ment. Every sheepman you meet is candid, straightforward, broad-minded, big-hearted and generous. No matter where you go here, you cannot help being impressed with the honesty and fair dealing between the buyer and seller and the mutual confidence and kindly interest existing between employer and employee."

Ways in Which Foot-and-Mouth May Be Transmitted.

In an article in The Journal of the Board of Agriculture, by Professor B. Bang, of Copenhagen, a few interesting points as to the methods by which foot-and-mouth disease spreads were brought out. With outbreaks in Denmark it was found that an estate close to the coast has had more frequent recurrences of the disease than any. This fact is difficult to understand on the assumption that the infection is conveyed by fodder from foreign countries, which is distributed throughout Denmark; but, on the other hand, it points distinctly to the infection being carried hither from Germany, where the disease has existed continuously. Prof. Bang says it must be a natural mode of transport, but which? I have thought for many years that it might be birds, such as gulls, crows, rooks, etc., which might conceivably fly across from Germany and carry infection on their feet, or possibly in their intestines, after having collected it from infected manure. I also do not think it impossible that the infection may have been carried by the wind. It might be a question of particles floating in the air in a free condition, or attached to the legs of insects, or possibly spiders' webs, called in Danish the "flying summer," which are seen flying about in profusion.

The virus itself is not known, but it has been proved to exist in the matter contained in the vesicles, and to be liberated when these burst. Thus it comes out in saliva, the manure (after passing through the intestines), and the matter discharged from the vesicles on hoofs and udders. It is known that the virus is a very minute object—doubtless a microbe—and that it passes through the pores of a filter: that is to say, it is smaller than the smallest of the bacteria visible under a microscope. It is likewise known that very little is needed to infect an animal with the disease, inoculation with one five-thousandth of a c. c. of the contents of a vesicle being sufficient. Such small objects do not require large means of transport.

The remarkable fact that the disease may break out in an otherwise healthy country without any apparent cause has been observed several times in England, which is no more inclined than Denmark to receive animals with foot-and-mouth disease from infected countries. The theory of the wind as an infection-carrier is an old one, and in Holland observations have recently been made which seem to support it.

In Sweden observations were once made which seem to indicate that the infection can remain for a long time with an animal which has passed through the disease. A Dutch bull was once, after undergoing the prescribed period of quarantine, imported into a herd in the far north of Sweden, and several months later this herd was visited by the disease. It was found that the Dutch bull had a deep slit at the back of the hoof—such as is often formed during the disease when the horn comes off—and that this slit, just at the time that the disease broke out in the herd, had grown so far down as to release, presumably, the virus hidden in it. But there can be no question of any such infection in Denmark, as in no case have cattle been imported from abroad.

It is difficult enough to avoid its introduction through persons who have visited cattle markets, where infection exists, or who have come into touch with infected herds, but we are quite at a loss to cope with infection carried by birds or by the wind. The frequent occurrence of the disease at the time of year when turnip leaves are used as fodder might indicate that the latter are especially liable to carry the disease. This could not be the case if the turnip leaves were used in the form of silage fodder. Although, I do not believe much in the carriage of infection through foreign fodder or packing, it cannot, of course, be denied that there is something in the suspicion. The same applies to railway wagons used for cattle transport.

In some cases the mode of infection has been easy to trace, animals having been moved from one infected herd, where the disease was not discovered in time, to other herds. In other cases it was clearly due to human agency, as it may have passed on to neighboring properties, but in some instances the connection has not been explained. In a densely populated district with close intercourse there are, however, plenty of opportunities for the infection to be carried, even if the means are not always clear. Birds and the wind may, of course, play an important part.

The treatment of diseased animals consists first and foremost in very thorough care. Suitable soft and clean fodder and ready access to water are the most important requirements as regards the mouth complaint, and dry and clean litter, with ample straw, is of the utmost importance when dealing with the teat and hoof complaints. Proper cleaning of the stalls and good ventilation are also very important. There is no specially acting remedy as far as we know, and in its mild form no medicinal treatment is needed for the mouth disease. The affected teats and hoofs, may however, occasionally benefit by expert veterinary treatment.

THE FARM.

Notes on Phosphatic Fertilizers.

(Specially contributed to "The Farmer's Advocate.")

Practical experience and scientifically conducted trials have alike proved that for the majority of cultivated soils, phosphoric acid ranks next in importance to nitrogen when it is necessary to consider the return of plant food in the form of commercial fertilizers. The more common materials employed to furnish this element may be briefly discussed as follows:

SUPERPHOSPHATE.

Superphosphate, also known as acid phosphate, is prepared by acting upon bones or one or other of the naturally-ocurring phosphate rocks with sulphuric acid. The result of the reaction of the acid is the conversion of the larger part of the phosphoric into a water-soluble form, hence it is that superphosphate, on the larger number of soils, is superior to other phosphatic materials for furnishing readily available phosphoric acid for crops with a short season of growth, such as the cereals, and for crops whose early growth must be stimulated, as in the case of vegetables. It has been found particularly valuable for turnips—a crop that readily responds to phosphoric acid—pushing them forward and thus enabling them to successfully withstand the attack of the turnip fly, which frequently is so disastrous in the early stages of their growth.

On mixing superphosphate with the soil a gradual conversion of the water-soluble phosphoric acid takes place and so-called "reverted" phosphoric acid is formed. The rate at which the change takes place depends largely on the character of the soil—that is the proportion and nature of the lime, iron and alumina compounds it contains. This reverted phosphoric acid though not soluble in water is nevertheless "available," for it is more or less readily attacked and dissolved by the soil moisture containing carbonic acid and by root secretions. The intimate incorporation of this reverted phosphoric acid with the particles of soil—the soluble phosphoric acid having first been brought into solution by the soil moisture and thus mixed, if we may use the term, very thoroughly throughout the whole mass of the soil—allows for a continuous supply of this element in an assimilable form to the crop during the whole of the growing season. It has been shown that this reverted phosphoric acid is practically as valuable as the water-soluble form. A well made superphosphate therefore ranks first among phosphatic fertilizers in point of availability. The usual dressing is in the neighborhood of 300 lbs. per acre, being broadcasted or drilled in on the prepared land before seeding.

Ruby of Maisemore.

Red; cross-bred Aberdeen-Angus-Shorthorn heifer, two years ten months old. Champion over all at Norwich, England, Fat-stock Show, 1912; weight, 1,700 lbs.

BASIC SLAG.

Basic Slag is a by-product in the manufacture of steel by the Bessemer process, and is put on the market under various names—Thomas phosphate powder, etc. Its value as an agricultural source of phosphoric acid was discovered in 1883 and since that time its employment has constantly increased, more particularly in England and Germany. Its use in Canada dates back only a few years, so that our experience here is as yet but limited.

Basic Slag will contain from 14% to 20% phosphoric acid, according to the richness in the process of manufacture. It is essentially an alkaline phosphate, containing a large percentage of free lime and while its phosphoric acid is not soluble in water, it has been found that slag readily yields this element to growing crops on certain classes of soil. In this connection it should be pointed out that the degree of its availability depends very largely on the fineness to which the slag has been ground. The "relative activity" of basic slag, the season of application, appears to be about 60, that of superphosphate being represented by 100. Certain experiments have shown that the "after effect" of slag exceeds that of superphosphate, but doubtless results will vary with the character of the soil and the fineness of the slag.

The soils most likely to respond to basic slag are those which are naturally acid, peaty and muck soils rich in vegetable matter and those deficient in available lime. It has given good results on soils that have been heavily manured for a number of years and which are consequently rich in nitrogen and poor in mineral plant food. An average dressing is 500 lbs. per acre, the slag being well harrowed in on the prepared soil. It is largely used in England and Scotland for top-dressing pastures, but this practice is not likely to be a profitable one in districts subject to drought during the growing season.

It is best suited, as a source of phosphoric acid, for crops with a long season, for roots, for orchard use and for laying down to grass and clover—particularly influencing the growth of the latter.

BONE MEAL.

While bones are generally classified with phosphatic fertilizers, the fact must not be lost sight of that they contain, associated with the phosphate of lime, a considerable amount of nitrogenous organic matter. This nitrogenous matter readily ferments, promoting the decay of the bone meal in the soil and resulting in the liberation of both the nitrogen and phosphoric acid in available forms. The factors favoring this decomposition and liberation of plant food are (1) comparative freedom of the meal from fat; (2) a fine state of division and (3) a warm, moist, aerated loam of medium texture. Vert little "raw" bone meal is now on the market, as "uncooked" bone is very difficult to grind fine, and the meal would be more or less fatty and hence slow of decay. Boiling or steaming the bones certainly reduces their percentage of nitrogen (though the loss is not great unless glue is being made) but it leaves them richer in phosphoric acid, freer from fat and in a condition that allows of finer grinding, so that all things considered, the meal from steamed bone is more directly valuable as a fertilizer than "raw" bone meal. Bone meal, like all other fertilizers should be bought on guarantee analysis; there are various qualities on the Canadian market, the nitrogen usually ranging from 2.5% to 4% and the phosphoric acid from 20% to 26%. In bone meal after the manufacture of glue, the nitrogen will be between 1% and 1.5% and the phosphoric acid from 28% to 30%.

A consideration of the foregoing shows that bone meal must be valued for its nitrogen as well as its phosphoric acid, and that it may be classed with the "lasting" manures rather than those which furnish immediately available nourishment to the crops. Its application leads to the improvement of the soil—chemically, mechanically and biologically. It is for this reason that of the so-called commercial fertilizers bone meal, more than any other, resembles farm manures, though this is not to be construed as saying that bone meal can be regarded as a perfect substitute for manure. There can be no doubt, though, that the mixture of wood ashes (supplying potash) and bone meal—so popular in Nova Scotia among orchardists and once so wide-