmas, consume 24 lbs. per day: therefore 200 eat 1 acre (15-ton crop) in one week. Beginning with lambs put on in September, it is approximately right to say 1 acre will keep 300 per week on an average during the first root season = 16 lbs. of roots per day, which would not be quite enough for the larger breeds.

Hay is also allowed = 1 ton per acre of roots.

Cake = $\frac{1}{4}$ lb. to each per day for six months, comes to 70 lbs. more than 2 tons for 100 sheep. It is near enough, practically, to say 2 tons.

Bullocks.—1 acre of good pasture, or $1\frac{1}{4}$ acres to $1\frac{1}{2}$ acres, according to quality, should keep one fattening bullock all summer. One store animal might be sufficient stock for 1 acre of second-quality land.

Turnips, $\frac{3}{4}$ cwt. per day, or 7 tons in 6 months, is nearly $\frac{1}{2}$ acre for each bullock. If giving 1 cwt. per day, $1\frac{1}{2}$ bullocks may be kept per acre of turnips (15 tons) between 6 and 7 months. The price at 7s. 6d. per ton = $4\frac{1}{2}$ d. per cwt.

Hay, 1 stone (14 lbs.) per day for 26 weeks = $22\frac{3}{4}$ cwts. A large-sized fattening bullock should eat about $1\frac{1}{4}$ stones = $17\frac{1}{2}$ lbs. per day. An ordinary crop of "seeds" hay = $1\frac{1}{2}$ tons per acre; a good crop, 2 tons.

Of natural hay, $1\frac{1}{2}$ tons is a good crop. Heavier crops get white at the bottom, and are not of such good quality, except on some rich, moist meadows where the larger grasses greatly predominate.

Of straw, a bullock in a yard will eat and trample down 3 or 4 tons in 6 months; 1 or 2 tons more could be trampled down if necessary.

Of meal and cake mixture, 6 lbs. per day to each bullock for 6 months gives a total of $\frac{1}{2}$ ton, less 28 lbs.—say, $\frac{1}{2}$ ton each.

Cows.—One cow can be kept summer and winter on $2\frac{1}{2}$ acres of superior dairy grass land, while 3 acres of ordinary quality are necessary, and in a hilly dairy district up to 5 or 6 acres.

Hay cut from 1 acre of natural meadow = $1\frac{1}{2}$ tons, or 19 lbs. per day per cow for 6 months; this, plus $\frac{1}{2}$ ton to 1 ton of good straw, is enough fodder for an average dairy cow: 24 lbs. of hay per day = $2\frac{1}{4}$ tons in 7 months: 25 lbs. of hay per day = 2 tons in 6 months.

Mixed concentrated food, given in spring after calving and before grass comes, may vary in cost from £1 each cow (ordinary feeding) to £2 each (high feeding).

Cotton cake given in summer on the grass, 3 lbs. per day for six months=(nearly) 5 cwts. per cow, and at £6 per ton, costs 30s. per cow.

Root and forage crops for all the year round are already given at page 134.

Tithe may be none, or varying from 2s. 6d. to 6s. or 8s. per acre. This should be considered as so much rent.

Rates and Taxes amount to 3s. to 5s. per acre.

Implements.—Total cost per acre, £1 on a farm half arable and half pasture, up to 30s. if it is all arable, or even £2 per acre if many new and expensive implements are bought, or when the holding is small. A 500 acre farm might thus have £500 to £750 or £1000 of capital sunk in implements.

Capital in an ordinary farm = £6 or £8 to £10 per acre: in high farming it may mount up to much more.

EXAMPLE NO. I

Is given as an answer to the first three questions set in the examination for the Diploma of the Royal Agricultural Society of England in 1884.

(1.) "What capital is required for a farm of 500 acres—half arable and half pasture? The arable being turnip and sheep land. The grass, 50 acres good feeding land, the rest suited to young stock.

(2.) "What proportion of capital would you apply to—

1. Cattle. 2. Sheep. 3. Horses. 4. Implements and Machines. 5. Tillages, etc?"

(3.) "State the most suitable course of cropping."

In all farm calculations the rotation is the first point to settle.

Question (3.)—Rotation for 250 acres arable.

A Five-course Shift.

1. Wheat, 50 acres.
2. Oats, 50 acres (better straw for fodder than barley). [Catch crops following more or less; as rye, trifolium, vetches, rape, etc., for sheep food in spring.]
3. Roots, 50 acres, mostly eaten on the land by sheep; part carted to the yard for cattle.
4. Barley, 50 acres (part might be oats instead).
5. "Seeds," 50 acres, all cut once for hay and the lattermath eaten by sheep.

Question (2.)—To find the numbers, and affix the prices, of the Horses, Cattle, and Sheep, that the foregoing 250 acres of arable and 250 acres of grass-land will keep.

Cattle.

250 acres, total of grass.	
50	„ (the best) keep 50 fattening bullocks worth
—	£17 to £20 each.
200	„ left.
75	„ keep 50 bullocks 1 year younger, £11 to
—	£13 each.
125	„ left.
16	„ (second quality) to graze 8 horses.
—	
109	„ left.
34	„ cut for hay.
—	
75	„ left for sheep.
<u>—</u>	

Horses.

Being light land, 3 per 100 acres cultivated = 8 horses. At £30 to £40 each, say = £320.

Sheep.

75 acres of grass left for sheep.
2 sheep per acre with their lambs.

150 Ewes @ £4* each = £600 total capital in ewes.

One hundred and fifty ewes get $1\frac{1}{2}$ tons of roots per day on grass for 4 months or 120 days = 180

* Rather high for an ordinary flock at current prices.

÷ tons 15 (average crop in tons per acre) = 12 acres
turnips required for the ewe flock.

Tegs, 200 eating 16 lbs. turnips per day consume
18 acres in 6 months or 26 weeks.

Turnips.

12 acres set aside for ewes.

18 „ „ tegs.

—

30 „ total for sheep.

20 „ for 50 cattle = 70 lbs. (fully) each per day

— for six months.

50 „ total turnips disposed of.

—

Fodder.

(1.) *Straw.*

150 acres of grain crops @ $1\frac{1}{4}$ tons straw per acre.

× $1\frac{1}{4}$

—

187 tons straw (50 bullocks eat and trample down
 $3\frac{1}{2}$ tons each).

175 „ for cattle.

—

12 „ for horse litter ; to go to the cattle-yard
afterwards.

Some of the straw given to the cattle for
litter would first be used for thatching,
which would not spoil it for that purpose.

—

(2.) *Hay.*

	50 acres seeds @	1½ tons of hay per acre.		
×	1½			
<hr style="width: 10%; margin-left: 0;"/>				
	75	tons total seeds hay.		
	34	„ cut from the 34 acres of natural meadow		
		—rather a light crop.		
<hr style="width: 10%; margin-left: 0;"/>				
	109	„ total hay.		
	18	„ for 8 horses = 2¼ tons each.		
<hr style="width: 10%; margin-left: 0;"/>				
	91	„ left.		
	30	„ allowance of 1 ton per acre of turnips		
		for sheep.		
<hr style="width: 10%; margin-left: 0;"/>				
	61	„ left to be sold, or a little more given to		
		the sheep and a small foddering per		
		day to the bullocks.		
<hr style="width: 10%; margin-left: 0;"/>				
<hr style="width: 10%; margin-left: 0;"/>				

Where a good market for hay cannot be got, it might pay better to pasture half of the “seeds” land instead of cutting it.

Capital = Spring Valuation of Stock, etc.

Cattle.

50 bullocks @	£20 each,		£1000
50 „ @	£13 „		650
			<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
			£1650
	Carried forward,		<hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
			£1650

Brought forward, £1650

Sheep.

150 ewes, with lambs, @ £4 each, .	£600	
200 tegs @ 60/ each—a high price,	600	
		1200

Horses.—8 @ £40 each, 320

Implements.—£1 per acre all over, 500

Tillages.

50 acres wheat @ 50/,	£125	
100 „ oats and barley @ £2,	200	
50 „ “seeds” @ £1,	50	
50 „ turnip land (including catch crops and manures for the same) @ £3,	150	
		525

Half-year's Rent, Tithe and Taxes
 @ 28/ per acre, per annum, 350

Cash in hand to pay wages and expenses, 455

Total capital, £5000

Question (1.)

Capital required per acre = £10.

At current rates the above prices might be adjusted so that the capital required might be reduced by £1 or £2 per acre.

EXAMPLE NO. 2.

The following calculation will show the rotation which might be adopted on a 300-acre farm in the south of England, consisting of two-thirds arable suitable for sheep, and the rest pasture for grazing or dairy purposes ; it gives also the stock kept, and the amount of capital required per acre, apportioning the amount for horses, cattle, sheep, implements, etc. Besides this will be found the number of labourers required, their different duties, and the necessary amount per annum paid for wages ; together with a Michaelmas valuation and a statement of receipts and expenses for a year.

A four-course rotation adopted for the arable land.

50 acres wheat—or part oats to produce better fodder.

50 „ roots, mostly swedes ; average, 15 tons per acre,—5 acres of mangel, 20 to 25 tons per acre, would keep up the above average, and allow 2 or 3 acres to grow potatoes.

50 „ oats.

50 „ clover or “seeds” all cut once for hay.

200 acres, the given amount of arable.

Pasture.

100 acres grass.

75 „ pasture should carry 150 ewes and their lambs (say 200) in summer.

25 „ left (carried forward).

25 acres left (brought forward).

10 „ keep 6 or 7 horses.

15 „ left for 10 cows' pasture = $1\frac{1}{2}$ acres each.

Or 5 cows might be kept, and their calves reared each year; the heifers coming into milk at two years off, and the bullocks of the same age put up to finish, in the autumn following.

Roots.

50 acres, average 15 tons.

12 „ for 150 ewes = $1\frac{1}{2}$ tons per day for 4 months during winter while on grass: by giving half quantity for 2 months at first, before lambing, the turnips may be spread over 5 months.

38 „ left.

1 „ for 10 cows = 30 lbs. each per day for 4 months in winter, including the time they are dry.

37 „ left.

20 „ for 200 tegs: 18 acres are consumed in 6 months by 200 tegs going on as lambs in September = 16 lbs. per day, being rather little for large breeds.

17 „ left (carried forward).

17 acres left (brought forward).

$\frac{1}{2}$ „ for 7 horses.

16 $\frac{1}{2}$ „ left.

5 $\frac{1}{2}$ „ for 50 tegs, bought in autumn, to feed.

11 „ left for bullocks: 7 tons are consumed by a fattening bullock in 6 months @ $\frac{3}{4}$ cwt. per day, leaving 1 ton per acre over, after feeding 2 bullocks per acre, which would make up the possible total to 24 bullocks.

Fodder.

(1.) *Straw.*

100 acres grain crops @ 1 $\frac{1}{4}$ tons straw per acre: this is a low average, but it is off light land.

× 1 $\frac{1}{4}$ tons.

125 tons straw.

20 „ for horses: half for litter, and the remainder for fodder being sufficient with 1 ton of seeds hay for each horse.

105 „ left.

10 „ as part of the cow-fodder: 1 ton per cow.

95 „ left (carried forward).

95 tons left (brought forward).

10 „ for cow's litter, which could be done without if necessary.

85 „ for 24 bullocks = $3\frac{1}{2}$ tons each, to supply fodder and litter. The litter is supplemented by the rough stable cleanings being thrown into the open yard.

(2.) *Hay.*

50 acres of "seeds" hay.

× $1\frac{1}{2}$ the average number of tons per acre.

75 tons total of hay.

40 „ given to the sheep—a little over 1 ton per acre of roots consumed (37 ac.), or something more than 1 lb. per sheep per day.

35 „ left.

10 „ for 10 cows, which with 10 tons of straw allowed provides the necessary 25 lbs. each per day for 6 months.

25 „ left.

7 „ for 7 horses also getting part straw.

18 „ left ; and might be sold at market or sale value—£4 per ton, more or less.

If there is no market, which is usually the case when a farm is located away from a large town or

railway station, 10 tons given to the sheep would supply $\frac{1}{4}$ lb. more for each per day, and a foddering might go daily to the bullocks.

Michaelmas Valuation—29th Sept.

150 ewes @ £3 each,	£450
200 home-bred tegs } @ 40/ each,	500
50 bought do. }	
7 horses @ £35 each,	245
10 cows @ £20 each,	200
8 pigs @ 30/—fed on refuse, grain, and potatoes,	12
24 bullocks @ £17 each,	408
100 acres grain crops (@ £8 to £10), say @ £9 per acre,	900
50 acres roots @ £5, 10/—nearly 7/6 per ton,	275
75 tons hay @ £2—consuming-value taken at half the sale-value,	150
Implements @ £1, 10/ per acre,	450
	<hr/>
	£3590
Petty Cash,	10
	<hr/>
<i>Total capital required,</i>	<u>£3600</u>

$£3600 \div 300$ (the number of acres) = £12 capital per acre.

Expenses and Purchases other than of stock bought to fill up the places of those sold that appeared in the first valuation.

Rent, Taxes, and Labour.

Rent (including tithe), 300 acres, @			
30/,	£450	0	0
Taxes, 4/ per acre,	60	0	0
Labour, 35/ per acre,			
arable,	£350	0	0
Labour, 10/ per acre,			
grass,	50	0	0
	<hr/>		
		400	0
		<hr/>	
		£910	0

Purchased Cakes and Feeding Stuffs.

For Cows (@ £1 each),	£10	0	0
For 24 bullocks, 12 tons			
@ £7, 7/,	88	4	0
For 250 sheep, 5 tons			
@ £7, 7/,	36	15	0
	<hr/>		
		134	19

Seed.

Rye-grass, home-grown ;			
clover, 10/ per acre, .	£25	0	0
(Wheat 5/, oats 3/ per			
bushel), 225 bush. @			
4/ =	45	0	0
	<hr/>		
		70	0
		<hr/>	
Carried forward,	£1114	19	0

Brought forward, £1114 19 0

Manure.

Super, 3 cwts. per ac. forturnips = 150cwts. @ 3/6,	£26 5 0	
Nitrate of soda and sulphate of ammonia for grain crops and potatoes, 2 tons @ £10 (average),	20 0 0	
	46 5 0	
<i>Shoeing</i> (30/ per horse) <i>plus sundry bills</i> for repair of harness, implements, etc. = £5 each,	35 0 0	
<i>Coal, etc.</i> , for the engine—a fixture belonging to the farm,	16 0 0	
<i>Interest on</i> £3600 capital @ 4 p. c. = .	144 0 0	
<i>Total expenditure for the year</i> (<i>carried to page 314</i>),	£1356 4 0	

Receipts from sales of farm produce for a year, leaving the numbers and value of stock as is found in the valuation at last Michaelmas.

From Sheep Stock—

Receipts for wool, and death and depreciation neutralise each other as follows :

Sale of wool (6 lbs.) at 5/ each on 150 ewes,	£37 10 0
Death, 3 or 4 per 100, and difference in price of old ewes sold and about 50 tegs bought,	37 10 0
	<hr/>

200 lambs (produce of 150 ewes) @ £2 each,	£400 0 0
250 tegs sold @ 60/ each, profit £1 each,	250 0 0

On horses there should be no loss if young ones are broken in and others sold at their best.

From Cattle—

10 cows (produce 600 gals. milk @ 7d. = £17, 10/ each) =	175 0 0
10 calves @ 50/ each,	£25 0 0
Less loss through sale and repurchase of 3 cows to prevent depreciation of the stock,	15 0 0
	<hr/>
	10 0 0
24 bullocks @ 35/ per month of increase (for 6 months) =	252 0 0
8 pigs yield a profit of £2 each, food supplied by the farm, =	16 0 0
	<hr/>
Carried forward,	£1103 0 0

Brought forward, £1103 0 0

From Sale of Grain—

(Wheat, $4\frac{1}{4}$ qrs. per ac. @ 35/ = £7 8 9)

(Oats, $7\frac{1}{2}$ qrs. „ @ 20/ = £7 10 0)

100 acres grain crops.

14 „ off for horses.

86 „ @ £7, 10/ per acre—after
paying market expenses, 645 0 0

From Poultry—

50 hens and 20 ducks @ a profit of
 $2/6$ each, = 8 15 0

Return from produce in the year, . £1756 15 0

Total expenditure for the year, brought

from page 312, 1356 4 0

Total profit, £400 11 0

The loss from death is assumed to be allowed for in stating the prices obtained. Should grain rise, say 10/ per quarter on wheat, the profit on the above farm, due to this item alone, would be increased by £200 a year. But, on the other hand, the fall of at least 5/ per quarter which has taken place since the time to which the calculations refer, has reduced the profit on such a farm by £100. The prices of live-stock cakes, feeding stuffs, and manures are now (1889) reduced 12 to 15 per cent., and in some

cases even 20 per cent., from the prices quoted above.

The foregoing do not pretend to be more than two of many methods which may be adopted of arranging the stock and crops on such farms.

The following Balance-Sheet and Revenue and Expenditure Account will enable the reader to follow more exactly the figures in the foregoing example (No. 2), and to verify the results. The accounts are framed on the footing of a tenant entering into possession of his farm at Michaelmas of an assumed year, with stock, etc., as on page 310, carrying on one year's transactions, as on pages 306 to 314 inclusive, and striking a balance at the Michaelmas succeeding his entry, with stock, etc., then in number and value exactly the same as at entry. In the Revenue and Expenditure Account, the value of grain, roots, and hay consumed is stated on each side, as well as the other receipts and expenditure described on pp. 310 to 314.

[BALANCE-SHEET.

Dr.

BALANCE-

	As at Michaelmas 1898.			As at Michaelmas 1899.		
	£	s.	d.	£	s.	d.
To Ewes,	450	0	0	450	0	0
„ Teds,	500	0	0	500	0	0
„ Horses,	245	0	0	245	0	0
„ Cows,	200	0	0	200	0	0
„ Pigs,	12	0	0	12	0	0
„ Bullocks,	408	0	0	408	0	0
„ Grain Crops,	900	0	0	900	0	0
„ Roots,	275	0	0	275	0	0
„ Hay,	150	0	0	150	0	0
„ Implements,	450	0	0	450	0	0
„ Cash in hand or bank,	10	0	0	410	11	0
	3600	0	0	4000	11	0

Dr. REVENUE AND EXPENDITURE ACCOUNT*

EXPENDITURE.

	£	s.	d.
To Ewes, Expenditure on their account,	238	10	0
„ Teds, ditto,	233	0	0
„ Cows, ditto,	82	0	0
„ Ditto, Loss through Sales to prevent De- preciation,	15	0	0
„ Bullocks, Expenditure on their account,	250	14	0
„ Horses, ditto,	160	15	0
„ Rent, Taxes, and Labour,	760	0	0
This after crediting pasture rent, £150, debited above under proper heads,—Ewes, Horses, Cows.			
„ Seed,	70	0	0
„ Manure purchased,	46	5	0
„ Shoeing, etc.,	35	0	0
„ Coals, etc.,	16	0	0
„ Interest on Capital,	144	0	0
„ Balance or Profit,	400	11	0
	2451	15	0

* For the arrangement of these facts and figures the

The following Labour Note shows the particulars of the £400 stated as expense of labour on page 311.

Labour—

3 carters.

1 cowman.

2 shepherds.

4 labourers.

10 @ 13/ per week, average,	£338	0	0
1 bailiff @ £1 per week,	52	0	0
<hr/>			
11 men,	£390	0	0
3 extra hands at harvest for three weeks @ 24/ per week,	10	16	0
	<hr/>		
<i>Total labour,</i>	£400	16	0
	<hr/> <hr/>		

The bailiff, carters, head shepherd, and cowman are all supposed to have cottage and garden accommodation in addition to the above money wages.

In some districts wages are higher, while in others they are lower. The above may be taken as an average of the reduced wages of the present time.

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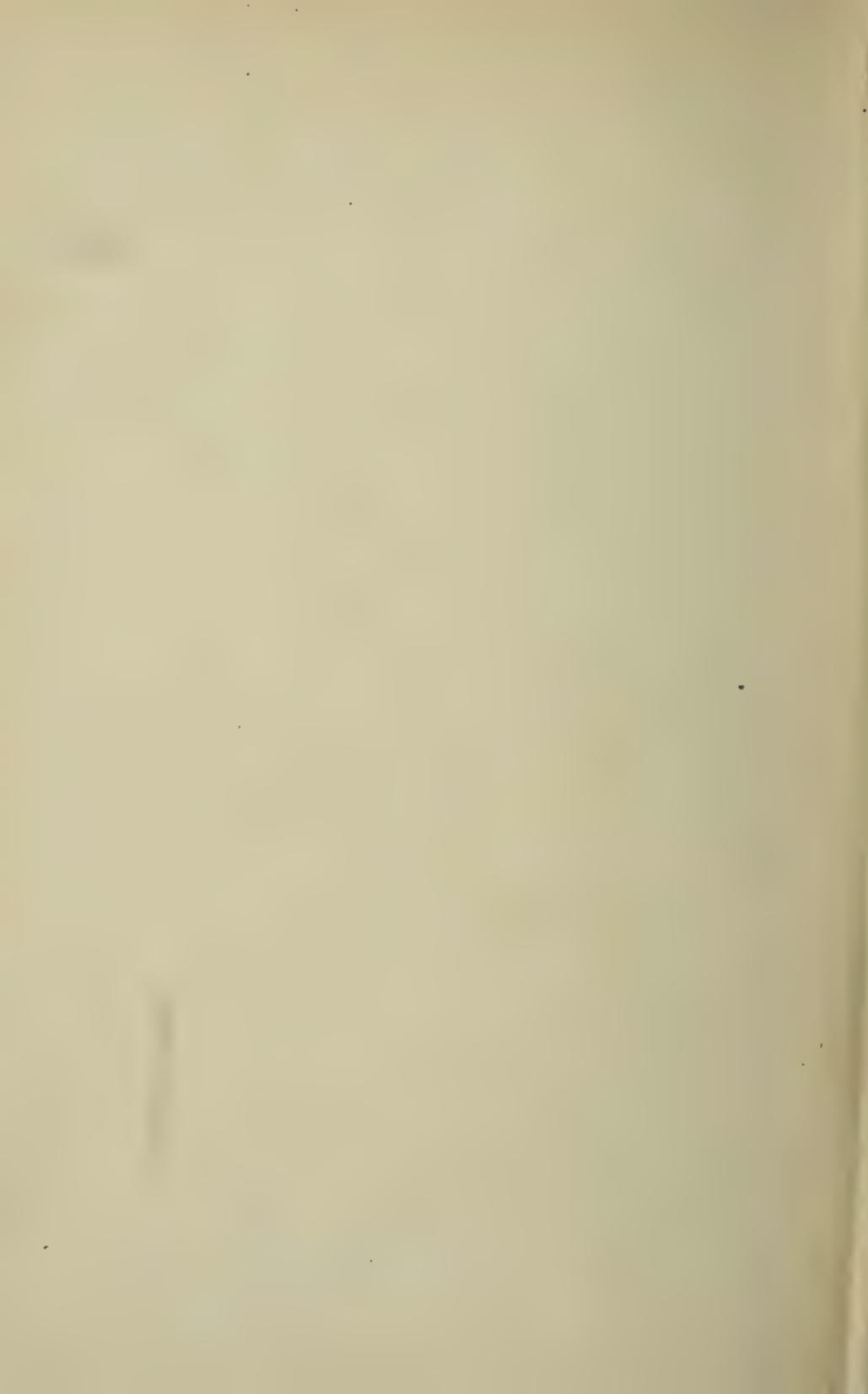
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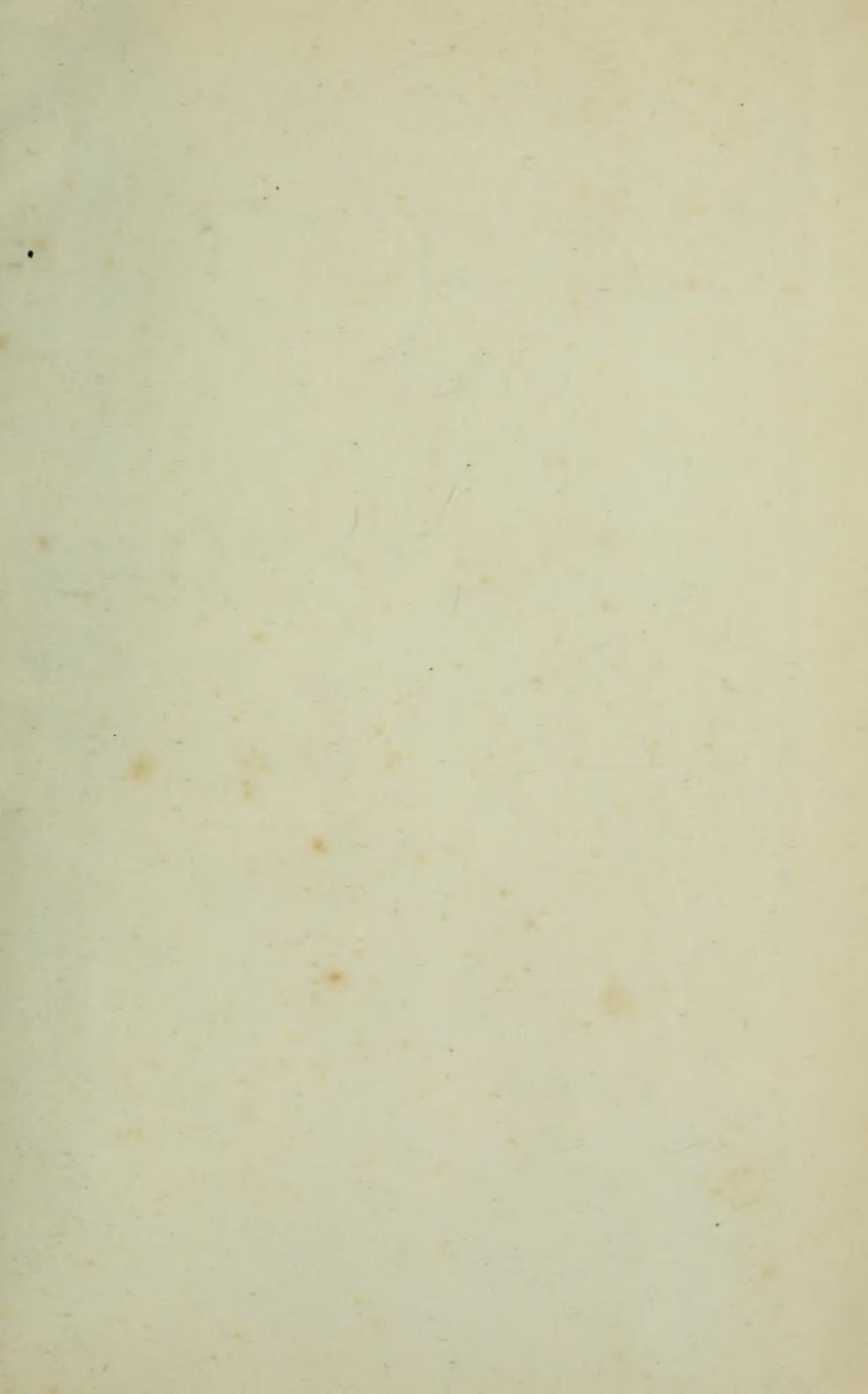
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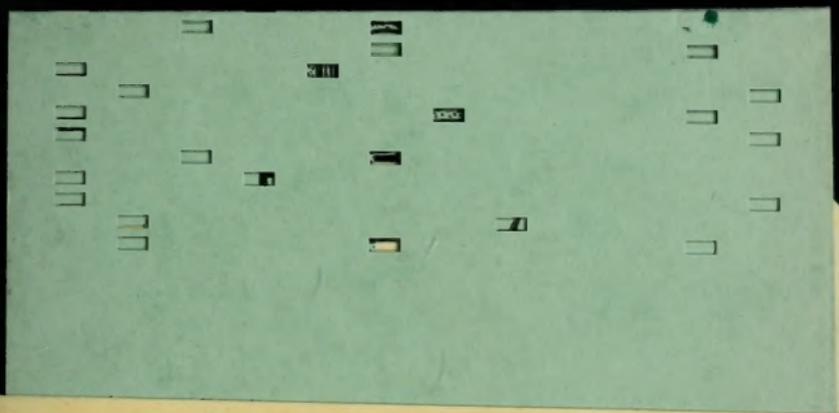
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