# THE FARMER'S ADVOCATE.

basis for settlement. Consequently the price of \$2.90 which was decided upon was determined by averaging the cost of production with the condensery prices, the average of 4 co-operative creameries and a co-operative cheese factory. The condensery paid \$1.89, the creamery \$2.20 with hutter-fat at 61 cents per pound, and the cheese factory \$2.50. The cost of production was \$4.26, skim-milk was valued at 50 cents for the amount contained in 100 pounds of raw milk, and whey was valued at 25 cents or half the value of skim-milk. This price is to be readjusted for each month not later than the 25th of the preceding month.

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Reports to U. S. Bureau of Markets from about 46 per cent. of the condensed and evaporated milk factories in the United States, indicate an average price. November price of 3.5 milk delivered at factories of \$2.61 per 100 pounds for 99 firms manufacturing both case and bulk goods and \$3.17 for 60 firms manufacturing bulk goods goods and \$3.17 for 60 firms manufacturing bulk goods only. In addition to these firms 54 reported no price determined up to November 30; 21 were temporarily closed; 16 were handling milk for patrons' account and 2 were out of business. Prices paid by 48 firms manufacturing case goods and 7 firms making both case and bulk goods in the States of Ohio, Indiana, Illinois, Michigan and Wisconsin ranged from \$2.00 to \$3.23 Michigan and Wisconsin ranged from \$2.00 to \$3.23 with an average of \$2.43. Six firms manufacturing case goods and 10 manufacturing both case and bulk goods in the States of New York, New Jersey and Pennsylvania reported prices ranging from \$3.00 to \$3.93 with an average of \$3.70. This is the territory covered by the Dairymen's League whose November price was \$3.65 and was refused by manufacturers. It is significant that in September 99 firms from this territory alone, reported an average price of \$3.64, and that in October the number had dropped to 44 with an average price of \$3.49. These figures throw an interesting sidelight on the fight now being waged between these manufacturing dealers and the New York Dairymen's League.

# What Red Calves in Black Breeds of Cattle Mean.-Part I.

A matter that will be of considerable interest to breeders of dairy cattle, particularly breeders of black and white cattle is discussed in a bulletin from the Wisconsin Agricultural Experiment Station. Liberal extracts from this bulletin are herewith presented in two parts. The first part dealt with in this week's issue deals with the general question of the occurrence of off color or red calves as a breeding problem; the second part, which will appear next week, will have particular reference to Holstein-Friesian cattle.

Color is an important factor in the live stock industry because breeders have come to accept certain colors as standard for certain breeds. The Guernsey breeder avoids animals with dark muzzles; breeders of Duroc-Jersey swine dislike to see black spots on the belly and legs; a bay Percheron stallion would not generally be chosen to head a Percheron stud; a redand-white calf appearing in a herd of pure-bred Holstein-Friesian cattle often brings a whole herd under suspicion. Yet the offending animal may be equal to the best in other respects, and, in spite of popular opinion to the contrary, his breeding may be equally pure. It is only the agreement to accept certain colors as the right

colors that makes the animal undesirable. The inheritance of black and red color in cattle, especially the appearance of red calves in breeds whose standard color is black, is a troublesome matter to the breeder. The appearance of such a calf leads to questioning the purity of the breeding, and misunderstanding and lawsuits may result in consequence From the standpoint of heredity, however, the matter of color is relatively simple, and the application of certain definite scientific laws solves the problem for the breeder.

A half century ago an Austrian monk, Gregor Mendel, worked out a definite rule by which he could predict what characters would appear in the offspring of plants on which he was experimenting, and in what relative numbers the characters might be expected to appear. Later investigators found his results correct, and his rule came to be known as Mendel's law. Upon the work of the student of hered

connection to be considered as a black breed, since white spotting is not taken into consideration.

The occurrence of white on an animal is an entirely different matter and is not related in inheritance to the color of the pigment, which in cattle may be brownish, black, red, dun, yellow or some shade of fawn. In conjunction with any of these colors there may be no white, as in some Angus or Galloways, or a little on the under parts, as in others; or there may be a considerable amount, as in most Holstein-Friesians, the present fashion, in fact, being toward a predominance of white. The unexpected appearance of these "off color"

calves is variously interpreted as being a revision, or as indicating impurity of breeding, or the unwelcome calf is simply called a "sport," no explanation of its occurrence being offered. A review of the history of the breeds, however, together with a slight knowledge of the laws of inheritance provides a simple explanation.

## INHERITANCE OF BLACK AND RED COLOR.

The inheritance of red and black, when other complications are not present, is very simple. If a pure-bred animal of a black breed, such as an Angus, is bred to another of some red breed, such, let us say, as a Red Polled, the calves obtained from the cross will be black. The same would be true if a Hereford were taken as the red breed, but in this case the calves, although black, would have white faces. Now these calves inherit red from their red parent just as much as they do black from the black parent, but when the two come together only the black shows. It is said, therefore, that black is dominant to red, since it dominates it in the ap-pearance of the crossbred. The red, on the contrary, does not appear in the crossbred, and accordingly red is said to be recessive to black.

The crossbred animals are really different from the parental black, in that they carry the inheritance of red though they do not show it. For if they, like their parents, are mated to reds, the resulting calves will no longer all be black, but there will appear red ones as well. In fact, the numbers of black and red calves produced by such a mating will, in the long run, be equal.

some of these continue to crop out. Selection is necessarily based on the appearance of the animals, and as we have already seen in the matter of color, while individuals may possess the desired characters they may nevertheless be merely masqueraders and actually carry the other traits in a recessive condition. Thus, while an accepted definition of a breed is "a group of while an accepted definition of a block, and possessing certain well-defined characteristics which are trans-mitted by inheritance," this definition must be taken with some allowance, since it is safe to say that there is no breed of animals which is strictly "homogeneous in block" in blood.

It is easy to see how, if red animals have at any time entered into the composition of a black breed, even though there may since have been the most rigid selection, the red should still occasionally crop out. This is due to the fact that the breeder, basing his selection merely on the color of the individual, may save blacks that are carrying red as well as those which are "pure" for black, and as we have seen, whenever two such "inconstant" blacks are mated, the chances are one in four that a red calf will result. As selection continues, however, none of these red calves being admitted to the breed, the number of black animals which carry red will gradually decrease, and there will be a corresponding infrequency in the appearance of red offspring. How well the facts bear out the foregoing statements may be seen by examining the history of certain breeds. (To be continued.)

### Developing Enthusiasm for Pure-**Bred Dairy Cattle.**

The accompanying photograph shows the winners of the State Herd Competition in Holstein cattle, which was a part of the Holstein judging at the recent National Dairy Show in Chicago. It is not too much to say that this one event in the Holstein judging created a great deal of interest and keen competition. Strong efforts are being made by all of the dairy breeds in the United States' to interest new breeders in their particular



### State Herd Compatition, National Dairy Show, Chicago.

#### APPEARANCE NOT A GUIDE.

The crossbreds in this case "masquerade in the guise of one of their parents," and it is a very important point to get in mind that the appearance of an animal does not necessarily serve as an index as to how it will breed. It may be said that the pire-bred blicks are constant in their breeding, since whether bred among themselves or crossed the result is the same. The crossbreds, on the other hand, are inconstant in their breeding, for when bred to reds, as already shown, or when bred together, both black and red calves are pro-

The important thing to be observed from the summary is that red calves appear only when (1) both the parents are red, (2) one parent is red and the other,

favorites, and various devices are employed to create special interest in each of the dairy breeds. The American Jersey Cattle Club has adopted a plan of holding a National Jersey Cattle Show at some one of the larger exhibitions each year. Thus the opportunity is taken to boost the Jerscy breed in a new section of the country each year, while in the meantime, breed propaganda is carried on over the whole country with the idea of bringing about a strong, sustained effort to popularize the Jersey cow. Similarly, the American Guernsey Cattle Club very strongly supports the showring for Guernsey cattle and, in addition, are rapidly developing a staff of field men, to each of whom is assigned a particular territory in which he is charged with the duty of developing the interests of the breed encouraging the establishment of new Guernsey

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this law The plant breeder has been able to make greater

use of the results of these experiments than has the animal breeder, largely because animals require longer time for reproduction and experimental animals cost more than experimental plants. Other conditions than heredity influence the development of many characters and make exact results difficult to obtain. For example, the development of milk production in a dairy cow of carefully bred, high milking strain is dependent on conditions of feeding, care, management and the like, and it is difficult to say how much of the final result in milk proudction is due to an inherited tendency and how much to other conditions.

On the other hand, there are other characters which are very little, if at all, influenced by the conditions under which the animal grows and lives. Color is one of these; it develops wholly according to the inheritance from the parents. This fact, coupled with the fact that laboratory results with smaller animals apply also to farm animals, allows the scientist to obtain very satisfactory and definite results in his study of the inheritance of color. For this reason he is able to offer the practical breeder an explanation and a practical solution of his

That red calves occasionally appear from pure-bred

stock in probably all the black breeds of cattle is generally known. This is true of the Angus, Galloway and Kerry, which are commonly regarded as solid black breeds. It is also true of the Holstein-Friesian, which is in this

though black, carries r or (3) both parents are black, but both carry red.

### TRUE ORIGIN OF BREEDS NOT KNOWN.

It is of interest to consider the origin and history of certain black breeds in order to determine why some individuals may carry the undesired recessive red. In the first place it must be remembered that our definite knowledge of the history of even the best known breeds is relatively fragmentary and that the exact origin of no breed is definitely known, that is, it is not known just what elements have gone into its making. We commonly look for each component of a breed to have been used in considerable numbers, forgetting that some character, such, let us say, as a particular color, which happens to be fancied and which later is common to every member of the breed, may possibly have been introduced by the crossing in of a single animal possessing it.

#### OUTCROSSING IN EARLY STAGES

A breed, then, is at best a rather artificial group. There is no breed which is not of more or less mixed origin, for even where they have not arisen simply by selection from the common stock of the country there have, in most cases, been definite outcrossings in the early stages to bring in desirable traits from other sources. As soon as the breed characteristics become definitely established selection rapidly eliminates many of the characters that are not desired, but for a long time

In fact, each of the four large dairy breed associations, namely, the Jersey, Guernsey, Ayrshire and Holstein Associations are fast becoming recognized as the centres of breed enthusiasm, and they are looked to by the breeders of these kinds of cattle for progressive extension work. The Ayrshire Cattle Breeders' Association is carrying on a considerable amount of work, as well as a strong campaign for official testing, and this association is, like the others, making a strong bid for dominance in undeveloped breed territory.

The Holstein-Friesian Association maintains a strong and active extension department devoted to the interests of the Black and Whites, and as a part of this extension scheme state Holstein associations are being formed rapidly, with a view to carrying the principle of cooperation, both in breed improvement and breed advertising to more local fields. Such states as Wisconsin, Minnesota, Indiana, Illinois, Kansas and New York are fast becoming recognized as centres for pure-bred Holstein cattle, and there is being developed also a strong rivalry between the breeders of one State and those of another for recognition in this regard. The illustration shown pictures one feature of this friendly rivalry which will do much to improve the quality of pure-bred Black and Whites in the various centres of

The idea is one which can well be put into effect the United States.