

three and a half dollars per cwt.; linseed, five dollars per cwt.; crushed oats (home grown), one and a half dollars per cwt.

According to Dr. J. Augustus Voelcker, who signs the report, the interesting general result is apparent that not only did the crushed oats and separated milk feeding give the highest gain at the least cost during the feeding of nine weeks with the special foods, but that subsequently, when the calves were turned out in the fields and all fed alike, the gain of live weight continued to be higher with this feeding than with any of the other foods. This would lead to the valuable conclusion that the influence of the early feeding of calves has an important bearing on their after development, and that a "good start" is very essential.

The improvement effected by the early feeding with dry crushed oats was well maintained for a period of quite seven months after the special feeding had been dropped. The next best result, as regards increase of weight, was obtained with the whole milk calves, and it must be freely said that in February, 1913, they looked the best of all the lots, having more "bloom" than any of the others. In fact, it was then quite possible for anyone looking over the calves when all together to pick out which were the "whole milk" ones. The "crushed oats" lot similarly stood out above the remainder, and undoubtedly the poorest of all were the calf meal lot. These relative appearances had practically been maintained throughout. It is intended to carry on the experiment until the bullocks are ready to be sent to the butcher.

An experiment in manuring grass land for milk was carried out by the Midland Agricultural and Dairy College in 1912 as the fourth year in succession. Eight acres were dressed in 1909 only with ten cwt. per acre of ground lime to get rid of moss, and half of the eight acres was manured in addition with four cwt. of high-grade superphosphate and one and a half cwt. of sulphate of potash per acre. On the manured plot the herbage was more abundant than on the other, and contained a much larger proportion of clover. Two lots of cows, as equal as possible, were fed on the two plots, being shifted fortnightly. It was found that the usual reduction in the milk yield as the season advanced was much greater in cows when shifted from the manured to the unmanured plot, than when the change was in the opposite direction. At the end of the three months of the trial it was found that 119 gallons of milk more from the manured than from the unmanured plot were obtained per acre. This compares with 81 gallons in 1911, 86 in 1910, and 84 in 1909. At 12 cents a gallon the extra milk in 1909 left a profit of a little more than two and a half dollars. In the other years, as there was no expense for manure, the gains were all profits, and for the four years the profit per acre was 38 dollars. There must have been a further profit from grazing after the trial had ended in each year.

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### Crippled Pigs.

Weakness of the hind quarters is a condition frequently seen in growing pigs. It is a form of paralysis, and the exact cause cannot be stated for all cases, says H. P. Hoskins in a Wisconsin news item.

One of the most plausible explanations of paralysis in young pigs is improper feeding. A deficiency of mineral matter, especially lime salts in the diet, is believed to be responsible for the majority of cases. The shortage of lime salts results in the improper development of the bones of the growing pig, and the condition known as "rickets."

On the other hand, the diet may be all right, well-balanced and wholesome, and yet the pigs may not be able to assimilate their feed and get the proper nourishment from it. In this case, the fault lies with the digestive organs. Pigs raised in damp quarters may develop weakness of the hind parts, often said to be a rheumatic nature. In this case the remedy is self-apparent.

So it is evident that paralysis, rickets, malnutrition and rheumatism are similar conditions as far as symptoms are concerned. The same general line of treatment is indicated in all these conditions. Good, wholesome feed, a well-balanced ration, plenty of fresh air and sunshine, with dry, clean, roomy, well-drained and ventilated pens, are the first requisites.

Then see that the pigs have access to a supply of mineral matter in the form of charcoal, bone meal, crushed limestone, wood ashes, and salt. For medical treatment, tonics are indicated, nuxvomica being generally accepted as the best. The bowels should be kept moving freely by laxatives, as constipation is generally present. If treatment is started early, recovery may be expected; but quite often these conditions are allowed to progress too long before receiving proper attention, and then treatment is usually of no avail.

### Why Some Female Stock Do not Breed.

One of the causes of loss in all live-stock breeding is sterility. Animals in every breed, of all classes of live stock, are found from time to time to be barren, and the percentage is larger than the casual observer may think. From an article by G. Heslop, L. V. Sc., published in the Journal of Agriculture of Victoria, Australia, we glean some valuable information. Sterility, he defines as the incapacity on the part of an animal to reproduce its species. It may be permanent, relative or transient. Absolute when fecundation does not take place; relative when fecundation occurs only very occasionally, and when development of the young animal is arrested by accident or abortion. A relative sterility may occur in animals in low condition, when owing to malnutrition, there is imperfect development of ovum in the ovary and absence of sexual desire. It may also occur in fat, obese animals, where there may be fatty changes in the generative organs themselves. Relative or transient sterility is produced by causes which are removable, and is therefore amenable to treatment. Absolute sterility, as the name implies, is incurable. Fertility in animals is dependent upon normal structure and function of the generative organs, and any abnormality may be productive of either partial or complete sterility.

The generative organs which are most likely to be subject to abnormalities which cause sterility are the ovaries, womb, uterine tubes and the vagina. The ovaries are concerned in the development of ova or eggs, at the various periods of "season" throughout the generative life of the animal. Two horns run from the womb, the hollow muscle sac in which development of the young takes place, one to each ovary. Connecting these horns with the ovaries are the uterine or fallopian tubes. These tubes convey the ova or eggs to the womb. A portion of the hinder part of the womb projects into the cavity of the vagina and is somewhat constricted where it joins the vaginal wall forming the os or neck. In a normally developed os this constriction does not bring about occlusion of the passage between the vagina and womb, although a great reduction of size of the opening is occasioned. The vagina leads from the neck of the womb and opens externally. Prior to age at which the generative organs are functionally capable of reproduction, these organs are inactive, but when this age comes inactivity gives place to periodical activity and seasons of "heat" take place. Immediately prior to the appearance of heat or season, an ovum or egg undergoes ripening in the ovary and escapes along the uterine tube towards the womb. If a male and female animal become mated at this time the egg will become fertilized by one of the living particles contained in the semen of the male. The union of these male and female elements will result in the formation of a new individual, which will subsequently undergo development in the womb of the female until expelled at birth.

### PREVALENCE OF STERILITY

Statistics furnished by English authorities go to show that from 25 to 30 per cent of mares used for stud purposes fail to produce foals; and figures supplied by one of the large German studs go to show that the percentage of sterility in that stud was 28 before artificial insemination was practiced, and that after artificial insemination was introduced this percentage of sterile mares was reduced to 21 per cent. The degree of sterility varies in different breeds. For instance, in Great Britain, in Shire mares, the average percentage of sterility was shown to be about thirty-seven, while in Clydesdales, the percentage was about 32, and in Welsh and polo ponies, the percentage was about 30.

An examination of the figures available goes to show that an enormous annual loss is occasioned by this high degree of sterility in the larger domesticated animals, and, therefore, any means to remedy the evil will commend itself to breeders.

### CAUSES OF STERILITY

Injudicious breeding and management.—A great number of cases of sterility have as their casual agent some error in dieting and exercising. "Condition" in an animal intended for stud purposes bears an entirely different relationship to "condition" in an animal intended for slaughter and food. Grossness should never be confounded with good-breeding condition, it being a well-established fact that very fat animals, especially females, often fail to conceive when mated.

Sterility is frequently seen in animals specially prepared for show purposes, where obesity and grossness are often associated with idleness and lack of exercise.

In race-horses there is often noticed a remarkable degree of sterility, especially in females. As these animals are not usually allowed to breed until after the completion of their racing career,

a condition of sexual inertia is established; in addition, the hard, dry food given in a racing stable, tends to hold in abeyance the powers of procreation. Such animals, in the majority of cases, require a long spell of grass before they are mated, in order that they may be capable of reproduction. Food, although probably only an accessory cause, exercises a remarkable influence upon the production of sterility. Unbalanced rations containing excesses of foods which are rich in carbohydrates (starch and sugar) are capable of producing varying degrees of sterility, such foods as brewers' grains being especially notorious in this respect. Foods, such as peas, beans, lucerne, and clovers, containing large quantities of nitrogenous substances, are said to increase fertility. This they probably do to a limited extent by increased sexual desire and assisting in rousing up a sluggish and inert condition of the ovaries to the production of ova and season.

Poverty and overwork are conditions which are often associated, and which tend to lower the fertility of the animal by bringing about ovarian inertia.

The influence upon fertility exercised by age is worthy of consideration. The ability to reproduce the species becomes gradually less as age increases beyond the period of full physical development, until, finally, in old age, the sexual function ceases altogether. Animals which have been mated soon after the attainment of puberty are more likely to conceive than animals which have been kept sexually idle until old age is reached and then mated.

In-breeding exercises an influence upon fertility, it being found that continued in-breeding results in the production of animals possessing varying degrees of barrenness.

Hybrids, such as mules, are generally regarded as being sterile. Cases have been recorded where mules of both sexes have been capable of reproduction, but these cases are exceptional, the rule being that hybrids are sterile.

In mares of an exceedingly excitable temperament it is often noticed that immediately after service the semen is ejected by a series of violent straining motions of the genital organs. In these cases the effect of exhaustive work before service is beneficial. This fact was probably first noticed by the Arabs, as it was a common practice with them, in dealing with excitable mares, to submit them to fatiguing gallop immediately before service, and afterwards to leave them quietly at rest.

In vicious draft mares, brisk exercise and the pouring of cold water over the hind quarters, and loins after service has proved a benefit in preventing the ejection of semen.

Climate, as well as exercising an influence upon puberty in animals, may influence fertility. Animals subjected to sudden changes of climate are often rendered temporarily sterile until acclimatized. It has been noticed that animals are more fertile in countries where the climate is fairly even, and is not subject to sudden extremes of temperature.

In animals affected with chronic debilitating diseases or fevers a temporary and sometimes a permanent sterility is present, in which there is dullness of sexual desire and faulty development of ova in the ovary. In the treatment of this condition, certain drugs having a stimulating action upon the generative organs are indicated. These drugs include strychnine, compounds of phosphorous, arsenical compounds, and several non-official drugs. Another favorite drug among some horse-breeders, but one falling rapidly into disuse among veterinarians, is cantharides (Spanish flies).

In the use of any of these drugs for ovarian inertia the breeder should be guided by the advice of his veterinarian, for owing to injudicious use, they have been responsible for the production of sexual and other disorders more serious in their consequences than those for which they were originally administered.

A large number of cases of sterility have their origin in alterations in, and diseases of, the ovaries. This is especially true of the majority of cases of sterility occurring in cows, where alterations in the ovarian substance are common. These alterations usually take the form of cysts, which, by enlargement and pressure, destroy ovarian tissue and prevent the development of ova. It is not usual for both ovaries to be cystic at the same time, excepting in well-advanced, old-standing cases. When one ovary is cystic and the other one is healthy it is quite possible for the healthy ovary to take up the whole function of production of ova and for the animal to conceive. Usually, however, a cystic condition of an ovary gives rise to irritation in other parts of the genital tract, causing straining and expulsion of the semen at the time of service. The remedy for this condition is surgical, and has for its object the breaking of the cyst wall and the liberation of its contents; or, in some cases, the removal of the diseased ovary and cyst, leaving the normal