MEDICINE VS. FEED.

Instead of thinking what nostrums or drugs you should keep in store for your sheep, think rather of improving your manner of feeding, and the quality offered, to secure perfect health, that there be no occasion to use medicine. This applies, too, to other stock on the farm. Remember that prevention is a sure winner,—cure is uncertain.

A CATECHISM.

How much wool "brass," as they say in Yorkshire, do you make in a year? Are your returns for wool and mutton commensurate with what you spend on the flock? What does your feed cost in a year? Have you any sheep that do not pay for their cost of keep? If so, give them notice to "flit" by sending them on to the butcher. Have you yet found out what system of feeding will give the best results with your sheep?

Care of Lambs After Weaning.

The weaning period is always a critical one with any animal, as unless necessary precautions are taken there is almost certain to be a stunt or receding in the young animal's growth. Lamb-fat lost is hard to regain.

Many of our most successful shepherds wean their lambs at about four months old. At that age, if given a good chance, they will feel sufficiently independent to keep them from fretting to their disadvantage. Lambs should, however, be taught to eat grain some time before weaning. If they have not been taught to eat they will stand around a trough of grain and bleat and grow thin. But if they are accustomed to feed and it is always at hand they will partake often and soon forget the attachment they had for their dams.

There is no field so suitable into which to turn newly-weaned lambs as a fresh clover patch, which, together with a feed of oats and bran, with a sprinkling of cracked peas or oilcake, will furnish the lambs with material upon which rapid growth will be made. They should also have a constant supply of fresh water and salt. Remember that sheep of any age like a change of run, even though the new field be not so good. They can soon be returned to their former clover field when they become restless. By the first of September a rape patch should be ready to turn into, which will complete the bill of fare, along with the clover field, until housing in the autumn is necessary.

Sheep Feeding Experiments.

A series of experiments were conducted at Woburn, England, in order to ascertain the relative advantage or disadvantage of feeding sheep heavily upon linseed cake and barley along with roots *ad libitum*. The sheep were divided in three pens. Pen 1 (20 sheep) were fed linseed cake and barley, equal proportions (double quantity). Pen 2 (20 sheep) were fed with equal parts of linseed cake and barley (single quantity). Pen 3 (20 sheep) fed with equal parts linseed cake and barley (single quantity), and hay chaff *ad libitum*. All the pens were allowed as much sliced roots—Swedes and mangels mixed—as they would eat.

Without going into the numerous tables and minute details, we give the conclusions drawn from the experiment, which are:

(1) "That in the case of sheep eating roots in the open, it pays better to fatten them steadily with a moderate amount of cake and grain than to fatten them off rapidly with a large amount of cake and grain."

(2) "That the addition of a small quantity of hay to cake and grain, given to sheep eating roots in the open, is both advantageous and economical, even when the selling price of hay is high."

Although the sheep in pen 1 looked very much more forward than the rest, yet when the pens were weighed at the end of 66 days' feeding, there was only 18 pounds difference between the total weights of pens 1 and 3, while when they were again weighed at the end of 80 days, feeding pen 3 was the heavier by 48 pounds. Again, while the sheep in pen 1 gained most at first, there was little increase from the 66th to the 80th day; whereas in the case of pens 2 and 3 there was a steady gain during this period.

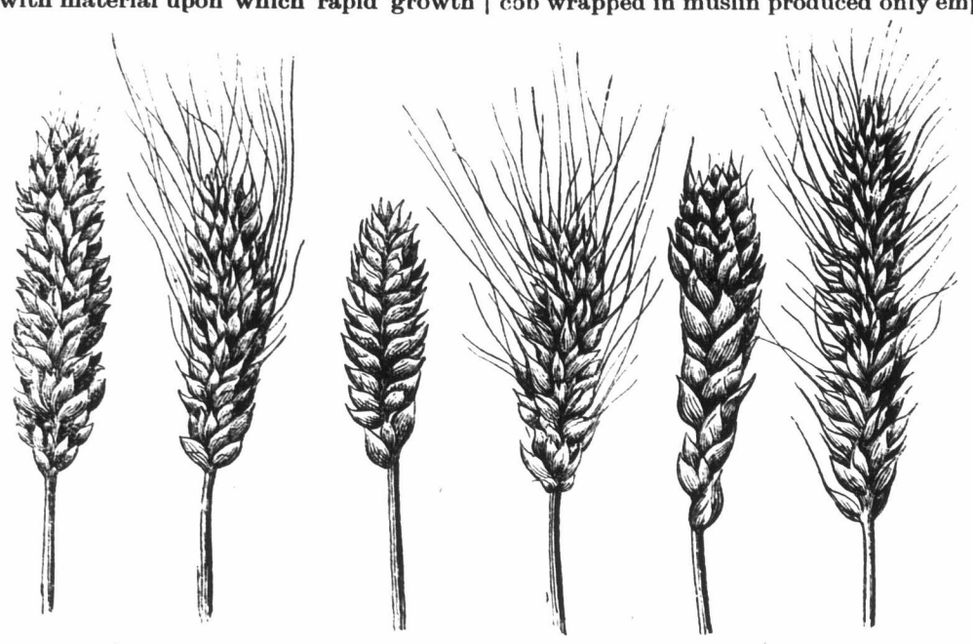
At the end of 80 days, pen 1 had gained 656 pounds, at a cost of £8 18s. 6d.; pen 2 had gained 622 pounds, at a cost of £6 17s. 6d.; pen 3 had gained 704 pounds, at a cost of £7 17s 6d. From this it is apparent that the increase of pen 1 over pen 2 was economically produced. On the other hand, pen 3 showed a still more economical result, and the best of all three lots.

FARM.

Raising New Breeds of Cereals.

In the April 1st number of the FARMER'S ADVOCATE we treated this subject under the following heads: "Cultivation," "Selection as Applied to Cross-breeds," "Selection as Applied to Old Breeds," "Spontaneous Variation," and "Artificial Crossing." We now propose to deal with the practice of "Cross Fertilization," as it has been carried on at Newton-le-Willows, Lancashire, Scotland.

In the days of Aristotle, plants were regarded as destitute of sexuality. Later, some thinking men were of opinion that plants, like animals, might be of two sexes—male and female. In 1694 a professor of botany in Germany got rid of this surmise by finding from experiments that no seed capable of germination could be produced without the co-operation of pollen. In 1740 James Logan, Governor of Pennsylvania, by experimenting with Indian corn, found: 1. Cobs from which stamens and pollen had been removed were unfertilized. 2. On the cobs from which some of the stigmas (silks) had been removed, he found exactly as many grains of corn as he had left stigmas. 3. A young cob wrapped in muslin produced only empty husks. From the researches of these and other men it is found that for seed production in plant life the co-operation of male and female is absolutely necessary. Unless pollen impregnates the egg of the female, no embryo or seed can be produced. The suitable germination bed for the pollen is the stigma—a special outgrowth of the case which envelopes and encloses the ovule. When the pollen grain germinates it sends down a pipe or pollen tube containing the fertilizing matter or sperm into the ovule. Sperm from the pollen tube enters into and blends with the egg within the ovule; this blending of fertilizing material with the egg constitutes *fertilization*. The embryo is the young plant formed from the combined egg and sperm, and the resultant seed is the changed ovule containing dam and embryo.



NO. 1.—SIX TYPES OF WHEAT FROM A COMPOSITE CROSS—ONE-HALF NATURAL SIZE.

The following parts essentially concerned in crossing are: *pollen*, producing the sire; *stamen*, producing the pollen; *ovule*, producing the dam; *pistil*, protecting the ovule and providing a germinating bed for pollen.

Self-fertilization of Cereals.—The flower of a cereal plant is composed of a tiny knob, to which are attached: 1. Two excessively minute scales—*lodicules*. 2. Three pollen-making organs—*stamens*. 3. An ovule protector, with a single ovule in its interior—*pistil*. The germinating bed for the pollen is the pair of feather-like outgrowths from the pistil. This flower is concealed by, and completely enclosed within, a husk composed of: 1. The valve of the husk below the flower—the *lower pale* or *fertile glume*. 2. The valve of the husk above the flower—the *upper pale*.

The parts especially concerned in grain production are: 1. The *sire* derived from the pollen. 2. The *dam* produced within the ovule.

In grasses and cereals, as a rule, both parents are derived not merely from the same plant and from the same ear, but from the self-same flower; for this reason the cereals are said to be *self-fertilized*. Extraneous pollen can find no entrance unless by rare accident; because when the flower parts are in *receptive condition* they are completely enclosed within the two-valved husk. Self impregnation must, then, be the rule among cereals.

After the receptive condition has passed, and after the pollen has been sown on the stigma of the flower which bore it, the husk opens, not for the purpose of allowing entrance of extraneous pollen, but rather in order to get rid of the now useless and encumbering anthers.

Whenever self-fertilization occurs no extraneous matter has entered and no new character is imparted; as a result the progeny of cereals retains the individuality and repeats the peculiarities imparted by the plant which bore the flower. Fixity and want of sportive character confirm the view that the cereals in ordinary cultivation are self-fertilized and not crossed.

Cross-fertilization of Cereals.—The details of the process are as follows: The ear is taken as soon as it comes out of the sheath and all the seed vessels or spikelets are cut off, except one, two, or three. The mutilation of the ear assists considerably the future operations, and if more than one seed vessel is left on each ear they should be left as far apart as possible. An ear is now procured of the variety which it is intended to use as a male parent, and which if possible should be about from three to five days out of the sheath, while the ear which has been prepared and on which it is intended to operate should not be over two days out of the sheath, otherwise risk of self-fertilization will be run.

BERE. EVOLVED TYPE. CHEVALIER.

NO. 2.—PARENT BARLEYS AND AN EVOLVED TYPE—⅓ NATURAL SIZE.

As the process is one of great nicety, a pair of delicate forceps are necessary. The ear which it is intended to make the male parent is then taken and the spikelet gently opened by pressing the point of one of the fingers on the tips of the glumes and palæ (chaff). The chaff scales having been thus opened, the anthers will be exposed to view. The slender filaments which the operator now takes hold of with the forceps and plucks out, are each laid on a sheet of paper, in order to be readily taken hold of again when required. The pollen dust retains its fertilizing properties for several days, so that although the female parent is not ripe enough for fecundation when the operation is performed, it becomes so very soon after, and long before the pollen dust becomes useless. The ear should now be securely tied to a stake and labelled with the names of both parents.

The pollen to be used is taken from a selected variety with suitable peculiarities. The selected pollen is applied when the stigma is in *receptive condition*, or, for certainty, even earlier; application of pollen to a stigma whose receptive stage has passed is mere waste of time, and can yield no result. When the process has been accomplished, an embryo plant is the result—embryo capable of developing an individual combining characters derived from the varieties used for its production; in after generations its progeny may even show new points of value possessed by neither parent. When two varieties are used the resultant is called a *simple cross*; when three or more varieties are blended by repeated crossing, the resultant is a *composite cross*.

The first product of a single-crossed grain is a plant often intermediate in character between the