of gestation, bad odours, plethoric condition, diseases of the system, (such as cattle plague, foot and mouth disease, pleuro-neumonia anthrax, tympanitis, tetanus, epilepsy, &c.) It is the belief of some authorities that abortion is altogether an infectious and a contagious disorder, and is propagated by a micro-organism, which enters the system only through the vulvular opening. Others again believe that the micro-organism is capable of producing the disorder by gaining entrance to the system by various means. All the above enumerated causes of sporadic abortion are, however, generally considered to be only exciting causes.

It would appear since the contagious and infectious form of the disorder is now proved beyond doubt, that the disease-producing germs must be present in every case, and that the organisms rapidly multiply after an abortion which may in certain instances take place sporadically.

All those who have anything to do with cattle are aware that epizootics, such as cattle plague, or to give its Ceylon misnomer "murrain," do produce abortion, and this has been conclusively proved at the Government Dairy farm during the last outbreak of the disease there. The outbreak, as a matter of course, was a clear case of sporadic abortion; but when cows that were not suffering from the plague, but that were in the same herd, aborted also there would appear to be no doubt that the "abortion" had assumed an infectious and contagious form.

Of recent years quite an amount of literature has been cropping up on the subject, and only the other day the Committee appointed by the Royal Agricultural Society of England to investigate this subject, completed and issued its report, but the Committee has not been able to agree upon any point except that abortion can assume a contagious and infectious form.

Continental Veterinarians, such as Franck, Nocard and Lebat, had made a series of investigations on this subject before it was so prominently brought before the British public, and long before it was thought necessary for the Royal Agricultural Society to appoint a Special Committee. Dr. Salmon of the United State's Agricultural Department published a report of a series of investigations made in America so far back as 1883.

What we are concerned most is to be able to recognise, and to follow the course of an outbreak of abortion in our herds, and, to know what steps we should adopt to prevent its occurrence. Professor Nocard has successfully coped with abortion through his antiseptic method of treatment, and the published evidence given before the Special Committee of the Royal Agricultural Society is in favour of not only Professor Nocard's antiseptic treatment, but also that advised by the American authorities; while a combination of the two, it appears, has given the best results.

Professor Nocard's treatment consisted of the injection into the organ of the aborting animal a solution of corrosive sublimate made by dissolving 15 grains of the sublimate along with 1½ oz. of salt in a pint and a half of lukewarm water. This method of treatment is calculated not only to destroy the micro-organisms that may exist, but to prevent the entrance of these germs. The American method consists in the internal administration of carbolic acid in warm bran mashes, from a ¼ to ½ an ounce of carbolic acid being gradually mixed with bran and warm water and given to the animal as a feed. As a matter of course this method of treatment is adopted with a view to destroy any organisms that have entered the system. But as was amply proved in the evidence before the special Committee of the Royal Agricultural Society, a combination of the two methods has given eminently satisfactory results.

An aborted cow should always be kept apart rom the herd, and the shed, persons and utensils employed in its feeding, &c., promptly disinfected by using either Jeye's or Condy's fluid. After this the application of the corrosive sublimate lotion and the administration of carbolic acid in bran mashes may be proceeded with. The rest of the cows of the herd should also be washed and disinfected. A bull that has served a recently-aborted cow should not be used for covering the healthy cows. In any case an aborted cow should not be served for at least three to four months after the abortion. These simple rules and in addition cleanliness and care in feeding should do much towards the prevention of this disappointing disorder among cattle.

W. A. D. S.

SISAL HEMP.

The following facts concerning Sisal Hemp are from the annual report on the Bahamas for 1893:—

One hundred pounds of leaf yield not more than four or five pounds of fibre.

The generally accepted standard of 600 plants to the acre, is now in many cases being changed to 800, and in some instances to 1,000. If this increased number be not found to impede harvesting by the inconvenient crowding of the plants, the yield per acre should, of course, be largely augmented. The estimated annual yield of a single plant is two pounds of fibre, and thus, instead of a return of 1,200 lb. from the earlier planting of 600 suckers, assuming that the results are not modified by want of room for the full development of the plants, 2,000 lb. will be the expected yield where 1,000 plants are given to the acre.

It is highly satisfactory to know that a machine manufactured by the Todd Company of New York has been at length found to work admirably, the fibre being cleaned perfectly, at the smallest possible amount of waste (*Kew Bulletin*, 1894, p. 189). There can be but little doubt that this machine will be universally adopted, as, besides its efficiency, it is cheaply operated, a woman to feed the machine with leaves, another to remove the finished fibre, being all the labour attendant on this process. It has been for some time a subject of much thought as to how the small cultivators were to utilise their labour where, as in the great majority of cases, they were too poor and their plantings too limited to admit of the cost of a machine. A satisfactory solution, however, has now been found which will be a great boon to this class, and will bring the blessings of the industry home to the hum-

blest peasant in the Colony. The process is as simple as it is available to all, and consists of a slit being made in the thick end of the leaf, when it is torn asunder, leaving the inner part exposed, and by then soaking it in salt water, which is never far to reach, in about a week the pulp may be removed by hand and the fibre preserved. No waste whatever is found in this method; and it is understood that a man or woman, or grown boys or girls, may turn out from 50 to 60 pounds of fibre as the result of a day's work. The plan is being adopted throughout the Colony, and what was for some time deemed a missing link is thus effectively supplied.

TROPICAL FODDER GRASSES.

(Reprinted from the Kew Bulletin.)

The selection of suitable grasses for cultivation in tropical countries is a matter of considerable importance. Few countries have completely solved the question. It is evident also that a good deal of time and energy is spent in the effort to introduce foreign grasses, when there are excellent indigenous grasses close at hand. It is proposed to draw attention to a few grasses that have attained to first rank for fodder purposes in the tropics, and to give particulars respecting the conditions under which they have been found to thrive. It is well known that the same kinds of grasses do not succeed equally well in all localities. There are certain conditions and peculiarities of climate and soil to be considered; but there is no reason to doubt that if careful experiment is made suitable grasses can be found for cultivation in almost every tropical country. In some of our colonies it is well known that grass, even for valuable horses, is gathered day by day from waste places and jungles. Such fodder is not only poor in quality, but it is liable to be infected with disease from stray animals. Further, during seasons of drought, the fodder supply is likely to fail altogether. The selection and cultivation of grasses, with particular reference to their grazing qualities, or for the production of hay, should receive more attention, and it will doubtless become, before long, a regular branch of rural industry in the tropics, as it has been for so many years in temperate countries.

Natural Herbage.

In the tropics the difficulty in establishing grasses is caused by the usually rank growth of weeds and bushes. These soon overrun any cleared area, and they have to be continually eradicated, or the grass would be completely destroyed. The natural herbage in most tropical countries would, of itself, form excellent pasture for cattle and horses. There is hardly any part of the world entirely devoid of good grasses, and these should first of all receive attention. Where no suitable fodder grasses are available, then, under such exceptional circumstances, it would be well to introduce the useful "Guinea grass" and "Para grass" for cultivation on land suitable for the purpose. In countries like Ceylon and Jamaica, there are vast stretches of lands, known as "patanas" and "savannahs," where somewhat coarse grasses have established themselves almost to the exclusion of everything else. Even these grasses, although in a fresh state they may be distasteful to cattle, become, after being cut and partially dried, very acceptable food to them. Under cultivation, good pastures can, as a rule, be established by clearing the land of weeds and bushes, and encouraging the spontaneous growth of local grasses from seed carried from neighbouring areas. This is regularly done in Jamaica in regard to Guinea grass. During the first year or two the land requires to be carefully weeded, and if the soil is poor it should also receive a dressing of manure. After the grass has become thoroughly established an annual clearing after the rains is all that is required. It should, however, be understood that continuous feeding is injurious to the permanency of good pastures. The best grasses are thus destroyed, and rank growing ones gradually take their place. Close feeding for a time is advantageous, but the pasture should have time to recover before the animals are again placed upon it. Further, it is better to keep cattle on a portion of the pasture at one time, and not allow them to wander at will over a large area.

Trees in Pastures.

Thwaites recommended that in Ceylon trees should always be planted upon land laid out for permanent pasture. The trees would afford grateful shade to the cattle, and they would prevent the grass from being entirely dried up during seasons of drought. Trees would also add to the beauty of the country. Most extensive pastures dotted over with shade trees exist in Jamaica. Many trees, such as the Saman (*Calliandra Saman*), not only give excellent shade, but the pods are a most wholesome food for cattle. The commoner and more hardy sorts of mango might be planted for the same purpose, as also the Ramoon (*Trophis americana*), the leaves of which afford a very nutritious food for cattle in tropical America; the bread nut (*Brosimum Alicastrum*); the Jack tree (*Artocarpus integrifolia*); and the bastard cedar (*Guazuma tomentosa*). The leaves as well as the fruits of the last are much liked by cattle. This brief list of useful pasture trees might be considerably enlarged. It would be noticed that many of the trees mentioned belong to the natural order, *Urticaceæ*. As the plants belonging to this order are so widely distributed over tropical regions, each country could make its own selection of suitable pasture trees. The best tree of all is, undoubtedly, the Saman. (*Kew Reports*, 1878, p. 18, *et. seq.*)

Grasses for Dry Regions.

Where the climate is moist and humid the selection of suitable grasses presents little difficulty. In countries subject to periods of prolonged droughts the circumstances are wholly different. The great want in such regions is the introduction of grasses that will maintain growth and vigour during many months when no rain falls. Grasses of this kind are to be found in the Bahama grass (*Cynodon Dactylon*), the Kangaroo grass of Australia (*Anthistiria australis*), and the Mitchell grass of Australia (*Astrebla triticoides*). These will stand periods of prolonged drought, and, in the case of the last, cattle are said to fatten on it, even when it is much dried up. In Jamaica, during severe droughts, cattle feed almost entirely on the underground stems of the Bahama grass. In dry soil impregnated with salt there are several grasses known in India affording a considerable amount of forage. A variety of *Sporobolus arabicus*, Boiss. (S. pallidus, *Duth.*) known as *Kalusra*, is mentioned by Duthie as constituting the greater