

the same species. Differences are also found in some species by comparing the result of the enclosing in one generation, with the result of enclosing continued through several successive generations. For instance rye gives not much fruit when enclosed, but several races give more than others; poppy when enclosed generally gives ample fruit with seeds, but some individual plants in this case bear fruit with no seeds or with scanty seeds; yellow lupine gives an ample quantity of seeds when enclosed for the first time, but scarcely any when enclosed during several generations.

The investigations of Darwin, showed that, even if a species gives seeds after enclosing of single plants, these seeds are with most of the species of lower germinating power and the plants resulting from such seeds are less productive. The first point I readily demonstrated but I could not find that such seeds produced plants of less luxuriant growth. Still it should be considered that Darwin compared plants as sown in the field and growing close together, while I only compared plants standing singly in breeding plats and having plenty of room.

#### BREEDING OF POLLED HEREFORDS.

By MOSSOM M. BOYD, *Bobcaygeon, Ontario.*

[The following is a memorandum of experiments by the Mossom Boyd Company at Big Island Stock Farm, Bobcaygeon, Ontario, in crossing Hereford and Polled Angus cattle with a view to removing the horns by a slight infusion of polled blood; also of that firm's progress to date in an attempt to produce pure polled Herefords by the use of two pure Hereford bulls born polled by sport of nature.]

In 1893 the purebred polled Angus bulls, Kendrick 11813 and Rupert of Hillhurst 16734, were used to 5 pure Hereford cows each, and the result in 1894 was a crop of 5 bull calves and 4 heifer calves. Of 4 calves by Rupert of Hillhurst 16734, one was black with white face and polled, one was black with white face and no record as to whether horned or polled, and of the other two, the records do not state whether horned or polled or what color. None of these calves were retained. Of 5 by Kendrick 11813, all were black with white faces and all were polled, but one had scurs. Of these, one bull calf out of the Hereford cow Peach 18th 29481 was retained for use. This calf was, as stated, black and polled. He had all the white markings of a perfect Hereford and no signs of scurs. He was named "Cross Patch" and has since been registered in the registry of the American Polled Hereford Cattle Club, of which Warren Gammon, Des Moines, Iowa, is Secretary, and was given the number SS282. Another bull calf was kept in reserve for a short time but eventually disposed of together with all the remaining calves: This completed the first stage of the experiment.

In 1895 and 1896 Cross Patch was used to 13 pure Hereford cows each year. These services resulted in a crop of 11 calves in 1896 and

12 calves in 1897, in all, 23 calves in the two years, of which 15 were bulls. These calves it will be seen were three-quarters Hereford and one-quarter Angus. As to color, 9 were black with white face and more or less of the other Hereford markings.; 14 were red with white face and more or less of the other Hereford markings. In several instances the white face was more or less blotched with spots of the body color. Of this lot of calves the following were retained:

Bull, Governor of Verulam, red with perfect Hereford markings and perfectly polled, dam Moreton Governess 7th 55395.

Bull, Elkhorn Tredegar, red with perfect Hereford markings, perfectly polled, dam Tredegar Beauty 25th 60280.

Cow, Three quarter Peach, red with perfect Hereford markings, polled, dam Peach 30th 60273.

Cow, Three quarter Prettymaid, red with perfect Hereford markings, polled, lined back, dam Prettymaid 16th 35280.

Cow, Three quarter Sweetheart, red with perfect Hereford markings, polled, dam Sweetheart 30th 60279.

The last four were sold to the Embar Cattle Company, Wyoming, in 1900, and I understand have since been recorded by that Company in the record of the American Polled Hereford Cattle Club referred to above. The bull Governor of Verulam after being used during the seasons of 1897 and 1898 to advance the experiment another stage, was finally sold to a farmer 20 miles distant and used by him and his neighbors for two or three years on grade Durham cows. The writer made a visit to the neighborhood in 1903 to inspect his stock and although many had been sold and others could not be seen, enough were seen to give the remarkable impression that this bull  $\frac{3}{4}$  Hereford and  $\frac{1}{4}$  Angus transmitted as large a proportion of Hereford color and markings as would have been expected from a pure Hereford bull, and as many polled heads as if he were pure polled.

From the coupling of Governor of Verulam with 14 pure Hereford cows in 1897, a crop of 7 bulls and 6 heifer calves was obtained in 1898. These it will be remarked were seven-eighths Hereford and one-eighth Angus. The color of one was not noted but the remaining 12 are all recorded as having been red with white face and other Hereford markings; 4 are noted to have had perfect Hereford markings, and 3 others good Hereford markings; 5 were horned, 5 polled, and 3 not noted. Two of this lot also went to the Embar Cattle Co., viz., Septem Cherry out of Cherry of Verulam 70317 and Septem Peach out of Peach 30th 60273. Most of the rest were retained in this neighborhood, and the bulls used on common stock have apparently been quite as impressive as purebred bulls and their produce is generally held in high esteem.

The esteem in which Mr. Torrey, President of the Embar Cattle Company holds the cattle secured by him is expressed in these words written us in February last:

In reply to your considerate inquiry as to how our polled stock is coming on, I am very glad to say that it is doing very well and that I think very highly of it. Last year I bred the bull obtained from you to all of our Hereford cows and have a beautiful lot of perfectly marked calves; about one-third of them are not polled;

those not polled cannot be registered; those which are polled can be. I note that you have some polled pure Herefords. I think that, in a race with the ones we obtained from you, you must be lost. Quite a good many judges of cattle have expressed the belief that those obtained from you are the best on earth and I believe they are right—that is, the cross has developed an ability to assimilate food, which makes the product, as I think, invaluable.

In these experiments we were struck with the facility with which horns can be disinherited (to use the word in an unusual sense) and we were in consequence encouraged to purchase two sports of nature in the form of the pure Hereford bulls "Wilson" 126523 and "Variation" 152699 both born polled although from horned parents and with a long lineage of horned ancestors. When purchasing the last named bull, "Variation," then eight months old, the writer visited the farm of Mr. Thomas where he was bred, saw the sire and dam, and noticed one peculiarity in a former calf of the same dam, a heifer; namely, that it had imperfect horns. The horns were as if 3 or 4 inches had been broken off their ends which had a shelly, ragged appearance. Whether there is any connection between this deficiency of horn in one calf and total absence in another calf from the same cow we do not know. The discovery of these two bulls (as well as of two other bulls and some eight or ten females which Mr. Gammon secured for himself) was the result of inquiries by circular made of some 1500 or 2000 Hereford breeders.

I give copy of a letter written the late W. E. Britten, Esq., Secretary of the Hereford Herd Book Society of England, and of his reply.

BOBCAYGOEN, ONT., March 16, 1903.

W. E. BRITTEN, Esq.,  
Sec'y Hereford Herd Book Society,  
20 East Street, Hereford, England.

DEAR SIR: One object in writing you is to ask you to be good enough to let me know whether you have ever met with or heard of a purebred Hereford naturally polled. We are told that an occasional polled beast appears among all breeds of cattle. Whether this is true or not with regard to the Hereford breed I would like to ascertain. If you do know of any such would ask you to kindly give me a few particulars and much oblige,

Yours truly,

MOSSOM M. BOYD.

HEREFORD, 13th June, 1904.

MOSSOM M. BOYD, Esq.,

DEAR SIR: As regards the polled Hereford, I have also made inquiries, as two Americans have written me on the same subject. I have not, however, heard of such a calf for years although there are such occasionally dropped, but they are promptly steered. They are such rare occurrences in the Hereford Breed that the chances are when one does arrive it is a poor individual and would make a poor specimen of a sire. I am,

Yours faithfully,

W. E. BRITTEN.

The two individuals "Wilson" and "Variation" which we were fortunate enough to secure are not poor specimens by any means. Both are good specimens of the breed. Wilson is a particularly handsome bull of strong masculine character, long and low, and thick-

fleshed with immense heart girth indicating the strong constitution which he exemplifies by being the best doer on the farm. Wilson was used to a few cows in 1903 and to a considerable number in 1904. Variation was used to a moderate number in 1904. The crop of calves to November 30, 1905, was as follows:

From Wilson:  
 1904, 16 bull and 11 heifer calves.  
 1905, 23 bull and 20 heifer calves.  
 From Variation:  
 1905, 17 bull and 12 heifer calves.

Of the 70 calves by Wilson 5 died soon after birth before it could be surely determined whether horned or polled. Of the remaining 65, 38 were polled, or about 60 per cent, and 27 horned.

Of the 29 calves by Variation one died soon after birth, and of the remaining 28, 22 were polled; *i. e.*, about 80 per cent.

The dams of these calves are pure Hereford and both cows and calves are registered in the American Hereford Record.

It remains to be seen what proportion of polled heads will be got by coupling these polled calves among themselves, and also with horned mates. We have been using two of the young bulls lately and expect to be able to report some results next year. It is quite possible (Mendel) that by coupling polled calves from Wilson with those from Variation, we may obtain a chance proportion of calves which will have the polled quality purely inheritable, and thus secure prepotency without inbreeding.

## THE PRODUCTION OF A VARIETY FROM ONE SPORT.

By ROSWELL H. JOHNSON, *Cold Spring Harbor, L. I.*

At the last meeting of this Association, Mr. W. J. Spillman in an interesting and helpful paper entitled "Mendel's Law in Animal Breeding" gave practical directions by which a new race may be established having a certain desired characteristic. To be concrete, he took the production of polled cattle from polled individuals of a horned breed. After crossing the sport with a normal individual, there are three possible courses; viz., (1) crossing the hybrid with a normal individual; (2) with other polled sports; and (3) with similar hybrids. He took for granted two breeders, who would exchange hybrids (presumably in order to escape the danger of inbreeding).

Now while this method is practicable in the case of polled cattle, it is not ordinarily available to the breeder who has a sport he desires to perpetuate, because he can learn of no other sport like it. I have, therefore, thought it would be desirable to indicate a method by which the sporting character may be preserved when only one sport is at hand and still avoid the dangers of inbreeding.