(2) *Steam-production on the Farm.*—A means of producing steam on the dairy-farm has engaged the close attention of the Institute. It is well known that great difficulty is experienced in effectively sterilizing milk-cans on the farm. Whilst cream-cans can be washed and steamed at the factory, cans used for the taking of milk to cheese-factories cannot be similarly treated, because they are generally employed for the carting-back of whey to the farm; hence provision must be made to have them effectively sterilized there. A suitable simple steaming-device has been devised which can be made by any farmer at a cost of from £1 10s. to £2. It simply consists of a shallow basis (an old cream-raising basin), 4 in. deep by 30 in. wide, provided with a close-fitting lid to which are fitted three jets made of 1 in. water-pipe. This pan is set on a stand sufficiently high to be heated by a primus lamp. The lid of the pan and battens nailed on its upper surface around the spouts, so that the can when inverted over a spout will rest on these battens and thereby keep the mouth about an inch from the lid. Boiling water from an electric heater is poured into the pan until there is a layer of about 1 in. to 2 in. deep. The lid is then fitted on, and the primus lamp set alight underneath. In a short time steam emerges freely from the three jets, and the cans to be sterilized are inverted over these. They are kept inverted until the lip of the can is so hot that it can just be touched by the hand. This takes about eight minutes for a 10-gallon can. The can is then taken off and allowed to dry of its own accord. Such a can is just as effectively sterilized as is one by steam from a high-pressure boiler, if it is given the necessary time to heat. Cans treated in this way, of course, must be previously thoroughly washed. An adaptation of this can be made from an ordinary copper. If a copper be provided with a wooden lid and a piece of inch piping be inserted in the lid, a can may be steamed as described. The objection to the copper is that it is slow in action, because of the small evaporating-surface in relation to depth of water. The unit described can keep a worker busy washing and sterilizing cans, since with three spouts in operation he can remove one can every three minutes, which is just long enough to allow him to wash one ready for sterilizing. Can-lids, parts of the separator, and similar small fittings are sterilized in a box with a sparred batten fitted over the jets.

Another means of providing steam on the farm has been experimented with. This is a unit which aims at developing steam from electric energy. Heat from electricity is accumulated in a heavy lubricating-oil by keeping immersed in the oil an element through which electric current is constantly passing. When it is desired to generate steam by opening a valve, the hot oil is allowed to pass through a tube which is surrounded by a water jacket. The heat then passes from the oil to the water, and steam under pressure is generated. This unit is sold by a Wellington company who hold patent rights. The Institute has tested the efficiency of this machine under working-conditions. It has been proved that steam under pressure can be produced which can effectively sterilize all milking-shed equipment, but, so far, difficulty has been experienced with the regulation of the temperature of the oil. An improvement to meet this difficulty has been made, and a new unit is now under trial.

(3) *Methods of testing Milk for Butterfat.*—A series of trials was carried out to compare the relative accuracy and usefulness of the Babcock, Gerber, Morsin, and Hoyberg methods of testing milk for butterfat for herd-testing purposes. The Babcock test is most commonly used in New Zealand, but the others offer certain advantages. The Gerber is rather more mobile, in that the centrifuge employed is scarcely so heavy and bulky. The Morsin and Hoyberg tests are even more mobile than the other two, since they require no centrifuge for the separation of fat. They have also the advantage that they employ a non-corrosive liquid, in place of sulphuric acid, for dissolving of the milk solids. The trials carried out at the Institute show that the four methods of testing are equally reliable when fresh milk is employed. The Morsin and Hoyberg methods are not suitable for the testing of milk preservatized with potassium bichromate, formalin, or mercuric chloride. It was also shown that these tests may give rise to errors if care is not taken to keep the water-baths used for the separation of fat at a proper temperature; but this difficulty need not be experienced under working-conditions, on account of the ease in maintaining the temperature of the water-bath within the desired limits. Full details of this investigation are being published at an early date.

(4) *Openness in Cheese.*—Openness in cheese is reported to be the worst defect of New Zealand cheese at the present time. Accordingly an extended series of trials to inquire into the causes of openness were commenced in January, 1929, as soon as the factory could be brought into operation. The scheme of investigation was so set out as to admit of team-work between factory and laboratory workers. The greater part of the time has been devoted to investigating whether pasteurization of milk causes openness of cheese. Since pasteurization is so widely adopted in New Zealand, it seemed desirable to determine first of all whether it was a contributing cause before other phases of the work were tackled. Throughout the investigations cheeses have been made daily from raw and pasteurized milk, the same milk being divided into two portions for this purpose. Milk has been pasteurized by the flash method at temperatures varying from 145° F. to 175° F. by 5° F. At each temperature at least six cheeses were made. Experiments were also carried out with the pasteurization of milk by the Holding method at temperatures varying by 2° F. from 140° F. to 150° F. for thirty minutes. These cheeses were also made from milk divided into two portions, and raw-milk cheeses were made from the same milk to act as controls. The milk used in these experiments was produced by the College herd, and care was taken to secure as pure a supply as possible, so as to eliminate factors arising from bacterial contamination. Very detailed records were kept of the manufacture of each cheese, and the cheeses have been regularly examined at seven days old and fourteen days old. Thereafter, half of the total number were exported to Britain, and arrangements were made with the Director of the Dairy Division to have these examined in England and reports forwarded to the Institute, so that we can get information of their behaviour during transport. The other half of the total number has been kept in the cold-storage rooms of the dairy factory, so that these can be examined again when sixteen weeks old. Careful bacteriological and chemical analysis have been made of the milk and cheese during the course of the investigation, in order to collect as much information as possible