posite the infected section. Holes should be dug at intervals of from ten to fifteen feet along these furrows. The caterpillars fall into the furrow, crawl along it, and finally fall into these holes, where they may be killed by crushing or an application of kerosene. The bulletin shows a cut of a large corn field which was almost entirely saved by this method.

4. TRAPS.—The females of some insects are unable to fly, and must reach the foliage by crawling up the trunks of the trees whose foliage their larvæ feed upon. This is taken advantage of in the case of the canker worm. A band of dendrolene is smeared on the trunk, and acts as a trap beneath or through which no insect can crawl and live.

Dendrolene is a crude petroleum product, and is in the nature of an impure vaseline, more or less greasy, smooth, of butter-like consistency at ordinary temperatures, and absolutely resisting wash by rains. Applied three-sixteenths of an inch thick or more to the surface of the tree to be protected, it will last an entire year without renewal. It should not be left too long on young trees, as it has a tendency after a time to injure the bark, especially so in the case of peach trees. On such trees it should be washed off after midsummer with some potash wash.

5. AGRICULTURAL.—Finally the most important of all preventive measures is good farming. Keep crops of all kinds in the most vigorous possible condition, with plenty of readily available plant food. Any animal or plant kept in a sickly condition is more liable to attacks from parasites that when in a perfect state of health. In all cases make the conditions as unfavourable as possible for the propagation of insects.

In the case of field and garden crops a systematic rotation should be followed as far as possible. Particular insects attack particular crops, and if the same crop is grown continuously for a number of years on the same land, the insects attacking it become more and more numerous each year. This is especially seen in the case of old pastures. They furnish an excellent breeding ground for grasshoppers and such insects, and grain crops in the near vicinity are more liable to attack than when at some distance away.

The sowing of good seed is another factor of importance. Peas affected with "pea-weevil," *Bruchus pisi*, are often sown. The bugs are thus set free, and remain ready to deposit their eggs on the pea pods when the latter have nicely formed. A good remedy for killing these insects is to place the grain in an air-tight vessel, and place a saucer containing some carbon bisulphide on the top of the grain, and cover the whole up for forty-eight hours. The heavy vapor will sink among the peas and destroy the bugs or any insects in or among the grain. One ounce is sufficient for 100 lbs. of grain. As the compound is very inflammable and volatile great care should be taken not to bring any light near it.

Varying the seeding time of some kinds of grain has also a preventative affect. In some localities which are subject to attacks from pea-weevil, peas are sown at a later period than usual, and thus escape the first attack, which is generally the most destructive.

Good drainage also acts as a very good insect preventive. Such insects as the "crane fly," which are most frequently seen in low, rank meadows, or along ditches or sluggish streams, and whose larvae feed upon the roots of grasses in such places, are deprived of their breeding grounds by draining the land affected.

Lastly, fall ploughing is one of the best insect destroyers. The eggs and pupa cases of the insects are turned up and exposed to the action of frost, and thereby large numbers are killed. It is quite safe to venture the assertion that this method is the most destructive of all to insects affecting field crops.

T. F. PATERSON.

O. A. C., GUELPH.

The Relation of Bacteria to the Souring of Milk.

WITH the exception of the first few drops in the milk duct, pure milk drawn from a healthy cow contains no bacteria, so that all bacterial contamination of the milk comes from external sources. For practical purposes, however, this statement requires to be modified. The immediate atmosphere surrounding the cow is thickly populated with bacteria and in the process of milking, the milk ordinarily becomes heavily seeded with them. In a sample of separated milk, which gave no indications souring, we have found an average of 74,000 colonies in every cubic centimetre; each colony being the product of a germ growth.

The sources of contamination are various. One that is always present is the milk left in the milk duct after milking. This duct is open to the air and the germs find here a temperature and food suitable for their rapid multiplication. Another cause is the air, although it has come to be regarded as a less potent source than formerly. Of course if while milking, the stables are swept or any work done which will raise a dust the danger is greater. The milk vessels and the hands of the milker are also sources of contamination. Most of the diseases capable of being carried in the milk, such as typhoid fever, are transmitted in this manner. The hairs of the cow's body are always covered with dust and dirt, and unless the udder be carefully brushed and then moistened many impurities, containing bacteria, will fall into the pail.

In the ordinary souring of milk the bacteria act upon certain constituents, notably the milk sugar, and produce from them acids which give the sour taste and curdle the casein, making the milk thick. Fortunately, lactic acid is the principal one formed, although smaller quantities of other kinds usually accompany it, and predominate as soon as the lactic germ ceases to multiply.

Many people think that electricity has a special effect upon milk, and attribute its quick souring during thunder storms to this cause. In experiments in which electric sparks were discharged over the surface of milk little or no effect was produced on its composition. It was shown that electricity is not of itself capable of producing sourness or even hastening the process to any extent. It seems that the connection between the thunderstorm and the souring of milk is of a different character. We know that a warm sultry atmosphere is conducive to the rapid growth of bacteria, and it generally happens that the quick souring of milk and the thunderstorm occur together, not because the thunder hastened the souring but because the climatic