southern Ohio the percentage of survival in the spring of 1928 was low, and conditions early in the spring were unfavorable for multiplication; but the second brood of beetles did considerable damage in some localities. In the vicinity of Columbus the beetle is becoming more numerous each year.

Bean Area in Michigan Menaced

In Michigan, so far as known, the bean crop has not as yet been damaged by the beetle, but the insect has become more generally distributed over the southeastern counties and may prove to be a serious menace to this important bean-growing area. A similar situation exists in the western part of New York State.

Research on methods of field control is being stressed even more than it has been during the last few years, and many tests are being made with nonarsenical insecticides. Sodium fluosilicate, one of the insecticides tried, has caused considerable injury to bean foliage, especially in 1928.

The advantage of the use of a stomach poison, such, for instance, as magnesium arsenate, is great on account of the continuous protection which it affords to the foliage which has been sprayed. Excellent results are usually obtained in the case of bush beans if the plants are sprayed up to the time of blossoming, in accordance with directions given in Farmers' Bulletin 1407–F. Along the Eastern Shore even this arsenical may cause some injury to foliage. In that section only certain grades of calcium arsenate may be used on bean foliage, and care must be exercised in the use of those.

Pyrethrum extract, especially if made with a light oil solvent, is effective in controlling the insect if a very thorough job of spraying is done at intervals of a week. The insects must be touched by the spray since it kills by contact only. This material may be used without danger on green beans after the pods have set, since, in the dilutions recommended, it is not poisonous to human beings.

NEALE F. HOWARD.

Milk Stations For Cooling Product Help Maintain Its Quality

The rapid growth of our large cities has made it necessary for the milk supply to be received from increasingly greater distances. When cities were small, milk was received from comparatively short distances; after it had been delivered to the country railroad station by the producer, it reached the city within a few hours. Even then, however, the milk did not always arrive in good condition because the producer did not have proper facilities for cooling it. Furthermore, there were often delays in getting the milk on the train and transferring it to the city plant from the railroad station. When milk stands for some time at a shipping point and then is transported for a long distance before being cooled, it will not arrive in good condition.

To provide a means of cooling the milk before shipment, country milk receiving and cooling stations have been established either by the producers or by the city distributors of milk at points in the country varying from 40 to more than 300 miles from the city. These stations are located in good milk-producing sections where a supply sufficient to insure the economical operation of a plant can be obtained

from comparatively short distances. They are also usually located on the railroad so that the milk can be loaded directly from the plant to the shipping car. An adequate water supply and proper sewage disposal are important factors to consider when selecting the location for a milk-receiving station.

Method of Handling Shipments

The milk is brought to the station from the farm in the early morning, usually between 6 and 9 a. m., and in some cases it must all be in by 8 a. m. If the morning's milk reaches the plant within a short time after milking, it need not be cooled by the producer. In some sections of the South where the producer does not have proper facilities for cooling and storing the milk overnight, it is brought to the station twice a day. As the milk is received from the producer it is removed at once from his cans, weighed, and a sample taken for the purpose of determining the quality. The producer's cans are immediately washed and sterilized and returned to him. The milk flows from the weigh can to a mixing vat, whence it goes over a cooler which reduces the temperature of the milk to from 36° to 40° F. It is then drawn into shipping cans, which have been previously washed and sterilized, and loaded on the shipping car, which is an insulated milk-refrigerator car that has been set off at the station several hours previously and will be picked up when the milk train arrives. If the quantity of milk handled at a station is too small to fill a car, the car will not be set off but the milk must be held in the plant until the arrival of the train. In that case a cold-storage room will be necessary.

The building for the country milk-receiving station should be simple in construction. A frame structure with concrete floors and side walls of concrete to a height of about 3 feet is usually satisfactory. The floors must be well drained and the building well lighted and ventilated. The equipment for a country station should be as simple as possible so that it can be easily operated and cleaned. Equipment for mechanical refrigeration is usually provided, though in the northern part of the country enough natural ice is often harvested during the winter to supply the requirements for refrigeration throughout the year. Other equipment necessary are scales and weigh can, receiving vat, and milk cooler. A can washer and sterilizer must be provided for cleaning the producers' cans and the shipping cans. A steam boiler is needed to produce hot water for cleaning purposes and steam for power where electricity is not available.

During recent years much milk has been transported from the country to the city in glass-lined tanks mounted on railroad cars or on automobile trucks where conditions are favorable for truck transportation. Where this is done, no shipping cans are required. Instead, an insulated storage tank must usually be provided to store the milk after it has been cooled. At some such stations the transporting system is so arranged that the milk may be pumped directly from the cooler to the tank truck or tank car and no storage tank need be provided except as an emergency measure.

Various Functions Performed

During recent years, because of the building of automobile roads, it has been possible to bring the milk from the farm direct to the city

plant by motor truck. When this can be done, a country receiving plant is not needed. This applies, however, only where milk is received from distances within the radius of the economical truck haul, which is not over 75 miles. As the supply for our large cities usually comes from considerably greater distances—often 300 miles or more—the country station will no doubt continue to perform an important function. Furthermore, where milk is brought to the city in tank trucks even from short distances from the city, the country station is required to serve as a concentrating point for receiving the milk from the producers and for cooling it before it is shipped.

Thus country milk plants serve a very useful purpose. They furnish a place for receiving the milk from the producers and for cooling it, thereby permitting it to arrive in the city in good condition. They also permit the producers to keep in closer touch with the person who weighs and samples the milk than would be possible if the milk were shipped direct to the city plant. The station operator keeps a close check on the quality of the milk that is received from each producer and can often assist him in improving the quality of his product by helpful advice. Furthermore, the country plant may serve as an equalizing agent for the uneven quantities of milk produced at different seasons of the year. During the season of surplus production the milk not needed in the city may be held in the country at a station equipped for manufacturing milk into by-products, with resulting savings in freight charges.

C. E. CLEMENT.

MOLDS Pressed Into Service in Utilizing Some Farm Products

Molds are known to most people as a pest. They invade the household, attacking foodstuffs in general and growing readily on damp clothing, paper, and leather. They seriously damage stored fruits, tubers, and grains. Science long ago declared war upon them and has been somewhat successful in combating their destructiveness.

Centuries ago, however, mankind learned that molds could be made to do useful work. Oriental peoples have used them for hundreds of years in the preparation of various foodstuffs and beverages, and in Europe it was found that some species are valuable agents in the ripening of cheese. In recent years molds of various species have been systematically studied with the view of utilizing some of their characteristic properties. In France they have been put to work to break down starchy materials in various alcoholic-fermentation processes. In the manufacture of gallic acid, an important dye intermediate made from tannin, the destructive characteristics of a mold have been employed; the process is based on a mold fermentation. A mold is now being used to manufacture citric acid from cane sugar, an acid that formerly was obtained exclusively from citrus fruits. It is also possible by mold fermentation to make citric acid from corn sugar. Recently a process has been developed in the United States Department of Agriculture whereby corn sugar is turned into gluconic acid through mold fermentation, thus at once producing an acid with possible industrial uses and opening up a new outlet for corn sugar.

There is a large field for investigation in the action of molds on farm wastes. Xylose, the one almost universal component of these wastes, is