THESIS I.

STUDIES on the IMPROVEMENT of the MORE IMPORTANT BRITISH BREEDS of CATTLE.

SUBMITTED BY
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The object of this study was to trace the improvement of some breeds of cattle that hold a place of importance in the world markets.

Such a study could only be carried out by tracing the history of each breed selected from breed literature, supported by reference now and then to herd books, pedigree tabulations, measurements of inbreeding, milk records, and show prize lists. The material collected from these references was found to be sufficiently accurate for the purpose. This was verified in the case of the Shorthorn breed, on which the present writer conducted extensive researches. (Thesis II).

Breed literature, though abundant in cases and scanty in others, is scattered here and there in various books and publications; and the linking of facts together, for this study was somewhat troublesome. Great discretion was also exercised to discriminate between statements acceptable to the scientist and others that had nothing at root, except the imagination of some unqualified writer, and had, therefore, to be discarded. In a great many cases the/
the writer came across conflicting and contradictory records, making the extraction of data, prior to the formation of reliable conclusions, a difficult task. In these cases, such records as were tested from a geneticist's point of view, supported by historic sequence of events, were relied upon.

At the start of the study, the writer was confronted with the question of definitions. Like every other scientific investigation, this work had to be based on accurate and strict definitions from the very beginning. The term 'improvement' is loosely used by many writers, and reference to their work showed that they did not form a clear opinion of the real significance of the word, confusing it with the evolution of breeds, or with the economic production of animal products. Therefore the writer endeavoured to define the term, and then to apply it to the breeds chosen for this study.

It is such erroneous conceptions as the writer tried to clear, that lead some people to form wrong ideas about the improvement of live stock. The question is principally a genetic one, improvement being based on breed characters and their genetic
genetic constitution, and is not a question of 'feed'. Although prematurely, the writer wishes to emphasize that 'feeding' in itself does not lead to improvement, it only gives expression to the improvement factor-complex.

The writer selected for his study the following breeds: Shorthorns, Herefords, Aberdeen Angus cattle, and the Ayrshires. By studying the methods used in the improvement of each, conclusions were formed in the shape of a general theory, and the factors of improvement were, further, gone into in great detail.

It was thought proper to begin this thesis with these conclusions, Paper I., because by so doing the reader will grasp at once the meaning of the definitions put forward by the present writer. PAPERS II., III., IV. and V. deal with the breeds selected, and are the material from which PAPER I. has been formed.

Dealing with each breed, great stress was laid upon the origin, evolution and foundation stock of the cattle, with the purpose of showing that the foundation stock were possessed of such genetic constitution/
constitution as made improvement possible. In other words, the improvement-factors were latent in the foundation stock and were brought to light by the application of sound breeding methods, to which 'feeding' gave expression.

Undoubtedly some points have been dealt with fully because of their great importance, while others were only referred to, or briefly treated. Among the latter are present day schemes of improvement, and the thesis deals with them as far as the principles underlying them are concerned. They are based on grading, that is selection, and this is gone into in great detail, while the schemes themselves were not included here, because of unduly enlarging the work. After all, a thesis is concerned with expounding the writer's theory, supported by data that bear on such theory in general or in part. This is the method upon which this thesis is produced. Great attention was paid to the breeding methods of the master-breeders, and every possible detail was given to the rôle of 'prominent sires' in the breeds selected, because these sires were the strongest instrument in improvement. Prominent sires will remain as important in the future as they have been in the past.
It is a matter of pride for Great Britain that she gave the world the best breeds of cattle. These breeds that are firmly established at present in almost every corner of the universe where man is turning grass into beef or milk, had their origin, evolution and improvement in this country.

Before discussing matters in some detail, two definitions push themselves forward. The terms 'breed' and 'improvement' must imply to the geneticist a definite meaning. In the sense in which the term 'breed' is used, in this study, it is restricted to any group of cattle that possess the same blood elements in their origination and genetic constitution, resulting in uniformity and homogeneity of their characters. This definition applies all along, even in cases where there may be two or three sections in a breed, like the Thorthorns.

With the term 'improvement' others come, simultaneously to thought - 'perfection' and 'economic production'. Improvement essentially leads to 'perfection', which is the aim and the ideal; but, on the other hand, it must be governed by economic considerations. Thus, the best definition the writer can put forward is that 'improvement' is the manifestation of the reaction between desirable hereditary/
hereditary characters and economic production.

This implies:

(1) Maximum production of a highly valued economic commodity, i.e. milk, or beef or both.
(2) At the least possible expense to the producer;
(3) Inherent capacity - once a breed has been built up and improved, its capacity for high productivity must become inherent in its progeny, and thus established as a breed characteristic, and, lastly,
(4) Uniformity in type or types of the breed in morphological characters, e.g., conformation, colour, shape of horns, etc. (although this point is of less importance).

'Improvement' defined in this sense, led to the evolution and establishment of the present day breeds.

In Britain, as far as records go, variations in type of cattle were known to be, obviously brought about by natural evolutionary factors, like the differences in the environment, climatic conditions, the nature of the grass and soil etc.

But improvement is essentially an art of man, for his own purposes. He applied his tools and instruments to the plastic material, until it eventually/
eventually took its present shape. Thus nature gave man the raw material which he worked upon. 'Improvement' is an art of man, we said, but specifically it seems to be a racial character in the British people, who have monopolised it, with the result that all the most important cattle breeds today bear the British stamp.

A T.H.O.N. TO BAKEWELL.

The writer chose for his study the more important British breeds of cattle - the Shorthorns, Herefords, Aberdeen Angus cattle and Ayrshires. In none of these breeds the name of Bakewell figures. Yet the work of Bakewell of Dishley, marks an epoch, not only in British Agriculture, but also in Animal Breeding, throughout the world. The results of his work are very significant. He brought to the notice of Breeders the importance of inbreeding and selection in improving the stock and fixing the type, a practice accepted today in the light of genetic theories. And, bearing upon this, the all-important element, the 'breed' in the modern sense, as defined before, came into existence.

It is of no consequence to the scientist whether Bakewell selected for his material the Longhorns/
longhorns, or any other cattle. He postulated certain theories, and demonstrated certain methods, which eventually had far-reaching influence on the work of the early improvers of cattle breeds. So it becomes a point of fairness that Bakewell deserves mention here. As his system was reflected in the work of the Collings, and other pioneers, the writer will not go into it here.

LIMITATIONS TO IMPROVEMENT.

Success by any scheme of improvement, past, present, or future, can be attained in cattle, or any other live-stock, if their genetic constitution responds to the method positively, i.e., economically.

The geneticist, or breeder, can never fix the blue colour in the Blue Albions, because it is the outcome of a heterozygous condition. Another example in cattle are the Longhorns, which failed in the hands of Bakewell. They were not a suitable material for improvement, and inbreeding or selection among them only sorted out characters that were of no use from the economic point of view, which is the "all - in - all" in improvement.
In cases of this nature, we see that failure is not due to the method of improvement in use, but to the Genetic constitution.

The studies of the present writer, on the breeds mentioned before, lead him to the conclusion: that improvement was attained in the beef breeds, and the dairy shorthorns, by the application of inbreeding, selection, and better systems of feeding and management; whereas, in the dairy breeds it was effected by selection, and better feeding and management (inbreeding did not play a great role here as in the improvement of the beef-breeds).

Factors of Improvement.

This theory readily reveals that the factors effecting improvement come under two headings:

1. General Factors; those applying to all breeds, i.e., selection, proper feeding, good management,

2. Specific Factors; those that only have been employed with some breeds, i.e., inbreeding.

We now turn to discuss these factors and their/
their effects

(1) Selection.

The policy of breed societies, shows and exhibitions, the pedigree registration system, fash-
ion, local competitions, and lastly the government schemes of improvement, have been to give breeders
of cattle certain standards and ideals for which
to select and breed.

The fact that selection has been the most
powerful instrument in improvement can be attribut-
ed to the heterozygous condition of cattle. Even
the "purebreds" are only pure, in the genetic sense,
for some of their characters.

The ultimate results of selection are:

(a) maintaining the uniformity of type within a
breed,

(b) maintaining and aiming to raise the high stand-
ards of production,

(c) bringing about any desirable change of type,
whenever economic conditions of markets and
public demand make it necessary, and

(d) it accelerates the results of breeding methods
based on "heredity", i.e., inbreeding, line-
breeding, etc.

That selection has been successful with
beef breeds is attributed to the correlation between
conformation/
conformation and productivity in these animals.

The score-card is a fair basis of judging beef cattle. But the case is much more complicated with dairy breeds. The researches of Gowan with Jersey and Freesian registers led him to the conclusion that the conformation of a cow influences to a little extent her milk yield, and does not influence the concentration of butterfat in the milk.

However, as the studies of Graves show, the factors for high-producing capacity in the dairy cow are partially dominant to the low-production factors. The significance of this statement cannot be much emphasised. It points out the possibility of success of any improvement scheme that aims at the elimination of the low-production factors. As yet, any scheme of the sort must essentially be based on careful selection according to milk records. We shall return to this later.

Yet there are cases which are exceptions to the rule, as the cases cited before of the Blue Albions and the Longhorns. We have shown, at an earlier stage, that selection was not the cause of failure, but the genetic constitution.

It is rather deplorable that the majority of farmers in most countries have not yet recognised how/
how important it is to eliminate the "scrub bull" from the breeding herd. Cattle are all important in any herd, especially so with a dairy herd, and good attention must be paid to securing them from the pure-bred milk-celligued bulls, and it will be all for the best if they would be "proved," by the performance of their progeny at the stall.

We now come to discuss, in some length, milk recording in Scotland.

It was a very sound movement, indeed, that selection, with regard to the dairy cow came to be based on her performance at the stall.

Outward confirmation, and certain points in the dairy cow are, no doubt, indicative of her milking capacity.

But this may be deceptive, and, besides, it is not a quantitative measure. Nothing can speak with more confidence than figures, and this is the principal reason that led to the adoption of the Milk Recording Scheme.

It may be argued that competitions have done, or may still do, a good deal to raise the milk yield. While this is not denied, we should not be led to forget for a moment that it is only the best specimens that do enter such competitions. Whereas milk/
milk records in the hands of breeders, ultimately serve to raise the average yield of dairy cattle as a whole.

By the aid of these records, breeders have civilized themselves in selecting their stock from good performers, and, eventually, there is no doubt, the elimination of the poor-silking strains will be forthcoming. As a matter of fact, it requires nothing more than that all dairy farmers should join, with interest and confidence, in the movement.

At the present time, encouragement from the State, through legislation or other means, is most desirable.

Before discussing other points, it is worth while to account briefly of the history of the movement in this country (Scotland)

Public milk recording, first initiated by Dr. SPEIR, has been carried out since 1903, but it was limited in scope in its early stages. From 1903 to 1907 it was administered by the Highland and Agricultural Society, and by that latter year seven local societies had been formed. At this stage it was thought, seeing that the scheme had gained some popularity, that it would be advisable to leave it to/
to the dairy farmers. Thus in 1907 the "Cleveland Cattle Milk Records Committee" was established to take the recording in their hands. They carried the work out till 1914. Only Cleveland cattle were tested under the new administration. In 1914 the extension of the movement became possible, so the constitution of this body was made to include representatives from agricultural institutions, other breed societies, etc. Complete arrangements had been made for the supervision of milk recording.

Other breeds were to be included in the test too.

But from its beginning the movement has been associated with the Yorkshire cow, and even the last reports for 1927 return 95 per cent of all the cattle tested as Yorkshires. The name of the society was also changed to the "Scottish Milk Records Association", with York as its headquarters.

So it is only since 1914 that comprehensive work has been done in this direction. Though very much handicapped in its first few years by the pressure of war conditions, the Association had been and is still, rendering valuable services both to dairy farmers and the dairy breeds. We shall touch upon this point later.

As practised in this country, milk recording is done either officially or privately.
The Scottish Milk Records Association is the central body supervising the whole work of recording which is carried out by Recorders appointed for the purpose by the local societies spread all over Scotland. These Recorders are qualified persons who have undergone a special training at the West of Scotland Agricultural College, or any other recognised school. Their appointment is, of course subject to the approval of the central association.

According to the regulations, the recorder visits each farm in rotation, the period between visits varying from fourteen to twenty-four days, according to the number of the farms of members in the local society. The recorder carries with him from farm to farm, the apparatus consisting of Gerber's machine and other necessary apparatus for weighing, sampling, and testing the milk. The recorder usually arrives at any one farm in the afternoon, and tests the milk of all the cows and heifers in the herd, which are in milk, that evening and the following morning. His instructions are such as to make him test on a representative sample of the milk. Butter-fat testing is compulsory, and this is also made at the same time. Each cow included in the records must be/
be clearly distinguished in the byre by a stall number in front of, and above her level; and she must also be tattooed with a mark approved by the Association. The weights of milk at each milking, are entered on the daily byre sheet, and then are transferred to the cow's special page in the milk record book. In the daily byre sheet, the recorder is required to fill in the following particulars for each cow - evening and morning hours of milking; the cow's stall number; weight, in pounds, of her milk in each milking, and the total thereof; gallons of milk, calculated at ten pounds a gallon, the butter fat content of the milk; and lastly, the computation of the gallons of milk at one per cent fat.

In the milk record book of the herd in the farm, the recorder is required to enter the following particulars in each cow's page: - her name, and byre number; herd book number; the names and herd book numbers of her sire and dam; her age at the opening of the record; the date of her calving previous to opening; and the date of her calving after the close of the record; quantity of milk in pounds; and in gallons; the butter fat percentage; and the amount of gallons of milk computed at one per cent butter fat. These books are sent to the superintendent of the Association.
Association in December of each year. There is no set period of lactation such as pertains in some schemes in other countries. Whenever a cow calves, and comes to the test, she is tested from the day she calves up to the day she is put dry prior to her next calving, so that a test may commence in one season and be carried into the next.

In addition, the Association has what is known as "Check tests" and "Surprise Check tests". The recorder must keep the superintendent in the general office informed at the beginning of each week where he will be testing during the week. The recorder may get a letter from the superintendent on arriving at a certain farm to wait another day at that farm to make a "Check test". In addition to this Check test, the assistant-superintendent from the central office may call at any farm on the day following the recorder's ordinary visit and conduct a "Surprise Check test".

The reason underlying this is to ensure that no irregularities are taking place and also to ensure that the recorder is doing his or her work properly. In case there is any marked difference in the test conducted by the assistant-superintendent, enquiry is at once made into it.
CLASSIFICATION of COWS and HEIFERS.

The Scottish Milk Records Association publish annually their reports appended to a register of Class I cows and heifers. The system is that cows and heifers are divided into three classes according to their milk yields computed in the corresponding quantities of one per cent butter-fat milk. This is adopted not only as a point of convenience as it brings the yields of different animals to a common basis, but also because it takes into consideration both the quantity and quality of the milk. The requirements for the three classes are as follows:

For entry into Class I, cows and heifers are eligible if their respective yields are not less than 2500 and 2000 gallons of milk (1% B.F.). In 1926, the standard was raised for Class I. to not less than 2800 gallons of milk in the case of a cow, and must have completed the lactation before 31st December, and have calved again before 1st May in the following year. In the case of a heifer, however, the yield should not be less than 2240 gallons.

For Class III., cows and heifers giving less than 1660 and 1330 gallons respectively.

For Class II., cows and heifers falling between the limits of the other two classes.
The writer does not intend to deal fully with these points, for, obviously, it does not concern us in Scotland. But, in passing, for the sake of comparing our scheme with others, we proceed to say a word about them.

In England the work of milk recording is supervised by the Ministry of Agriculture & Fisheries, the recording itself being done by the farmers and checked now and then by the Ministry's Inspectors. The Ministry publishes annually the Register of Dairy Cows with Authenticated Milk Records. There is no division into classes, but all cows and heifers of a certain breed yielding a minimum, complying with the set standard for that breed, will be eligible for entry. Only the quantity of the milk is considered.

There is no system of Advanced Registration in Scotland. Advanced Registration as practised in America, is carried out by the Breed societies. As previously stated, recording here is carried on solely by the Association in Ayr. The Association's method of classifying the yield of animals for inclusion in the annual report is the only point of similarity/
similarity between the systems of Advanced Registration employed in America and the system of Authenticated milk records as done in Scotland. To enable the yield of an animal to appear in the Scottish Association reports it must be a Class I. animal. This method is very satisfactory and effective in the work of improvement.

PRIVATE OR UNOFFICIAL MILK RECORDS.

Further, to establish on a wider and more popular basis, and to induce a larger number of farmers to adopt ultimately the official system, the Scottish Association inaugurated, a few years ago, a new scheme of private records. The testing methods are essentially the same as those employed in the official scheme, with the exception that here the owner of the herd or his agent carries out the test by himself. While the farmer thus derives the benefits that accrue from recording for his own personal use, it only helps him in the management of his herd. Naturally the Scottish Association are by no means responsible for such private records.

THE INFLUENCE OF HIS OWN ON THE IMPROVEMENT OF DAIRY CATTLE.

It was previously stated that selection
is the most powerful factor of improvement possessed by the breeder. To breed from the best is the best advice we can give him. That dairy farmers have grasped upon the significance of this practice is evident from the analysis of the Association's REPORTS. And though it is not within the scope of this thesis to go into exhaustive analysis of milk records, it is quite convincing of the usefulness of the work done to compare the percentages of cows and heifers in Class I. for the last twelve years. Extensive recording has been made by the Association only since 1914. If we take, then, this date as the starting point of the analysis we can readily see that praiseworthy efforts have been made to increase the average milk yield of dairy cattle in this country.

This fact becomes evident by a study of the following graph, and its figures. We draw attention here that war conditions appear to be responsible for the fall of the graph from 1916 to 1919. Between 1923 and 1925 the graph shows a slight fall again. This is really an apparent, not a true, depression being caused by the inclusion of new herds in the records.

Notwithstanding these facts, and considering the question as a whole, steady progress and improvements have been made since the establishment of the scheme of records. The graph shows that the number of the cows and heifers in Class I. has been increased.
GRAPHIC REPRESENTATION of PERCENTAGE of CLASS I. ANIMALS
From 1914 to 1926.
The dotted Graph line shows Actual Number of Cows tested during the same Period.

![Graph of Class I Animals from 1914 to 1926](image-url)
increased by about 30 per cent between 1914 and 1926. It is self-evident, then, that the future holds a great scope for more and more progress. Every dairy farmer north of the Tweed will benefit immensely by collaborating to carry out the scheme to its full extent. In facing the serious problem of foreign competition, his only hope rests in cutting down his expenses of production per gallon of milk by increasing the yield of his herd. The best strains of dairy cattle possess wonderful inherent capacities, and from these he should breed or build up his stock. Then he must ration out his cows individually according to the yield that each gives. These are points of the utmost importance; as a matter of fact, they are determining factors in dairy farming success, and to the identification of which points milk records are the only aid we have, as yet.
Undoubtedly the successful improvement of breeds, brought about by selection, etc., owes everything to the pedigree system.

This system has been attacked by some writers on the grounds that it does not give any indication about the productivity of animals. On the face of it, this may seem justifiable, but, in the opinion of the present writer, it falls without the aim and scope of the system.

The principal value of the pedigree system has been:

1. In giving every animal an individual identity.
2. In keeping every breed pure within itself, closing the door to any attempt at improvement except from within.
3. Thus establishing certain blood-lines within every breed, and
4. Making it possible for breeders to select from the best of these blood-lines, while lastly
5. It has kept all breeders of one breed in a unit, with regard to breed standards and interests.

So much, then, for the subject of selection.

(II)
Proper systems of feeding, and management inseparable from each other, have had a direct and important bearing upon improvement. As stated before, improvement has an economic end in view, and the ultimate destination of cattle products is human-food market. Cattle are transformers of one form of matter and energy into another form, suitable for human nutrition. With a proper system of feeding, this has been done with great success. The principal hereditary factors which it is endeavoured to sort out in the process of improvement are those which will bring about a more economic utilisation of raw food stuffs and also the manufacture of higher quality produce. Thus high milk yield, better fat concentration, fattening tendencies and early maturity are largely a matter of how the food consumed is utilised.

The functions of food in the animal body are:

1. the maintenance of life in good health,
2. what food is over and above the maintenance requirements is utilised for production purposes. Therefore, without a proper system of feeding, there will not be production, or the keeping of animals in health, to the best advantage.

It was the introduction of roots that gave an impetus to cattle improvement, instances of which will be given at a later stage.
It was to the response to good feeding that the COLLING'S animals stirred the country with sensation - we need only keep in memory the "Durham Ox" and "The White Heifer that Travelled", and both of them travelled and were shown in every place as an effective advertisement of the COLLING'S method of breeding and feeding.

Perhaps the length of the grass season is one of the reasons why 'improvement' had been monopolised by Great Britain. This is where the British farmer stands to an advantage over farmers of other countries, who invariably face the difficulties of shorter seasons of grass.

On similar lines, we can postulate the effect of good systems of management. Their end in view is keeping cattle under the best surroundings, in good health, so that they can perform their functions under the best conditions available. Again, under management systems, we have these all-in-ortant factors, such as selection, system of breeding, keeping of records, joining breed societies and shows, etc, factors without which improvement could not have been achieved.

The breeder of the future will reap the fruits of the increasing valuable information that science is now revealing every day; he will have a better, if not a perfect, understanding of feeding, disease/
disease control, heredity, etc., which will enable
him to find his way with ease and certainty.

DEERING AS A FACTOR OF IMPROVEMENT.

It is an established fact that endogamy
played a great part in the formation of our domestic
breeds of livestock. It was a very prominent instrument in the improvement of the beef breeds of cattle.
Even in other breeds, like the dairy breeds, which
are not inbred to any great extent, we note that the
concentration of the blood of certain sires and dams
played no small a part in their improvement. The
ultimate result of endogamy in homozygosis or in other
words the rendering of the heredity factors pure.
Homozygous animals are impressive breeders and if
they are of the right type such animals are the most
likely to beget offspring of uniformly good character-
isation.

It, further, has been clearly demonstrated
that inbreeding has few deleterious effects, if associ-
ated with selection. Recent research has shown be-
yond doubt that the injurious effects, that had been
ascribed to inbreeding, are in fact due to recessive
factors that can be easily eliminated by selection.

The writer does not intend to go fully into
that subject here, but reference may be made to his
other thesis.

END.
FUTURE IMPROVEMENT.

It becomes evident from the previous discussion that the factors which will bring about improvement in the future are:

(1) selection being the most important, helped by

(2) better systems of feeding and management.

STAGES OF IMPROVEMENT.

In the writer's studies, tracing the evolution and improvement of breeds, whenever he came to note a change of type, or a change in the improvement factors operating, he considered it to be a definite stage in improvement. This is only an arbitrary line of system, as there was no actual line of demarcation between one stage and the other, any change that took place did so gradually.

The results show that:

(1) in the beef breeds there have been three stages of improvement marked by a change of type, while

(2) in the dairy breeds there have been three stages of improvement, marked by a change of the operating factor of improvement.

The following tables are illustrative of these facts.
### DAIRY BREEDS

<table>
<thead>
<tr>
<th>STAGE</th>
<th>DATES</th>
<th>MILK VARIETIES IN OPERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>1600-1690</td>
<td>Non systematic selection for heavy milkers.</td>
</tr>
<tr>
<td>Second</td>
<td>1650-1903</td>
<td>Selection based on Conformation.</td>
</tr>
<tr>
<td>Third</td>
<td>1903-</td>
<td>Selection based on Conformation but more strongly on Milk Records.</td>
</tr>
</tbody>
</table>

### BEEF BREEDS

<table>
<thead>
<tr>
<th>STAGE</th>
<th>DATES</th>
<th>MEAT CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>1709-1855</td>
<td>Size, scale and substance, with excessive fatness.</td>
</tr>
<tr>
<td>Second</td>
<td>1855-1889</td>
<td>Size, scale and substance, but reduction of waste of excessive fatness.</td>
</tr>
<tr>
<td>Third</td>
<td>1889-</td>
<td>Size became smaller, bones finer, earlier maturity, emphasized by &quot;Baby Beef&quot;</td>
</tr>
</tbody>
</table>
Having thus far, summarised the result of studies, worked out a general theory of improvement, discussed the factors concerned, and given an account of the stages of progress, the writer will proceed, now, to trace the evolution and improvement of each breed separately. For completion, the outline is preceded by an introductory note, giving a brief account of the value and characteristics of the breed, to be followed by a description of the foundation stock, for the sake of emphasising the improvements attained later, then, lastly, a short account of the improvement of the breed.
Undoubtedly the Shorthorn breed is the most outstanding example of stock improvement in this, or in any other country. No other breed received more interest, or had an earlier start in its evolution. No other breed was handled in its infancy by such keen judgment or inborn constructive talent as was possessed by the early improvers of these cattle. The distribution of the breed at the present day bears evidence to its utility and long-tried qualities. About seventy per cent of the cattle population of this country are Shorthorns. The breed is a great, perhaps the best favourite in countries where the cattle industry is a chief business; the Argentine, the United States of America, Canada, Australia, New Zealand, France, etc.

As a beef animal, the Scottish Shorthorn and its crosses stand in the front. It is early to mature, economical to feed, and the quality of the beef is certainly excellent.

The Dairy Shorthorn is a splendid "doer" among dual purpose breeds.

And/
And, whether for beef or milk, there is no other breed so adaptable to different conditions in different countries, or so impressive of its characters, and so prepotent, all the world over, as the Shorthorn has proved to be. This wonderful breed as we see it today, is the outcome of patient work through almost a century and a half, from the days of the Collings down to Duthie and his contemporaries.

THE FOUNDATION STOCK.

Shorthorn cattle were known before the time of the Collings, and had established a good name for themselves. They were localised in Yorkshire, in the part known as Holderness, hence they derived their name - "The Holderness Breed". They were also called the 'Durham', 'Tesswater', 'Yorkshire', and 'Shorthorned Cattle'.

The accepted theory of their origin is that they were produced, to a great extent, by the use of imported Dutch bulls on the native cows of the district during the sixteenth and seventeenth centuries. Professor Wallace states, that the introduction of Dutch blood appears to have ceased about the middle of
the eighteenth century, and since that date, the improvement of the breed has been brought about practically within itself.

It was already stated that these cattle had a good reputation for themselves. WILLIAM LILIS in 1746 wrote:

"I think of all the cows in England none come up to the Holderness breed for their wide backs, short horns, and large bodies, which render them whether black or red, the most profitable beasts for the dairymen, grazier, or butcher".

Evidently they were much of what we call today 'dual-purpose' animals. The following is a description of them shortly before the time of the COLLINS, that is, before their early stage of improvement.

They were lacking much in uniformity. They were generally wide and thick in form, long in body, with wide backs, deep forequarters, and an undue prominence of the points of the shoulders and hips. There was a lack of length in the hindquarters, rather narrow in the chest, bare on the shoulders, long in the legs, thin skinned, with scanty hair. Their conformation was coarse and patchy due to the uneven deposition of fat. With regard to colour, there/
there were reds, blacks, reds with orange tinge; but a good proportion of them were red-and-white mixed, or 'flecked'. They were said to be good milkers, good grazers; but slow to mature.

FIRST STAGE OF IMPROVEMENT.

THE COLLINGOS (1793-1820).

The modern improved Shorthorn had its origin upon Ketton and Barmpton farms, near Darlington. Ketton was the property of Charles Colling Sr., the father of the two great improvers of the breed. The father used to take pride in possessing good live-stock, but difficult circumstances forced him to give up farming, whence he handed over his property to his son Charles. Charles had been a student of BAKESWELL'S and had made a good and thorough study of his methods of breeding at Dishley.

Like BAKESWELL, but working on a different material, CHARLES COLLING had in his mind an ideal of what the Shorthorn cattle should be, and started collecting the nearest approach to his ideal by buying from the best herds of the time.

He had Cherry from his father, and he himself purchased
purchased three other cows, Duchess, Daisy, and Favourite, with her young heifer-calf, Young Strawberry. These four cows are of such importance in the later development of the breed, that a little should be mentioned here about them. Duchess was a massive short-legged cow, of a beautiful 'flecked' colour. She became the matron of the ever-famous family "the Duchesses" of Gates. Colling considered her the best cow he ever saw. Daisy was very neat of shape, and inclinable to make fat.

Favourite (Lady Sayward) was a roan that became the ancestress of several famous families "and of the bull that fairly created the improved Shorthorn". This is the great bull Favourite. With these cows CHARLES COLLING was asserted to have possessed the four best cows in existence, at the time, a fact that bears testimony to his keen judgment, and contributed a good deal to his success.

Robert, his brother, working on the same lines and principles, had bought the bull Hubback of everlasting fame and of whom "BEE'S B climb said that no stock ought to have been registered in any herd book of Shorthorn's "which had not Hubback's blood in their veins". Hubback was rather small in size, and of a yellowish-red colour with some white. "Estate", of herd-book fame, described him thus: "Head good, horns/
horns small and fine, neck fine, breast well-formed and fine to the touch, shoulders rather upright, girth good, loins, belly and sides fair, rump and hips extraordinary, flank and twist wonderful.

With this bunch CHARLES COLLING set to work after his ideal. In his early work he did not apply BAKEWELL'S method, but proceeded to produce good progeny. The three following examples are noteworthy:

(1) Hubback X (cow unnamed).
   Haughton (+) X (l x Barker's Bull)
   Foljambe (♂) (263)
   Foljambe was a white bull with a few red spots, big in size, wide in the back, and thick in body. He inherited some of Hubback's good qualities through his dam.

(2) Foljambe X Lady Haynard.
   Phoenix (♀)

(3) Foljambe X Young Strawberry.
   Bolingbroke (♂) (86)

COATES used to describe Bolingbroke as the best bull he saw. Bolingbroke must so have appealed to COLLING that he started to apply BAKEWELL'S method of inbreeding for the first time in his herd. So he mated

Bolingbroke X Phoenix
   Favourite (♂) (252)

Favourite/
Favourite was a light roan. He so nearly met Colling's view that he now began a very intensive course of inbreeding. For years the bull was used indiscriminately upon his own offspring, often to the third, and in one or two instances to the fifth and sixth generation. Here is an example of the system:

Favourite X Phoenix

Young Phoenix (♀) X Favourite

Comet (♂) (155)

Comet was the pride of his day, and the first Shorthorn bull to realise the unheard-of price of one thousand guineas.

By this time the Brothers Collings were so in possession of the best specimens of the breed that they began to make a reputation for their herd throughout the country. In those days there were no shows, so they used to send some of their cattle to country fairs where their appearance created a sensation, and attracted the attention and interest of other breeders. Of these animals exhibited we may mention the Durham Ox, sired by Favourite, and the White Heifer that travelled, by the same sire.

It is interesting to record here that the bull Bolingbroke served two Galloway heifers, thus producing/
producing the "Alloy" strain. Although this Gallo-
way blood was lost in a few generations in the full
flow of pure Shorthorn blood, this incident is being
held responsible for the evolution of Polled Shor-
horn cattle in America.

The OLLINGO dispersed their herds in
1810 and 1820 obtaining very high prices, and disse-
minating their blood among the breed.

It is common knowledge that to Charles and
Robert OLLINGO is due the credit of the systematic
improvement of the world-famous breed.

Their method is summarised in:

(1) Intensive inbreeding.
(2) Rigorous selection after their ideal,
(3) Hiring out bulls, a practice that greatly
helped in the building and improvement
of the breed, and
(4) An elaborate scheme of showing and adver-
tising.

Now, these questions act themselves to the
writer. How did they influence the breed? What im-
provements did they effect?

At an earlier stage, we saw what the cattle
were like before they began to give them the OLLINGO
Stamp. Now, to answer these questions, we give a
brief account of their herds at the dispersions.
The cattle were uniform, and all of the same type.
They were of great size and substance, the type in
vogue/
vogue at that day. They were of good conformation as indicated by having good heads, well-sprung ribs, and well-covered long hindquarters. Black colouration soon disappeared in the workshops of Ketton and Barbyton. The horns became shorter. The muzzles were flesh-coloured. The animals were low in leg, deep and thick in body. Their skin was loose and pliable, soft and mellow. Red, red-and-white, roan, and all white, were the colours in the herds. They were excellent milkers, and had a tendency to fat.

The Boar (1790-1834)

Interest had grown among contemporary breeders in the success of the Shelley, and Ketton and Barbyton became the centre of admiring attentions and business transactions of many a good breeder at that time.

Booth and Barby were among the first to grasp the importance of the work done. Fortunately for the breed, they took to the task of improving it, each with a different view, that until the latter half of the nineteenth century, they held its reputation high, and created a movement of enthusiasm, even reaching mad speculation at times, among other herd/
herd owners both at home and in America.

In Killeby, Corby, and Studley, the ROOTH were at work. THOMAS ROOTH the father, was a man with a definite aim in view, and of independent character. To this we may attribute largely his success and his originality, for he followed a system of breeding that was as much different from the "ROLLING" as from "ROLLING" and he did wonders. His system was to secure the best non-pedigree Shorthorn cows, cows that were of good frame, large size and tendency to fat. These he crossed with moderate-sized, strongly-bred, "ROLLING" pedigree bulls. His view was to produce animals of substance, flesh-making capacity, and breed on the back and loins. This is of considerable importance, as we see that he laid the foundation of the beef type of Shorthorn cattle.

Carrying his scheme into action, ROOTH purchased at Darlington market, and other places, those female cows that he deemed would suit his purpose; and, mating them with "ROLLING" bulls, he obtained his first crosses. These first crosses were the material that underwent in the pot an intense system of inbreeding, and eventually developed into/
into the famous 300th tribes. Thus obtained were the Fairholmes, the Strawberries, and the Bracelets. These three tribes constituted his herd till 1814, by which time he had established a name for himself as a skilful breeder and talented improver next to none. His son, Richard, working on the same lines, evolved the Isabella tribe.

We may now show in what way his system differed from that pursued by the 30128 and by 30232. The animals, the brothers 30128 in-and-inbred, were not related, to begin with, while those the 30232 inbred were closely related, more or less as all of them went back by descent to Favourite and Favourite. Thus 30128's method was a more intensive system of inbreeding. While 30232 essentially differed in his method in that he had recourse to 30128's pedigree males and females in building his stock, and maintained their level of inbreeding.

Later on, about 1830, 300th evolved, by following his very same system, three new families. These were the Farewells, the Broughtons, and the Moss Roses.

In the establishment of the Yorkshire and Royal Shows (1838-1839), 300th cattle had the opportunity/
opportunity of honouring the showyard and receiving the highest honours there. To mention some of them: the famous twins Bracelet and Beaklace, White Strawberry, Birthday, uoon of the Boy, Lady Imp-Grant, the white bull Leonard, the world-renowned bull Crown Prince, and many others.

What was the result of the BROWN work? We saw how the BROWN produced an essentially dual-purpose animal. The BROWN succeeded in giving the world a beast primarily for the butcher, a beast that eventually, in the hands of OXON- SHANK and other breeders, developed into the beef type. The BROWN beasts were uniform in characteristics, of good robust conformation, low to the ground, good grazers and tending to fat. Colours were red, roan, and white.

BROWN, JOHN (1829-1849)

Meanwhile, single of purpose to the last day of his life, and dogmatic to the extreme, BROWN was busy making known to the world his herd, especially the Duchesses, members of which were hard competitors with the best cattle for the highest rewards of the showyard. BROWN built his Duchess/
Duchess tribe from the progeny, males and females, of the cow Duchess of COWLING. Thus pedigree animals of both sexes were the originators of this famous family. BATES took to the work of concentrating the Duchess blood with the result of obtaining a good homogenous stock, admired by all who saw them. On the occasion, BATES said: "I selected this tribe of Shorthorns as superior to all other cattle, not only as small consumers of food, but as great growers and quick grazers, with the finest quality of beef, and also giving a great quantity of very rich milk." He described his system thus:- "Since I became possessed of the tribe, I have never used any bulls that had not Duchess blood except Belvedere, and he was the last bull of a long race of well-descended Shorthorns." Belvedere 1736 came from the Princess line.

The writer must refer here to a common fallacy among most writers on this subject, namely, that BATES inbred his cattle to such a degree that only the outcrossing with Belvedere saved his position. Now, accurate scientific research does not confirm such a belief at all. GOWALL-WRIGHT, in fully analysing BATES' Duchesses and measuring their coefficients of inbreeding, shows that BATES started with/
with COLLING stock already 40% inbred, and maintained that level by constantly introducing just the right amount of fresh blood to keep the percentage from rising above 40%. This is a fact that points to WIES' sound judgement.

His aim was breeding capacity, early maturity, and good milking qualities. Of his herd WIES says, on the occasion of its sale, "Thus passed into other hands a herd that was destined to receive recognition in the subsequent progress of the breed beyond even the wildest dreams of its founder."

If the BROTHER COLLING are credited with evolving the "improved Shorthorn," to the BOWLE and to WIES falls the honour of paving the way, as it were, to the development of the two great branches of the breed - the beef type and the dairy type respectively.

OTHER CONTEMPORARY BREEDERS.

The eminent men of whom we accounted were not all the breeders at work, though their methods, efforts, and reputation as the leaders of the movement, overshadowed the work of others. But/
But, as a point of fact, there is a long roll of
honour, and hundreds of strong personalities, in
different parts of the country, were engaged in the
construction of the breed. "Chilton got
rid of the open shoulder and improved the forequarter
generally." J. W. STIGGER is credited with being
the first to command an extensive trade in bulls.
JOHN WHITTLER had a herd from which the early im¬
porters drew some of the most valuable cattle. It
was due to WHITTLER'S persuasive efforts that
COATES issued the first volume of the Shorthorn
herd-book at Otley in 1828. WHITTLER was proud of
the dairy capacity of his herd, paying as much at¬
tention to the udder as to any other point in the
conformation of his cows and heifers. T. S. of
Ayleshby was one of the greatest breeders of his time.
He was a great admirer of COATES' cattle, and founded
a herd equal to any in the country.

These are perhaps not more worthy of men¬
tioning than other breeders, but even to name the
rest is beyond the scope of this paper.

THE SCOTCH SHORTHORN.

Even as early as only five years after
the COLLINGS started work; breeders from Scotland,
impressed/
impressed by the wide fame of the Kelton herds, were known to cross the border with the view of introducing this new element in their farming practice.

ROBERTSON of Ladykirk, Berwickshire, in 1789, bought from the COLLINS twenty five of their best cows and two of their best bulls. ROBERTSON not only improved his own stock, but also that of the district that availed itself of the free use of his bulls. He introduced into the country the system of early finishing of fat cattle, demonstrating among his own. For forty years he carried on the good work, his system was essentially inbreeding.

GENERAL LIND of Pitcothie, Fifeshire, was at the same time forming his herd of Shorthorns too, from pedigree cows and bulls.

But really it was JOHN KENNEDY, of Blastonkie, Brestonkirk, East Lothian, who did much to make known, and to give the breed a firm footing, in Scotland. In 1816 he introduced ROBERTSON's blood into his own herd. In 1822 the Scottish National Fat Stock Show was held under the auspices of the Highland and Agricultural Society for the first time, due to KENNEDY's efforts. This event is of considerable importance, for it is obvious that shows constitute/
Constitute in themselves a great element in the promotion of stock interests.

Then DSLAY held his sales important purchases were made, and at these sales DSLAY and others laid the foundation of their herds.

1. T IN DSLAY of Ury is the founder of the first Northern herd of Shorthorns, an enterprising feat at the time. Very likely he became interested through visits he used to pay to his cousins in the Border district. There he must have seen Shorthorns, and eventually he got in contact with CLAY of Chilton. About 1822 DSLAY brought to Ury the bull Corinader, bred by CLAY, and afterwards he hired the bull Chantassie from DSLAY, his object being to use them in producing store cattle from his Aberdeenshire cows (these are not the Aberdeen Angus of to-day). They were black cattle, with long horns, coarse conformation and very slow to mature. But it was not till 1827 that he gave up this practice by selling the Ury stock, and took to build a herd of pure Shorthorns. The foundation stock were all pedigree animals, and we must mention some of them because of their influence on the future of the breed. At the sale of DSLAY's herd, DSLAY bought, among other cows and heifers, Lucy and Rose.
he may note that the famous Orange Blossoms of Littyton descended from this cow. At the same sale, he also purchased the bull Champion, of SCOTTISH blood. At ANTH's sale, he bought the cow Lady Smith to which the first dry herd very largely owed its character and success. Ten years after, due probably to financial troubles, he sold all of his herd, with the exception of one cow Magnet, and two young bulls.

But, very shortly after, he started building another herd. Most authorities are of the opinion that his second herd was not so good as the one he disposed of. Nevertheless, among his second herd were cows and bulls that influenced the development of the Scotch Shorthorn to a good extent.

To mention Mary Ann of which Miss Bruce says "is perhaps the most remarkable cow on record, no fewer than nine well-known families tracing to her".

At the dispersion of this herd, MR. MAY & MR. MILLADEN were purchasing.

MR. Y of Caithin deserves mention of possessing the first herd of Shorthorns in Aberdeenshire. His herd was built up on a dry foundation, but, later, on, he introduced "WEMY" blood, and later/
later still, bred blood. I've bred some good families of which space does not permit to account. It is enough to note that the development of both the pure-breds and feeding-crosses of Aberdeenshire, was indebted to the Shetland sales of bull-calves. This Shetland herd marks a starting-point in the revolution of Aberdeenshire farming, that led to the evolution of the Scotch type.

(View Megal 61 IMPRINT. (1837-1889)

14. CHICHESTER type of Shorthorn.

"By the determined devotion [Rev. Bruce] of a lifetime, CHICHESTER shifted the centre of the Shorthorn world from Teesdale to Aberdeenshire. HILL, BURGH, and his contemporaries kept it there."

CHICHESTER appeared upon the scene of action with a definite object to achieve. He was after a new type of cattle. Shorthorns with pedigrees, the fashion and craze of the time, did not mean much to him. Cattle with beautiful appearance never carried him off his feet. He looked for utility, for animals that would pay and be profitable to raise.

His idea of such an animal was a good

MAGIK
middle on initiative of stock feeding capacity. A
breed full shown: well-arched and deep rib, hide
and broad back. These points in the beast were his
all-in-all. A weak middle was to him a fatal
fault. He almost turned every stone in England,
Scotland, and Ireland, in search of foundation stock
to serve his purpose. He obtained his cattle from
different sources, greater attention being paid to
the selection of bulls, while the Cityton herd
was developing, it had the service of a good few dis-
tinguished sires and show bulls.

But, naturally, such a herd would not be
uniform in characters, so that, to obviate this
fault, Mr. CROSSWHITE had to alter his system of
breeding. He had a home-bred bull, Triumph of
England, which approached CROSSWHITE's ideal of
the kind of animal he wanted. So, therefore, made
use of this bull, and its male offspring, in a sys-
tem of inbreeding leading to the concentration of
that bull's blood. And the result was a marvellous
progress of the herd towards uniformity. Ever after
this, all his stock bulls were home-bred, and the
principal ones were the offspring of the "Champion."
The writer will refer to them below.

Among his purchased bulls that proved
good/
good breeders were Lord Egley, Lord Jackville, Lord Bathurst, and Plantagenet. Now, cows carrying the blood of these, Lord Egley being the most important, when crossed with Champion of England, gave birth to bulls that were very largely responsible for bringing Dittyton herd to its eminence. One after another of the progeny of Champion of England, whether males or females, grew up to satisfy GUILY-SHARE'S ideal. "Dales might be filled," says WILLIAMS, "with the names, pedigrees, and performances of his descendants in the showyards and breeding-pens of Britain and America. Champion of England himself, the greatest stock-bull the breed has ever known, was a roan bull, sired by Lancaster Comet, and his dam was Virtue by Plantagenet, both sire and dam tracing back to BOTHIE blood.

In the system of concentrating his blood, these bulls were used on the Lord:-

CHAMPION OF ENGLAND.

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<td>Cumberland.</td>
<td>Baron, Violet.</td>
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<td>Condolier.</td>
<td>Commodore.</td>
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Here are a few of his families—

(1) The Vioclets, of which the famous prize-winners
Village Rose was the best cow;

(2) The Butterflies, a prolific family, distinguished
by good strong backs and loins, and well-sprung ribs;

(3) The Orange Blossoms, a very good family spread
here and in America. Orange Blossom eldest
was the dam of the great sire William of
Orange (53624), Queen of the South, one of
that family, was one of the best cows in
Scotland in her day.

(4) The Hirusius family, though not numerous, were
thickly fleshed and of that typical blocky
conformation.

(5) The Ladya, were noted for being the very per¬
fection of symmetry.

(6) The Victorian, numbers of which carried to
America counted among the very best ever im¬
ported there.

The BUICKSHORN blood widely spread in
this country and abroad to meet the demand of breedERS who fully recognized the usefulness of the type.
It was estimated [Sonders] that the number of cattle
sold from Sittyton, for breeding purposes, reached,
by the closing sale in 1889, 1912 animals.

At that closing sale CRUGSTOCKEN'S

herd consisted of 156 beasts, and they were secured
by T. BOW - 2500, of Liverpool, for exportation to
the Argentine. Fortunately enough for this country,
the deal was not concluded, and the herd passed to
MR. LIDDELL & MR. MILLAR.

THIRD STAGE OF IMPROVEMENT. (1887) 

The public taste for smaller cuts of
beef created a new type, or rather a smaller mixed
animal of the CRUGSTOCKEN type. This was not a
sharp change by any means, and the progeny of
Champion of England - Lord Inglen - have been and
are still, all the enthusiasm of breeders. When
CRUGSTOCKEN gave up breeding, due to ill health and
age, his "monile", as it were, fell on the shoul-
der of WILLIAM LIDDELL of Collynie, Duthie, the
King of the Shorthorn - so-called, until his death
in 1923, maintained the high reputation of the
Scottish Shorthorn, and his influence is far-reaching
on both sides of the Atlantic. Most of the present-
day blood of Shorthorns has flown from Collynie and
Uppermill, it is therefore necessary to mention
some/
some of the families of both herds:

- Of the Collynie herd: the Collynie Princesses, the Collynie Clipperts, the Collynie Josephines, and the Estelles.
- Of the Uppermill herd: the Hellenes, the Jessies, the Clares, the Royal Ladys (in Canada), and the Missies (in Canada).

**THE DAIRY SHORTHORN.**

Long before the time of the great pioneers of Shorthorn improvement, the originators of the breed were extolled for their milking capacities. Reference was made, when dealing with the origin of the breed, to the classical quotation of William Ellis. Then, when the master-improvers undertook the re-modelling and re-shaping constructive operations, of which the modern breed is the outcome, milking qualities were not neglected. Even in the herds of the 50th, where flesh was of prime consideration, there were some heavy milking cows. We have studied Ellis and his cattle of whose milking records he used to boast. Further, and at a later stage in the development of the breed, although having in view nothing else but the production of the beef type, Cruickshank had a family, the Secrets, that were noted as good milkers. Other herds were progressing.
progressing likewise. Thus, the Shorthorn breed was not, from beginning to end, deficient in milking powers, and, though the Dairy Shorthorn Association was not formed till 1905, the Dairy Shorthorn is not of recent discovery or recent creation.

The Association have it in view "to do their best to sustain and popularise the Shorthorn for dairy purposes. To use their own definition, "An animal which would yield a large amount of milk, and which was capable at the same time of carrying flesh." Thus, fundamentally, the Dairy Shorthorn is a dual-purpose type.

There are at present some good herds of Dairy Shorthorns, while others are in the making. But the type very widely and markedly differs from the Scotch Shorthorn in its development. No close inbreeding was used in its evolution. Dr. Pizzey and Mr. E.G.T. state that, on the average, this type does not differ, as shown by the inbreeding coefficients, from the entire British Shorthorn breed.

The British Dairy Shorthorns are, therefore, a group selected for dairy qualities from such diverse blood lines as to be equivalent to a random selection from the Shorthorn breed as regards degree of inbreeding, relationship to Champion of England and Favourite."
Favourite, and relationship inter se."

This section of the breed is eligible to registration in "Cattle" hard-book.

The Association keeps milking records which, no doubt, will be a great help in selection for the future improvement of the yield.

**THE LINCOLNSHIRE RED SHORTHORN.**

This is a local variety perhaps as old as the shorthorn breed itself. The original cattle of Lincolnshire were of enormous size and very slow to mature. Almost nothing is known of their improvement in the early stage, except that three bulls were bought for the purpose from the Ketton sale in 1810. Probably, also, other bulls were hired from other noted herds. But in the latter part of the eighteenth century, **MRS. TUNBILL, NOSBY,** was recognised to be the one improver who influenced this type and brought them to their present condition. His herd was described by the famous **MRS. YOUNG,** in 1799, as not surpassed by any in the county for points highly valuable, or their disposition at any age to fatten rapidly."

"Nothing is known of the old methods of breeding/"
breeding; but the improvements he effected are far-reaching. These improvements can be summed up thus:

(a) medium size;
(b) deep cherry red colour, the characteristic feature of these cattle at the present day;
(c) early maturity;
(d) development of the prime joints of beef.

In the earlier part of the nineteenth century GORDON, BRIGHT, OLIV... and G. F. WIGHT held the high standard of the cattle. Their herds were all influenced by COUNCIL'S blood. In later generations the BRIGHTS and the BRIGHTS maintained the character and excellence of the type.

The Lincolnshire Red Shorthorn Association was formed in 1895 to look after the interests of the breed and to keep a bull-register. The first volume was published in the same year. Only a limited number of these cattle are eligible for registration in COUNCIL's head-book, and these are the cattle that only fulfil the requirements for such registration.

This variety of the breed is rapidly developing into one of the best milking strains in England.
This variety of the breed originated in Ohio, U.S.A., about 1877. It has been argued that the Calloway out-crossing of CH. HARRIE COLLING is responsible for the appearance of these polled cattle. The variety has been cultivated in its country of origin, and other states, in view of the advantage of the absence of horns. There are two distinct types of this variety:

(a) Double Standard, descended from the COLLING'S alloy strain.

(b) Single Standard, bred by crossing Shorthorn bulls on native muley cows until they are now pure by these crossings.

REGISTRATION.

Registration of pedigrees is by no means a point of little importance in the work of improvement. To breed from the best is the best practice any breeder can do. JOSEPH HITCH (see previous) proved to be a far-sighted character when he persuaded COTTUS to issue his herd book. As the Short-horn breed spread in several countries, registers have/
have been kept for the purpose in all of them. The first volume of \textit{Culling's} herd book was issued in Otley in 1822. In this open register "no bull is eligible for insertion unless it has five crosses, and no cow unless it has four crosses of Shorthorn blood, which are, or are eligible to be, inserted in the herd book." We need not follow the conditions of insertion in other countries.

\textbf{FASHION IN HIS BLOOD.}

Throughout the history of Shorthorns, fashion has been a powerful factor, and may be summarised to have assumed four aspects:-

(1) About, and during the period of the \textit{Culling's}, a big size was the fashion.

(2) This stage passed, the fashion of the next period was the possession of pedigree animals from \textit{Culling's} breeding.

(3) This, later still, assumed another character, and the leading fashion was the possession of pedigree animals of certain blood; e.g. \textit{Bos\textsuperscript{III} or \textsuperscript{II.2}} cattle. This dominated a very long time on both sides of the Atlantic, reaching madness at times, to which the ever-memorable /
ever-memorable New York hills Sales of Duchesses bear evidence.

(4) The fashion in colour in the early history of the breed red-and-white cattle were popular. Later on, roses became very popular, and whites were discriminated against. At the beginning of this century reds were the craze in America, and whites were strongly out of favour. Nowadays white is not discriminated against either here or in America. At present the popularity of colour is dark uniform roans, reds, and whites, in order of succession.

Fortunately fashion did not affect the Shorthorn breed in any injurious way. Still there is a place for the remark that the pursuance of fashion should not be overdone to the neglect of individual animals of merit.

THE GROWTH OF THE BREED IN AMERICA.

A Supplementary note:
It is not surprising, in view of the many relations between this country and America, that cattle were imported into the latter even at earlier dates than records can tell. That these importations took/
took any important character did not occur till the
termination of the Independence war, when peace and
security reigned over the country, and people got
busy in revolutionising their agriculture. The first
direct importations from England were made by F.B.
LEWIS SANDERS of Kentucky, in 1817; hence the de-
cendants of these cattle have been designated 'the
Seventeens' to the present time. But they went out
of grace, later on, when the fashion was calling for
B. XII and B.X.1 cattle. Then followed other ship-
ments of cattle to other enterprising breeders and
to the Ohio Company to graze the rich virgin valleys
in Ohio and Kentucky, and soon in the district the
Shorthorn acquired favour and established itself.
To farmers of this district the hoof of 'the red,
white and roan, was indeed golden', says SANDERS,
"and to this day no other type of cattle has found
equal favour among those enjoying the fruits of the
Shorthorn's peaceful invasion of the ancestral acres.
"The historic visit of R. NICK and his confrères to
England, in 1834, had far-reaching effects upon the
future of Shorthorn breeding in America. They visit-
ed almost every herd of fane at the time, and returned
home with a consignment of cattle among which were
four of the offspring of RATES' Belvedere, and two
heifers/
Heifers, rose of Sharon and Young Mary, both gave rise to families of Shorthorns which are at the present day among the most numerous to be found in the leading Shorthorn breeding States.

With the success of the Kentucky breeders, Tennessee began to follow example and importations became rife for this State.

Meantime, large consignments of cattle were sent from England to the Eastern states, especially New York and Pennsylvania. In connection with these transactions John Miller was the most conspicuous figure.

From 1836-1850 importations ceased, and the industry was much depressed in America. But soon after 1850 the clouds cleared up, prosperity was beginning to rule, and activity in the Shorthorn breed was resumed. Other importations on behalf of Kentucky, Ohio, and New York took place, and the breed spread far to the West, into Indiana, Illinois and other states.

The need for an American herd book was felt when the breed became established and spread far and near. Dr. Allen issued his first volume in 1846, then his second volume in 1855. This second volume appeared with about three thousand pedigrees.
In 1863 the book was purchased by the American Shorthorn Breeders Association.

General attention was drawn to the breed about 1865 through the wonderful and effective medium of the Showyard. The result of the campaign was very satisfactory as it spread the reputation of the cattle in the whole country, and gave the breed a firm footing that made the interests of the breed in America a national business. Volumes could be filled with famous herds and show prize-winners, but it is impossible here even to mention some names. About 1870 hundreds of herds were at the height of fame, and hundreds still were in the formation. The breed was extending everywhere from the Atlantic to the Pacific Coast, and even exportations were made to England, the home of the breed. The leading herds of the time carried BALFOUR and BOURCH blood. Even the disappointing fate of the "wonders" of New York stills sale did not shake the unswerving purpose of those mighty American breeders. They had faith in the Shorthorn, the Duchesses misfortune quickly passed from memories, and the tide ran its course. Interest became keener and keener as the years passed along. But other elements pushed themselves to the front, for not only enthusiastic breeders were at the job, but also speculators and fanciers became dominant/
dominant in the affairs of the breed. Prices rose to an impossible height. But it was only natural that the reaction would set in, and about 1870 some American breeders relieved that tension by indulging in Herefords and Black Polls. These were critical days for the Shorthorns in America, and it looked as if the breed was losing its grip on the country under the rivalry of the newly-mentioned breeds. But this was not destined. The star of the Shorthorn soon rose high in the "eighties" with the introduction of the Scotch type.
literature on the origin of this breed is by no means inadequate. Since the early part of the seventeenth century, the agricultural historian has had something to say to throw light upon that point, but, unfortunately, much confusion arises from the unreliability of most of the early records that we have in hand. Contradictory and conflicting theories are met with here and there regarding the origin of these cattle, so much so that we must consider some of the early statements as representing an individual opinion, more than depicting an element of truth.

In 1768 MARSHALL wrote that the cattle of Devonshire, Sussex and Herefordshire had a common origin, and that variation in their types arose from variation in the type of soil, etc. But he contradicts himself again in saying that Herefords were the first breed in this country.

KNIGHT (1790) adjoins the view that the importation/
importation of white-faced cattle from Flanders is largely responsible for the evolution of this breed.

CHARLES CULLEY (1794) said - "As to the Herefordshire brown cattle, they are, I am pretty clear, neither more nor less than a mixture between the Welsh and a bastard race of long-horns that are everywhere to be met with in Cheshire, Shropshire, etc."

There are many other statements on the subject that we do not need to go into here. It is, then, evident that a combing of the literature cannot give any precise information regarding the early history of the Hereford. The prevailing theory is, that the breed originated by an amalgamation of the blood of Welsh, Flemish and that of the indigenous cattle of Herefordshire.

The foundation stock, noted as excellent grazers, would fatten quickly even on/
on poor pastures, and that their beef was 'marbled' and of the finest quality, notwithstanding the fact that they were usually worked in the field between the ages of three and six or seven, as a rule, before they were put to fatten. The cattle were not noted for the quantity or quality of their milk, thus establishing themselves as a breed that was ultimately to develop entirely for beef production.

The bulk of evidence is in favour of the view that these cattle were red or brown, some light and others dark, but self-coloured. However towards the end of the eighteenth century white, mottled, and grey faces made their appearance. This white colour seems to be due to the infusion of the Flemish and Welsh blood in the breed; but there are also many records to show that white-faced cattle sprang as a mutation in self-coloured herds. Whether the one or the other, or all these factors combined to work out the white face of the Hereford cannot be ascertained; but we can note that no considerable attention or importance was given to colour by the early breeders of these cattle. Certainly these face colours were preferred to self-colours which soon disappeared. But no one colour of the face, at that/
that time, stood in preference to another. Breeders of the time were engaged with something else of more importance. The conditions prevailing called for cattle of big size and scale for farm work, and beef and grazing quality came next in consideration.

PERIOD OF FORMATION.

In 1799 the first Smithfield Fat Stock show was held. Herefords made an impressive appearance, competing against other breeds, and the first prize was awarded to a bullock shown by MR. VOGT JR. Another prize went to a bullock shown by the DUKE of HEDFORD, which was classed as "the best ox fattened with grass and hay only, in the shortest time from yoke." There is no doubt that the Smithfield Show did much for directing outside attention to Herefords as beef animals, which until then were only of local importance. As much was also done by the local shows of the Herefordshire Agricultural Society, the first of which shows was held about the same date as the Smithfield Show. The usefulness of the breed for beef, apart from its value in farm operations, became more and more manifest, so much so that the Herefordshire Society mentioned recognised the/
the fact and had it as an object "to carry the breed of cattle and sheep as to fleece and carcase to the greatest point of perfection".

Almost next to nothing is handed down to us about the methods used by the early breeders and founders of the breed.

That they might have copied RAYTHELL and his school, who stirred the country with their achievements, seems to be more than likely. At any rate, it is certain that the method followed by BENJAMIN TOWINS, junior, was one of blood concentration. His father and grandfather were noted breeders of Herefords in their time. That the grandfather, Richard, in a will made in 1720 bequeathed to his son Benjamin the Silver cow, and to his son Richard the oxen Spark and Merchant, is evidence that he was possessed of a good herd, in the breeding of which he took much interest. His son Benjamin, senior, 1714-1739, was one of the early breeders who paid as much consideration in breeding for the butcher as for the plough. His cattle are believed to have been chiefly reds and browns with mottled faces. MACDONALD and SINCLAIR state that by 1760 he and his friend WILLIAMS each possessed a herd of noted cattle, "the result of years of thought and labour. They,"
They seem to have bred from each other's stock, and it is understood that, conjointly and separately, they made excursions to different parts of England in search of blood to improve them."

There were many other contemporary breeders of whom we may mention such as TULLY who bred for the white face and S.McKES' whose herd were light red in colour with occasional markings in the face. The stock of INYCOU were very dark red with little white. Of these breeders' work we have no information, but we can note the wide range of colour in their herds, each had been breeding his own type; and the breed, as it stood then, was far from uniform.

FIRST STAGE OF IMPROVEMENT. (1789-1856)

We have seen how BENJAMIN TOLKIN, senior, had built his herd from those cattle left to him by his father, and those he used to purchase here and there.

His son BENJAMIN, junior, carried the work after him, and it was stated before that his system of breeding was one of blood concentration. He worked upon a mixed foundation, having in view to /
to obtain form and flesh. The result of his efforts was the establishment of three families - the Silvers (descended from the Silver Cow), the Pigeons, and the Nettles. The Pigeons were grey-faced, and the names of the other two families are suggestive of their face colours. The most prepotent bulls that were used in this system of in-and-in breeding, were the Silver Bull, a red with a white face and a little white on the back. Wellington is another, and he was dark red with a mottled face and chest, and was said to be the best stock sire ever used in the herd. Sam was a very good bull too, he and his son Ben, and his grandson Izard did much in the herd. In 1886 TOMKINS held a sale of about fifty animals which were at the time "allowed by competent judges to be equal if not superior to most in the kingdom". After his death in 1815, the herd was inherited by his daughters. They held a sale in 1819 realising an average of £150, which is clear evidence of the high estimation of the blood at the time. Finally, the herd was dispersed in 1854, after being all along the most popular supply of good blood to many breeders of Herefords.

...TOMKINS, junior, has been denied by/
by many a writer on the subject, the pride of place
of the "founder of the modern Herefords". Of the work
of those breeders who preceded him, we know nothing.
And even of the detail of his work we are left groping
in the dark. But it is fair to credit him with
being the first on record to apply DUMAS'S methods
to Hereford cattle.

He did much to improve the quality of
the breed, and through his sales and the final disper-
sion of his herd, his blood became well disseminated
in most herds of the early part of the nineteenth cen-
tury. And if we cannot, for lack of information, give
him with certainty the place of the COLLINGO, he does
not occupy a place less than that of DOW or M.Al.
in the history of the sister-breed.

By the year 1871, when the COLLINGO
herd had made more than a local reputation for itself,
JOHN F. ISC. of Worcestershire, made his first pur-
chase. He built his herd exclusively on TETZLAF
foundation, and followed his system of inbreeding on
his own stock. Like DUMAS, he also disregarded
colour, and is credited with keeping careful records
of his stock. He even improved on the TETZLAF type,
which were said to be very wide over the hips and nar-
row on the shoulders. HIS efforts and sound
judgment resulted in getting his cattle "much wider on
the/
the chine, wit. less gaudy hips". Many herds of
that time owe their origin and foundation to "HEF stock.

The BEAFS of Gloucestershire were
famous breeders of Herefords too, and certainly did
a great deal to improve the cattle. Their influ-
ence on the future of the breed became of great mag-
nitude later on, for JOHN HAM junior, was the
first breeder who held that the white face colour
should be fixed as a breed character. Scale, sub-
stance, and quality, were the characteristics of
the "HEF cattle. With the exception of one fami-
ly, all the stock were white-faced, and their blood
eventually became effective in bringing that face
colour to the front.

JOHN HAM junior, carried out the good
work until his death in 1873. The scene of his ac-
tion shifted from Gloucestershire to Lancashire
and Cheshire, thus carrying from one place to an-
other the work that must have been instructive to
breeders, and the blood upon which many of them have
been drawing. . The system he followed was essen-
tially inbreeding, and it crowned his efforts with
many good families and grand bulls. Silver (546)
and his sons and their progeny were good sires in
the herd. Old Sovereign was even of more importance,
and, himself inbred, sired more prize cattle at Smithfield and other shows, than any other bull that lived in his day. To show how much the WELF strain was in demand, it is enough to state that as many as thirty-five bulls went out to hire in a single year, many of them fetching from £100 to £200 for the season.

THEREIS J.W.H. was another of those leading breeders and early improvers, and, till his death in 1844, he produced many fine beasts and prize winners. The bull Octomore was first in the class of aged bulls at the Royal in Oxford in 1839. Governess was a celebrated cow, and the dam of good stock.

Like J.W.H., J.M.G. is credited with "turning the tide of battle on colour marking from the mottle to the white face".

And these were not all who were at work. Many other breeders of the time join in the honour of creating, and preparing the way for the evolution of the modern Herefords. Among these, in passing, we may mention the names of Y.M., M.R.I. and T.R.A.

Now Herefords were making steady progress. Their career at the Showyard was magnificent, and graziers were enthusiastically keen on them. But re-
records were scarcely kept, and pedigrees were only known to their originators. It happened then, that a certain breeder went to Herefordshire in search of good blood, thus collecting private information for his own use, others interested in the breed persuaded him to publish the information he had gathered. Thus Dr. L.M.S., of Bonnerville, published the first volume of the Herd Book in 1445, after much trouble in collecting the necessary information here and there. He had to face the doubts of many as to the use of such a work, while others were reluctant to give away what they held as secret. But by far the worst trouble he had to deal with was that breeders of a certain face colour objected to, and resented the registration of other stock with their own. For it had happened that breeders of Herefords separated into factions, each holding that their cattle were the superior type.

However, a compromise was reached by the registration of each group of cattle in a separate section. And thus the book appeared in July of that year, with the names and pedigrees of 551 animals, all bulls, arranged in four sections.
in order of precedence, the sattled, the white, the
crews and the light grey-faced animals. Six years
after, the second volume appeared. In 1931, pub-
lished the first part of the third volume. In
1878, carried the work after him, until in 1878,
the Herd Book Society was formed for the purpose, and
to look after the interests of the breed.

But the colour controversy affected the
work of improvement, or progress of the breed, is not
the case. It only represented a phase of enthusiasm
for one type or the other. But interest in the breed
was keen, and the Herefords were making fast progress.
As a point of fact, by the time Dr. issued
the third volume of the Herd Book in 1878, that con-
troversy had not only died out, but the work of fix-
ing the white face, was going on with great zeal and
energy. This is apparent from the fact that all the
animals that appeared in this third volume were turn-
ed out as red with white faces, except for a few sat-
tled. Other colours had almost completely disappear-
ed by 1878, so that the writer will make this date
the close of the first stage of improvement.

But the controversy on colour had handicap-
ped the extension of the breed outside its borders.
Before 1835 Herefords were well established in fif-
teen/
fifteen English and Welsh counties, and a good few went abroad. But the partiality to colour, while it lasted, was the cause of "alienating the support of agriculturists who would have helped to distribute the Herefords in other counties." Much of the work of improvement by that date mentioned was done in the home of the breed and the adjoining counties.

To sum up the improvements done in this early stage that opened with the good work of HAWKSHIRE TOLLING junior, and closed in 1858, size, scale, and substance were of the first importance, considerable attention was also given to the flesh-making capacity of the animals. At the beginning of the stage no regard was paid to colour, then the mottled faces became favourites to many breeders, but the white face was rapidly pushing on and became the one colour bred and selected for; thus, about the close of the period, all other colours were completely disappearing, and the breed was gaining uniformity in colour.

THE SECOND STAGE of IMPROVEMENT (1858 - 1899)

In this stage marked and important improvements were effected, completing the uniformity in colour, in producing better fleshed animals, earlier to/
to mature, moulding the breed into one homogeneous unit. But still in this stage size and scale were held of first importance.

To record the achievements of this period is to tell the story of great men, and to dwell upon the wonderful power of inbreeding. This was the period of propotent stock-sires and their performances at the Shows, and in the breeding-pens. To these bulls, factors in bringing the breed to the height of its eminence, we must direct our attention.

The first of these great bulls, Sir David (349), was born on MR DAVID WILLIAM'S farm, Newton, in 1845. The sire was Chance, and the dam Duchess the daughter of the sire. Sir David was not only a great prize-winner, but also "the terror of all adversaries of all breeds at shows great and small, national and local; and after his death he lived again in his sons and their sons, such as Sir Benjamin, Sir Thomas, Sir Roger and Lord Milton, factors every one in bringing the breed to its highest perfection". It is really very interesting to note that this bull of Hereford bulls was the result of a chance mating, his sire breaking from his box and serving his own daughter Duchess the second. And to show how far-reaching and deep his influence was on the future of the breed, it is enough/
enough to record that SIR DAVID served as a stock-
bull in the herds of CAPE WATSON, EDWARD MURCH,
TURNER, HIGGINS, and JAMES MURCH, all leading
breeders and improvers of the time. It is not going
too far, in the writer's opinion, to designate
SIR DAVID as the father of modern Herefords.

THOMAS, another eminent breeder,
inhaerited a splendid herd from his father, and he
was making additions to it now and then. But the
most valuable addition he made was the great bull
SIR BENJAMIN, son of SIR DAVID. SIR BENJAMIN followed
in his sire's footsteps, and no doubt, he was the
most prepotent sire of his day leaving an indelible
mark upon the breed. The most celebrated cow--queen
of the Lilies was a daughter of his, and she was a
champion at the Royal Show in 1869. She was the dam
of many good show animals and stock-bulls, to mention
of these King of the Lilies and his son HELIANTHUS.
SIR BENJAMIN also sired some good impressive bulls,
among which SIR RICHARD, SIR OLIVER the Second, and
SIR THOMAS were outstanding, and had a conspicuous
career. Of the progeny of SIR BENJAMIN, CAWTE says
that "they became the sensation of their day, and at
the Worcester Royal of 1863 they came to the front
with a rush, taking four firsts and three second
prizes".

The/
The blood of Sir David and Sir Benjamin became the fashion of the time, and surely that blood found its way to almost every herd of importance. They, and their offspring, were characterised by big size, scale, quality, and every one of them a red with a white face.

BENJAMIN ROGER was the breeder of Sir Benjamin which he sold at an early age to H.A., as previously mentioned. But Sir Benjamin had sired, in ROGER's herd the bull Bolingbroke. MR ROGER impressed by Sir Benjamin's career, bought his two sons Sir Richard and Sir Thomas, the latter being in the opinion of most authorities the best of Sir Benjamin's sons. Sir Thomas was described as having a noble good masculine head, robust constitution, great length, strong loins, deep and level hind-quarters, and of a placid and gentle disposition.

Sir Thomas sired in ROGER's herd the cow Blossom the dam of the great and impressive breeding bull Grove the Third. This bull after fairly flooding the great show yards of England with his mellow rich-fleshed progeny, was bought for importation to America.

The system used by the breeders of this stage of improvement was the concentration of the blood of these great stock-bulls by in-and-in breeding. The following pedigree is one among hundreds that/
that clearly illustrate this system:

Grove the Third + Daisy

Charity 4th. (bull)

Grove the Third's dam, Blossom, was by Sir Thomas, and the cow Daisy was a daughter of Sir Thomas too.

Another great and important sire was Horace whose blood was highly esteemed, and whose son Grove the Third carried on the good work after him. Horace carried the blood of Tembridge, a son of Sir David. In the hands of such a devoted breeder as JOHN PRICE of the Court House, Horace made his reputation "by his stock carrying all before them both at the fat stock and breeding shows. At the Bath and West of England show in 1876, ten of Horace's sons and daughters won prizes and honourable mention".

One of the most marvellous, perfect, and renowned breed-builders of her day was the cow Leonora, bred by THOMAS EDWARDS of Wintercote. She had an admirable career at the show-yard, winning first at the Royals in 1870, 1874 and 1875, and the championship at the Smithfield Shows. Of her SANDERS says "With the production of this great cow the breed may indeed be said to have burst into full flower."
The cumulative result of a century of devotion to the evolution of a heavy flesh-carrying type was in her exemplified in startling fashion.

**RECENT IMPROVEMENTS (1889 - )**

By 1869 the present-day Hereford may be said to have come to the front. Change in the type of cattle to be bred had made itself manifest; and no longer size or scale was the dominating factor, so characteristic of the preceding stage of improvement. Quality, symmetry and compactness of the body, with a low to the ground smaller size of animal have become distinctive of the new type of Herefords, and other beef animal, much in demand by the breeder, grazier and butcher to conform with public taste of smaller joints of beef. This has been accentuated by the call for "baby beef".

In this direction the progeny of the great sires Sir Thomas and Grove the Third were the most prominent factors. In connection with these latter-day improvements of the breed, the names of **CARWARDINE, WILLIAM WILLIAMSON** and **PITFORD**, among many others of the rank and file of breeders, have made an everlasting fame.

It was at Stocktonbury, **. A. B. H. D. B. .** farm, that/
that the great impressive sires Lord Wilton and Anxiety, which contributed a great deal in revolutionising the type of Hereford, left their indelible mark.

The herd of "CARWAVEL" was formed in 1863, when he purchased some daughters of Sir Thomas, and to which he added some refined pedigree cows and heifers in later years.

It was on this farm that Anxiety (5168) was born. This stock-getter and his pedigree did much to improve and refine the type, especially in the hindquarters, on both sides of the Atlantic.

Another sire of no less importance was Lord Wilton who, at Newport Show, in 1881, won first and champion against all breeds and ages, and repeated the same honour the following year. Lord Wilton had really a far-reaching influence upon the development of the breed at home and in America. On both sides of his parents he carried the impressive blood of Sir Thomas. Lord Wilton's progeny were paid high tribute in the Breeders Gazette, 1900. "The remarkable uniformity of his produce, especially with regard to their heads and eyes and general character, drew much attention to his merits as a sire, and as his stock continued to be pushed forward at all the breeding shows, CR "CARWAVEL"'s herd and its constant/
constant successes became the chief subject of conversation in the Hereford world, both at home and abroad.

Lord Wilton was dropped on LR TUDSE'S farm in a herd that had made a reputation as next to none.

We now turn to LR TURNER'S farm where that splendid sire Grove the Third had a noble career. Grove the Third was calved about the end of 1874. JOHN HILL, a leading breeder and judge, described him thus: "The bull is a true male - had extraordinary mellowness of skin and flesh of the best kind and quality for a stock sire".

TUDSE'S name will always be linked to that of the fine bull and stock sire Sir Oliver the Second, son of Sir Thomas.

We mentioned TUDSE in connection with Lord Wilton. He was a breeder of first class Herefords. Of his breeding such animals as Lord Wilton, Rosebud, the celebrated cow Roseleaf, the grand bull Good Boy and Rob Roy, all were show-yard winners and good stock-getters at the beginning of this century.

TAYLOR was another keen breeder and improver, and of his cattle the bull Maidstone deserves good mention. Maidstone won successively six first prizes at the Royals between 1884 and 1889.
It is almost impossible to say even a passing word about the rest of breeders and their cattle, but the honour of improvement responsible for the high place the breed occupies to-day, has been shared by a long roll of strong personalities.


cold Herefords

Those evolved in America from pure-bred Hereford Herds. CARRIE COTTON in 1901 started collecting and breeding a herd of these bulls. As the type is very useful on the ranch country, a Herd Book society was organised and issued their first volume in 1913, containing over 4,000 pedigrees.

The Inbred Abroad.

The inherent properties of Herefords have rendered them indispensable to breeders and feeders of first class beef cattle all the world over. The great usefulness of the breed has, for a very long time, been a well-established fact.

Beef of prime quality, early maturity, thriving on even hard keep, indifference to climatic conditions, hardiness, adaptability to extremes of cold or heat, economy in feeding and fattening, and resistance/
resistance to tuberculosis, have all been factors in spreading the Herefords in every corner of the universe where man turns grass into beef.

For well over a century, Herefords found their way to the United States of America, the stronghold of the Shorthorn. That they proved successful is evident from the fact that they are now next in number, in that country, to the sister-breed.

They predominate solely in the Great West. In the United States, as well as in other countries, they have been found the most successful animals under the "range" conditions. In Canada, the United States, The Argentine, Brazil, South and East Africa wherever the conditions have been too poor for the Shorthorn, the Hereford has not only gone to stay, but also "to have it all his own way." It has been so successful in Brazil that in 1916 the Government of that country decided to encourage and favour it.

Similar successes have been met with in Australia and New Zealand too.

The Hereford Book.

An account was given in previous pages of the/
the history of the English Herd Book. This registry is a closed one, the book being only open to the progeny of those animals registered in it till 1886.

FASHION AND MAN BRED.

Although, at their time, Tomkina's, Newer's Sir David's, Sir Benjamin's etc., blood was the fashion of the Hereford breeding world, we note that colour has been the most conspicuous aspect of fashion. In tracing the improvement of the breed in its three developmental stages, we have seen that Bottles were much in favour till about the middle of the nineteenth century; thereafter the White Faces have enjoyed the pride of place till the present day. Colour is now fixed as follows: red either of light medium or dark shade, the medium is much in preference; the face usually including the ears and throat the under-side of the neck, the dew-lap, the brisket more or less of the under-line, a clear-cut strip from about the middle of the neck to the top of the shoulders, the legs and the switch of the tail, must be white.

Fashion with regard to Herefords has been a happy element in working out and maintaining the striking uniformity of the breed.
PAPER IV.

ON the EVOLUTION and IMPROVEMENT of the AMERICAN ANGUS BRED OF CATTLE.

INTRODUCTORY NOTE.

This valuable breed occupies the first place among beef cattle, and justly so, in view of its many qualities which highly commend it, and its crosses, to the breeder, the feeder, and the public taste.

Its blocky low-to-the-ground form, a typical beef conformation, and its perfect 'rounded' symmetry, with absence of patchiness, are proverbial.

Its early maturity combined with unexcelled feeding-capacity, makes the breed of particularly great value for producing the world-famous "Blue Greys".

Its heavy weight in proportion to its size its high killing-percentage, have awarded to the breed the championship of carcass competitions at home and abroad.

The quality, texture and marbling character of its beef are, beyond doubt, the best.

The/
The success of the breed under arable and semi-arable conditions, due to its admirable response to intensive feeding, has established the breed here, in Ireland, in the Americas, in Australia, and in many other parts of the world. The breed is even claimed to be doing very well in the "range and ranch" countries.

With the exception of some strains, the milk yield of the breed is not high, but rather very good for a beef animal, both in quantity and quality.

**ORIGIN of the BREED.**

The bulk of evidence tends to consider that the breed had its descent from the wild indigenous cattle that were roaming all over Caledonia, at one time, and eventually came to settle here and there, whence differences in type made their appearance as the result of natural agencies, like soil, climate, the nature of the grass, etc.

It is held by most authorities that in the remote past, the Scottish breeds were one and the same type.

**FOUNDATIONAL STOCK.**

Similar in almost every respect, there existed/
existed from time immemorial two varieties of cattle indigenous to the districts of Angus and Buchan. They were known in the former as 'Doddies', and in the latter as 'Humbies' - both words meaning 'hornless'.

The appearance of polled varieties among the ancient cattle of Scotland has been a matter on which opinions differ among Zoologists, each attributing it to some factor or another, but all dealing with it as a 'mutation'. With that we are not very much concerned; what is significant to us is, that 'hornless' cattle had been there from time 'out of mind' in the north-eastern counties of Caledonia, which are the headquarters of the Aberdeen Angus today. At least as far back as four hundred years, these cattle were known in these districts, as evinced by the selection and acceptance of JU.X:G of an "unum bovea nignum homnyll", when he came into possession of his father's estate in 1523. The quotation means a "black hornless cow".

The district from which the breed draws its sub-title to-day - Angus - comprises at present the county/
county of Forfarshire and the locality. While
suchan was mainly the appellation of the lowlands of
Aberdeenshire.

With the advent of the eighteenth century,
when the elements of revolution in the agricultural
practice came to press and impose on the bovine race
its rôle in the economy of nature, that is, the pro-
duction of food for man, and not work in the field,
these cattle in question came much into favour with
the farmers of the district for their good qualities.

This event in itself, to which is added
the growth of the Scottish trade with the London fat
market, gave a strong impetus to the breeding, feed-
ing and ± reading of these cattle in their native
quarters, by the end of the eighteenth, and the
early part of the nineteenth centuries. Breeders
of that period used to "decidedly prefer the true
native breed, unmixed, and raised by good keeping,
to the mixture of the Falkland or Fifeshire breed
with that of this county, and consider both these to
be much superior to the English or to any foreign
breed". This is the evidence of one of the most
eminent and earliest breeders on record, GEORGE
WILLIAMSON, of St John's Wells. He further states
the reasons for such preference in saying that these
cattle "are most easily maintained, have flesh of
the finest grain, and pay better in proportion to
the goodness of their keep”.

Begun business in 1770 and for over fifty years patronised these cattle, then known as the “native Lowland breed”. He also did much to impress upon others the soundness of keeping the cattle “unmixed” - that is, pure.

Other noteworthy breeders of the time were the Love of Gordon, James Walker, John Anderson etc. Their practice was to winter the cattle on straw and turnips, and graze them all summer.

The introduction of the turnip crop in Aberdeenshire gave another stimulus to the progress of the breed, if we may call it “breed” then, for farmers realised that it aided them better to fatten their own cattle than to send them down south to be finished for the butcher. This event also marked the dying-out of the horned black cattle, of the Highlands of the district, and so replacing them by the “Polls”.

Summing up, these hornless cattle, the Doddies and the Humbies, were the two branches that gave rise to the Aberdeens Angus breed of to-day, after operations to which we shall refer below.

The colours of these cattle at that period were various - black and white, brown, yellowish red, brindle/
brindle, and occasionally grey and dun. But the greater proportion were black with some white, undefined.

**THE EVOLUTION OF THE**

Apart from crossing with the now-extinct Fifeshire cattle, the earliest attempts towards any formative operations were the introduction of the Galloways and crossing them with the native Humbles. This took place about the close of the eighteenth century, when ... and others conducted these experiments. The results were an increase in the percentage of the polled cattle, and a "slowing-down" of their feeding capacity. This being a disappointing result, the crossing was then evaded.

Next, when the introduction of Shorthorns into Scotland made a deep impression upon native breeders, a good few took to crossing them with these cattle. The result was that Shorthorn blood produced better cattle for the butcher than had hitherto been known, so much so, that such crossing became the craze of the day. Eventually the outcome was also disappointing, as some of the good pure herds/
herds degenerated into animals of varying qualities. Under the influence of the great early pioneers of the breed, this crossing was also abandoned, and it was clearly and convincingly shown that improvement could only be obtained within the breed itself. But, although these crossings were not successful, they brought about the infusion of Fifeshire and Salloway blood to a lesser extent, and of Shorthorn blood to a greater extent. And from the melting-pot came out the plastic material which was shaped in Keillor, Tillyfour, etc., into the breed we have to-day.

**EARLY IMPROVEMENTS (1608 - 1852)**

The first successful improver and champion of the breed was HUGH WATSON of Keillor. Born and brought up in a farming circle, he fostered a love for the Angus Dodies from his early days. At twenty years of age, he gained admission to Keillor farm in 1608 as a tenant, and there he remained till his death.

He began by receiving from his Father "six of his best and blackest cows, along with a bull, as a nucleus for an Angus Dodie herd". However, He was not satisfied with these, and decided to secure by/
by purchase the pick of the Daddies. Thus he obtained ten heifers and a bull from Brechin, the best that appealed to his judgment as exhibiting the greatest characteristics of the breed. This lot were described as "black, brindled, and black with some brown". MTRJ was much addicted to black, and was determined to work the other colours out of fashion.

With these, added to his father’s gift, he took to the task that eventually gave him the place of the Collings in the Shorthorn world. He began his work 28 years after the Collings. Their achievements must have impressed him immensely. In addition, his relations with the Shorthorn pioneers, especially MOUTH and MOUTH, were destined to direct his footsteps in their track. His ideal was an animal the type of "MAJOR AND MINOR" of BOOTH. And thus MOUTH’S type of Angus was very close to the BOTH type of Shorthorn - a beef animal.

Of MOUTH’S breeding methods nothing much is known in any degree of detail. On the whole he employed, for working out his ideal, inbreeding and rigid selection. Combined with these, we may note his good system of feeding and his clever advertisement of his animals by exhibition.

That was exactly his system of inbreeding we know not, and shall never know. All that can be said/
said is that he aimed at breeding certain lines, or families, and kept breeding them within themselves. Here, we may note, was started the family system which, ever since, has become a domineering fashion in the Aberdeen Angus circles.

His show career was really admirable, the number of prizes awarded him in Scotland, England, Ireland and France amounted to five hundred. This not only brought him honour, but also attracted much attention to the new breed he had been showing here and there. He won his first prize at Perth in 1829. One of the heifers he showed there, was, at the request of the Highland and Agricultural Society, sent to Smithfield as an indication of what might be expected from the new breed. There she was shown for some time, and finally fetched the price of fifty pounds.

One cow of his breeding deserves special mention here. This is Old Grannie, or the prime cow which gave birth to many prize-winners, and impressive sires that left their mark on the breed. Among others he also bred the Jock bulls, and the family's favourite and Beauty which also influenced the future of the breed.

His/
His cattle were characterised by size, feeding capacity, fattening tendency, early maturity, and good symmetry. Size was all the cry at that period, before the call of Baby Beef came to force it out.

Watson's death in 1865 ended an ever-memorable career of devotion to the improvement of Boddies, marked by keen judgement and exceptional ability.

Of contemporary breeders Lord Panmure deserves mention. He attempted to amalgamate the Galloway blood in the breed. Disappointed with the result, he directed his attention to amalgamate the two branches of the breed together. Thus the important bull Panmure (51) was born to the Buchan cow Black Meg by the Angus bull Hector. Panmure (51) was placed first in the Aged bulls class at the Highland Show in Dundee. He sired many impressive bulls which left their mark upon the breed, and of which we may name Earl Spencer (24) and Monarch (44). Queen Mother 348, that cow that produced a family so famous in the annals of the breed, traces back to Black Meg, Panmure's dam. The writer will refer to this in a later stage.

And/
And this was not all that LORD PANMURE confined his energies to, important as it was. He rendered a valuable service to the breed by forming the East Forfarshire Farming Association, of which he was President, and which aimed at holding competitions and awarding prizes confined only to the breed. Thus, while HUGH WATSON was giving impetus to the breed through "Exhibition", LORD PANMURE was employing the influence of Societies and keen competition to further the progress of the Polls.

There are many other breeders who might equally share the honours with those mentioned before, but of whom, it is obvious, we cannot deal here.

If HUGH WATSON had been the COLLING of this breed, it was really WILLIAM M'COMBIE who carried the work of improvement on a large scale, and who did everything possible to advertise the breed in other countries. HUGH WATSON gave a start to the breed, but M'COMBIE firmly established it. About 1829 he became a tenant of Tillyfour farm, and took immediately to building up a polled herd to which he devoted his energy and skill until he died in 1830.
M'COMBIE's system was one of intense in-breeding, and rigid selection; and yet he paid no less attention to exhibition too. His career in the showyard has few parallels, a career that was crowned by the awards his cattle obtained in the International Exhibition of Paris, 1878.

M'COMBIE figures as the most eminent pioneer of improvement in the history of the breed. His aim cannot better be described than by his own words. He had "directed his earnest attention to the improvement of the Aberdeen or Angus polled breed, with respect to size, by symmetry, fineness of bone, strength of constitution, and disposition to accumulate fat, sparing no expense in obtaining the finest animals from the purest stocks."

It was M'COMBIE who bred the famous family, "The Queens", in which he concentrated the blood of the bull Panmure (51), to which we referred before. Through this family, which greatly influenced the breed, the blood of Panmure became disseminated in the Aberdeen Angus cattle to that extent of the blood of Favourite (252) in the Shorthorns. Among members of the Queen family, the two cows Charlotte/
Charlotte (203) and her daughter, Pride of Aberdeen (581), were outstanding. "Sufficient proof of their excellence is found in the fact, that these two cows were considered about the best of any breed exhibited at two great International Shows - Charlotte at Paris in 1857, and Pride of Aberdeen at Battersea in 1862". M'CORMAND and McSINLAH say again that "the family of polled cattle in which occur the names of L'IR M'O'CONLIE'S favourite cows, Pride Aberdeen, Charlotte, and Queen Mother, is held in very high esteem by breeders."

We need mention no more about his cattle, except the bull Black Prince whose successive achievements at the showyards was proverbial, so much so that the late Queen Victoria inspected him at Windsor.

The third eminent improver of the breed was SIR JOHN M'COMERSON, 1st of Bellindalloch, that farm that has been, and still is, at the front of the Aberdeen Angus circles. SIR GEORGE carried on the good work after his father, and noted as a very successful breeder of bulls that were much in demand, thus leaving their stamp on the breed. Among equally good tribes he bred the Breca family, of/
of Keillor origin, noteworthy as impressive breeders, bulls and cows, apart from their showyard honours. This family stands out as one of the best strains of the breed.

These were some of the master breeders of the period. It would be impossible even to enumerate other improvers, among the rank and file, here. But the list of honour is a long one, and the names of those who built the breed will ever shine in the history of the human cause.

SECOND STAGE of IMPROVEMENT (1852-1890)

This stage is marked by two all-important factors which enhanced the progress of the breed. The first was the recognition of the breed by the Highland and Royal Agricultural Society in 1852. This came as the natural result of the wonderful career of the breed at the different shows. The Society did not only recognise it as a breed, but also "cannot but record it as the most valuable breed of Scotland." Since then the Society used all their good influence to encourage the progress and spreading of these cattle.
The second factor which gave the breed a no less important impetus was the establishment of the Herd Book.

The first volume, compiled in 1851 by Ravenscroft, was unfortunately burnt in an outburst of fire in the Highland Society museum. However, he succeeded in re-issuing it by 1862. Galloway cattle were registered too, but, after the first four volumes, the book was closed to them.

In 1879 the Polled cattle society was informed to keep and publish the Herd Book, and look after the interests of the breed. It was not till 1938 that the name of the Society was changed to the "Aberdeen Angus Cattle Society", and the breed's name also became "the Aberdeen Angus."

Uniformity in this second stage was also attained. In the previous stage of improvement, uniformity was lacking in the breed for three reasons:

(1) there were some breeders who bred for the dual-purpose type;

(2) there were some who still followed the craze of introducing Thorthorn blood;

(3) and there were others who did not favour the moulding/
moulding of the two branches of the breed - Aberdeen and Angus - into one.

Thus owing to different objects in view, the breed till about 1850 was a mixture of different strains. Thanks to the efforts of M'COLL, who dedicated successfully the last years of his life to work for the uniformity of the breed. His efforts to achieve this end were much emphasised by the craze for certain blood-lines among breeders. These were headed by the rids of Aberdeen and the ERicas.

Still in this stage, as in the previous one, size was bred for. In the range of colours, black became the dominating one with or without a slight touch of white on the udder or scrotum, and grey hairs on the tail. Other colours led by this stage completely disappeared.

RECENT IMPROVEMENTS (1890 - )

A little before the break of the present century, a change in the public taste became manifest for smaller and smaller joints of beef, a demand that breeders had to meet. This led to a change in the type of beef animal, which became smaller in size and finer in bone. This marked the last/
last stage of improvement in the Aberdeen Angus breed, as well as other beef breeds, leaving them as they stand today.

Little change in colour also took place with a strong tendency to 'all-black'. The present day fashion is that "colour should be black with no reddish or crindle cast. White on the underline back of the navel is permissible, but undesirable."

The craze for certain families has now much abated, which is a sound move on the part of present-day breeders. Family craze is not only permissible, but also desirable in the first stages of formation and improvement of any breed, being a strong aspect of selection, thus working the uniformity of type. But once the breed has become uniform in characteristics, and well-established, it is individual merit that should count in the breeding animal.

It is not our object to make an account of some of the herds of the breed today, but a work of this nature would be incomplete without a word about a few of them. Those who have made a study of the prize-winners in the Highland and in the/
the Royal Shows last year, 1927, can only look with admiration upon Ballindalloch. Its present owner is SIR GEORGE MACPHERSON GRANT. Among other leading breeders of the day we may mention KENNEDY of Donnholme, SIR JOHN FINLAY of Aberlour, WEBSTER, KERR of Harviestoun, and MR MITCHELL of Blerton whose famous herd the writer had the honour to inspect last summer.

FASHION and the BREED:

A great scientist in America, some few years ago, wondered if there could ever have been one-tenth of the improvement we have today in our breeds of cattle without the pedigree system. It is quite true. But did not Dome Fashion work wonders too? Certainly Fashion has its ups and downs, it sometimes condemns an individual animal, here and there, that may possess merit. But considering the interests of any breed as a whole, Fashion is a strong and efficient factor in bringing about "uniformity".

And it is the same with the Aberdeen Angus breed. In its first aspect, the fashion of bloodlines, it certainly disseminated the best blood throughout/
throughout the whole breed - that of the Prides of Aberdeen, the Mayflowers, the Ericas, etc. And it, in its second aspect of colour-fashion, stamped out the various shades of red, brindle, etc. and allowed none but black.
Perhaps no other dairy cow holds the admiration of the world of agriculture as a whole like the Ayrshire cow. This is largely attributed, on the one hand, to the manifold merits of the breed, and, on the other, to the prodigious and tremendous efforts of those who have made it their business and duty, all through the ages, to look after the interests of the breed. Of comparatively recent dates the Herd-book Society and the Scottish Milk Records Association have been sparing no effort within their reach to improve a breed that to all appearances seems a masterpiece in improvement. Enough was said of Milk Recording, its achievements in the past, and its prospects in the future, in a separate paper. We turn now to the Ayrshire cow itself. Where milk of quantity and quality is in view, this cow suggests herself as rivalled by none. Where beauty and perfection in symmetry are looked for, she has no match.
Her conformation is closely that of a typical dairy cow, her udder and teats are particularly very well-shaped. She is an ideal milk-producing machine. Her resistance to tuberculosis, the scourge of humanity, her adaptability to hard climates conditions and to poor keep, where others would fail, spread her far and near, and will open the future to her extension on a large scale all over the universe. And though she is firmly established now in America, Northern Europe, Australia, New Zealand, South Africa, and Japan, the Ayrshire cow stands the best chance of being the world’s future milk producer.

As to the origin of the indigenous cattle in that part of the country known as Ayrshire nothing is precisely known. Considerable difference of opinion exists among those early writers who dealt with the point, none of whom is able to throw light upon it. Lost probably these cattle in question had their descent from the wild cattle that were roaming all over the country at one time, and finally came to be settled here and there, whence differences in their types made their appearance, due to the effects of natural agencies as climate, soil/
soil, food, etc.,

These cattle indigenous to Ayrshire are essentially the foundation-stock from which the modern breed evolved, after operations to which the writer will refer in a later stage. Thus it is desirable to give a brief account of these cattle, as they were about the middle of the eighteenth century. To all evidence they seem to have been of a bigger size than the Ayrshire cow of to-day. According to Fullarton, in his Survey of Ayrshire, 1811, these cattle were herded on bare pasture in summer, and so poor was their food in winter "that they were scarcely able to rise in the spring without assistance." As to their colour, they were almost wholly black, or brown, with few white spots. Their horns were irregularly shaped, and marked with ringlets at the base. On the whole, then, they were ungainly, and were neither noted for fattening qualities nor for milking propensities.

IN THE EVOLUTION OF THE BREED

Some pioneers of agriculture in the district, seeking to improve their cattle, endeavoured to introduce the Teeswater cattle and cross them with the native stock. As to the date of this introduction,
introduction, it was 1750 according to Aiton, or between 1724 and 1740 as argued by Robertson.

Whether the one date or the other, this is a theme for controversial historians. What is significant to the world of science is the event of the introduction itself.

The first of these pioneers, on record, is the John, of H. Sibbald who brought to Ayrshire, from his estate in Berwickshire, a bull and some cows. These like most of the Teeswater cattle at the time were "flecked" or light brown spotted with white. The Teeswater cattle had long been noted for their milking properties. The writer does not need to give a lengthy description of them, this being given in a separate paper on Shorthorn Cattle. Having imparted their qualities to the offspring, when crossed with the cattle of Ayrshire, there is no wonder at all that they spread with great rapidity in Kyle, where the Sibbald brought them, and the surrounding district. With the success of the crossing, the Sibbald's example was followed by many breeders and farmers of the time.

About the same time, or a little later, there is evidence that John Duncannon, of Dunlop House, in Cunningham, the northern district of the county, introduced/
introduced some of the Alderney cattle, exclusively dairy animals.

A little later, CRR of Barrowsfield introduced the Alderney blood too, and it is asserted that his example was copied on many hands, so that these cattle were rapidly spreading and crossing with the native cattle too. We have it, then, that the period from 1724 to 1775 was a landmark in the agriculture of Ayrshire, during which Teeswater and the Alderney blood was infused through the native cattle.

The amalgamation of the blood of these three distinct types is certainly the happy event which gave birth to the breed we know to-day as the Ayrshire.

Its first appearance was in the Cunningham district, and they were, then, called the "Dunlop", and also the "Cunningham cattle."

To show how this new breed greatly differed from the original foundation stock, the writer proceeds to quote Fullarton's description of them. "The breed is short in the leg, finely shaped in the head and neck, with small horns, not wide, but tapering to the point. They are neither so thin-coated as the Dutch (Teeswater cattle) nor so thick and rough-hided as the Lancashire cattle. They are deep in the body, but/
but not so long, nor so full and ample in the carcass and hindquarters, as some other kinds. It is not uncommon for these small cows to give from 24 to 34 English quarts of milk daily.

Thus, from the melting-pot the breed came out with a smaller size, more refined in shape, horns and coat, than the raw material from which it originated from. In addition, they inherited from the Alderneys and Teeswater cattle their capacity for milk. As to their colours, the poet has it:

"The colours preferred are confined to a few, either brown and white checkered, or all brown will do."

By 1780 a revolution in the farming practice of Ayrshire had taken place, substituting dairy farming to wheat, or other cereal, growing. Much care was given to the breeding of cattle, and better attention was devoted to their feeding and management.

This, of course, acted as a stimulus to the progress of the breed, which in a short time, by the end of the eighteenth century, spread not only over Ayrshire, but also over Renfrewshire, Lanarkshire, Dumfries-shire, Wigtownshire, and other counties.

**FIRST STAGE OF IMPROVEMENT**

(1808 - 1853)

In addition to the growth of dairy farming
in the home of the breed, another equally important stimulus to the breed was the influence of the showyard. Here, standards are set and breeders compete hard trying all the time to comply with, or reach as nearly as possible these standards.

We may mark, then, that the first stage of improvement was dominated solely by the influence of exhibitions between 1903 and 1852.

It is supposed that the first exhibition of Ayrshire cattle took place in 1803, under the auspices of the Kilmarnock Farmers' Club. This was only a local show, confined only to the Club members. Soon other shows followed which were open to all cattle. In 1925 Ayrshire cattle from any part of the country were allowed to compete at the Highland Show held in Glasgow. In 1835, the Ayrshire Agricultural Association was formed, having as an aim in view to give an impetus to the breed, and their shows were held in different places, until it was in 1852 that they decided to hold their shows in Ayr in the future.

Thus competition at different shows, local or national, was rife, much to the progress of these cattle.

Very little is known, almost nothing, of the breeders of this period, or of their breeding methods. Accidentally/
Accidentally mentioned in the scanty references, we have the names of PATON, the BULL of ROTHESAY, and \[\text{MR ALEX. ofphantasie, of Shorthorn-fame, as eminent breeders, exhibitors, and prize-winners.}\]

Of the cattle of that period we know as little too, and even there is no clear idea about show-yard ideals or standards. It is more than a likelihood that milking qualities were given due attention. \[\text{MR JAMES RICKSON, a judge at the Highland Shows, wrote about 1850 to say that the practice of the Ayrshire cattle breeders had long been the selection, both of bulls and cows, for breeding purposes; from heavy milking strains. Further, he states that "regard to symmetry, or other points, is not studied, or if considered at all, it is simply with reference to the milking, not feeding qualities". Strange enough that such a judge of long experience would deem this practice, he described, as fallacious. In the light of recent theories in Animal Breeding, the writer may emphasize that the selection of breeding animals from the progeny of heavy milkers, was a very sound practice and was the first step towards the improvement of the breed.}\]
THE SECOND STAGE OF IMPROVEMENT.
(1850 - 1903)

By 1850 Dame Fashion interrupted the good work that was being carried out, and turned the tide from selection after "production" to new ideals.

Beauty of shape, a lighter body, a small teat, as small as a thimble, a tight vessel, and upturned horns, came to be the craze of the day. And, after such an ideal, a new type of Ayrshire cow was evolved. So much so was the pursuit of fashion overdone, that it had eventually a detrimental effect upon the productive capacity of some strains, and not a few at that. It was reasoned that these points in the conformation of the cow were indicative of its performing ability. Hence the stress laid upon them at the show-ring, and breeders would, no doubt, lose no time to attain the new standard set. But the swing of the pendulum was not destined to stand at that end. Endeavours were made, now and then, by those who foresaw the danger, to introduce milking competitions. Even milking tests at shows were carried out, although they were not satisfactory, because of the shortness of their duration. Supposing for a minute that these competitions would have/
have a desirable effect, the fact remains that they were confined to show specimens. And here we may ask what about the average cow? That was to be done to put the race on the right track? For a long time this problem seemed to baffle all solutions, until some pioneer happily hit the mark by suggesting the establishment of the Milk Recording Scheme. We have to leave this point until later to turn to deal with events of an earlier date.

THE HERD-BOOK.

It was not before time, but rather it had been delayed too long, to start the Ayrshire Herd-book, a delay that is largely responsible for our lack of knowledge about the breed in its early stages of improvement. However, this fault was remedied at a meeting of breeders and farmers in Ayr in 1877, when it was decided to form the Herd Book Society. The first volume of the book was published in Ayr in 1878, containing the pedigrees of over 550 animals. In this connection the efforts of the IOM. V.B.N.C.O., in compiling the necessary material for the book are praiseworthy.

A volume has been issued annually since then. It may be well to mention that V.B.N.C.O. became the/
the first President of the Herd Book Society, an
office he held till 1909.

We have stated that the second stage of
this breed improvement began in 1890, and terminated
in 1903 when the Milk Recording Scheme was initiated
by SPEIR. Of the eminent breeders of the period
the DUK. of BUDGE is outstanding. He had more
entries in the first few volumes of the herd-book
than any other breeder of his time, a fact that
points out the great size of his herd. His herd was
collected from the best strains in the country, and
he had drawn much upon JAMES HOMFR's blood. The
DUK.'s herd had eventually a far-reaching influence
on the development of the breed, impressing their
excellence of form, their heavy-milking capacities,
and the prevalence of white colour. This herd was
dispersed in 1895.

Among the rank and file of great breeders,
of the period, the names of JAMES ALLAN, SLOAN,
FATON, HOMFR of Burnhouses, ALEXANDER STUART,
V. RISH, and THOMAS KERR may be noteworthy. These
were some of the master-breeders of the day.

As to the methods of breeding practiced
by them and their contemporaries nothing much is
known. As far as the investigations of the writer
go,
go, this point has not been elucidated or dealt with. But just to obtain an idea of those breeders methods, the writer had to make out an analysis of the two most important herds of the period—the Duke of Buccleuch's herd of Drumlanrig, and Mr. James Howie's herd of Burnhouses. The method followed was to tabulate complete pedigrees for all the bulls and cows entered in volumes 6 and 7 of the Ayrshire herd-book, under the names of these two breeders. The study of the tabulations shows whether inbreeding was practised at all, and to what extent.

Although a general idea can be got this way, of the state of affairs, it must be clearly understood that an accurate and exact statement on the matter can only be furnished as the result of patient work in the analysis of the Herd Book, and needs the measuring of the coefficients of inbreeding by the usual methods adopted in research. This is a slow work that will extend over years of study.

Nevertheless, the study of the writer, of the Herd Books in connection with the two herds mentioned, suggests the inference that inbreeding in Ayrshire cattle was not much practised. The following table shows the results:-
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<td>10</td>
<td>42</td>
<td>52</td>
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<td>27</td>
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<td>3</td>
<td>12</td>
<td>5</td>
</tr>
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Note: Insert text as needed.
To explain, out of 100 animals tested 52 were found to be inbred, that is, each connected on the sides of the sire and the dam by one or more common ancestors. This ratio might have been higher still, had not the book failed to give the pedigrees of about 12 animals, mostly bulls. The study shows, and this is of the utmost importance, that close in-and-in-breeding was not followed to any great extent, the relationship being, in most cases, the outcome of line-breeding.

Most of the line-bred animals trace back to the great bull "Burnhouses" (8), bred by Mr. Lawrie, Drew, from whom it was secured by Mr. James Howie.

Having in memory that the blood of the two herds mentioned disseminated throughout the whole breed, and by far the majority of the breed today trace back to them, we can safely say that this great foundation-bull "Burnhouses (8)" had fairly re-created the modern Ayrshire breed. His influence on the breed is very much similar to that of "Champion of England" on the Shorthorn breed.

Among other sires of importance in that period we may mention Geordie, Lunnoch, Prince Alfred, Macgregor/
Mcgregor of Drumlanrig, and the prepotent bull White Prince (63).

RECENT IMPROVEMENTS.

With the break of the present century great efforts were being made to improve the Ayrshire breed, and far-reaching achievements have been obtained. The aim and goal of these improvements have been to raise the milk yield of the breed, to direct the breed towards the highest production. The instrument used for this purpose has been the establishment of the Milk Recording Scheme. This subject has been dealt with by the writer in a separate paper. Nevertheless, we can appreciate the work done when we point out that, under the scheme, the progress has been rapid. Breeding and selection have come essentially to be based on the performance of the cow at the pail. The breeder has been enabled, by means of the Records, to use only heavy-milking animals in the production of his stock. He has been given means to find out, and discard accordingly, from his breeding stock, the poor yielder, the one that does not pay its way to keep or breed from. He has also been given clear-cut information for adjusting his rations and management of his herd.

While/
While the Recording scheme was in operation and producing its good results, another all-important stimulus was given to the breed. This is the recognition of the Milk Records in the show-rings, which has been operating since 1921. It came to be as the result of a meeting of breeders and farmers, in Ayr, in 1919. Thus the standard of judging Ayrshire cattle has come, since 1921, to include not only points of conformation, but also actual production. The present scale allocates points as follows:

<table>
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<tr>
<th>Points</th>
<th>Description</th>
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<tbody>
<tr>
<td>30</td>
<td>Form, symmetry, and Constitution</td>
</tr>
<tr>
<td>35</td>
<td>Mammary Development, to include teats, Shape of udder, milk veins, etc.</td>
</tr>
<tr>
<td>35</td>
<td>Authenticated Milk Yield in the case of a cow or Authenticated Milking Pedigrees in the case of bulls and heifers</td>
</tr>
</tbody>
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In passing, a brief word may be said about some of the most important herds of this period. One of the most eminent breeders is THOMAS B/P in whose herd in Kobsland, Monkton, is of great fame. The herd/
herd had its foundation in 1884, great attention
and care being devoted to its breeding and manage-
ment. In 1917, ninety-three per cent of his cows
were Class I. animals in the records. Some of the
best sires were used to serve the herd, among which
we may mention Masterpiece and Perfect Piece. Per-
fected knew the showyard as a champion bull both
here and in America in 1914.

MR CRANTER'S herd, Dunlop, Ayrshire,
was founded in 1906, from the best breeding-stock
and heavy-milking strains in the country. His prac-
tice was, like most other master breeders of the day,
to breed from the best sires obtainable, of which
Proud Favourite, Marquis, Perfect piece, Rising Star,
and Not Stuff, deserve special mention.

MR McKIN'S herd, Hillhouse, Kilmaurnock,
was founded over 30 years ago, mostly from stock
secured from Burnhouses, that farm as famous in the
annals of the breed. Among the sires used the great
stock-getter Traveller's Heir of Holehouse, and
Blockade, are noteworthy.

There are numerous other herds, and
equally-important other breeders of the period, of
whom space does not permit description. We may just
mention, in passing, the names of the Hon. CORBETT,
MR JOHN CLARK, CIR HUGH SWAN STEWART, MR GEORGE
DUNLOP/
DUNLOP, and Mr. COCHRANE, in addition, all of whom
great breeders of the day, were prize-winners at the
last shows of the Highland in Edinburgh, and the New
Show in Ayr, in 1927.

FASHION AND THE AYRSHIRE BREED.

In tracing the development and improvement
of the breed, we may see how dominant a part Dame
Fashion played. This may be summed up to have had
two principal aspects—

(1) Beauty and neatness of shape; this aspect of
fashion characterised the second stage of im¬
provement (1850-1903). The ideal sought was
that of a neat, smart, light-bodied, cow with up¬
turned horns, tight vessel and small teat. This as¬
pect is certainly responsible for the beauty of the
Ayrshire cow of today, and in particular the very
neat symmetry of the udder, but it was so overdone
that it had detrimental effects on the production of
the cow, and would have done more harm had not
a corrective been initiated by SACIR.

(2) Colour; when the breed came first into existence,
specimens all-brown were known and not discriminated
against, the majority of the cattle were "brown and
white/
white checkered", as so described.

Then, about the middle of the 19th century, cattle with "more white in them" came much into the fashion of the day. The prevalence of the white colour, so popular, was enhanced by the dissemination of the blood of the ever-famous AMERICAN and SUCCcHUCH herds in the breed. All white is the most popular fashion of today, especially in America. Nevertheless, either red, brown, or mahogany, is quite allowed with white, but each must be distinctly defined.

In conclusion, then, the trend of fashion in colour has been towards lighter and lighter shades.
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