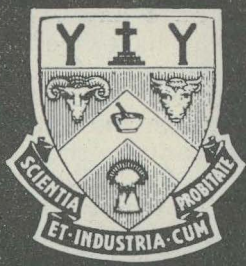


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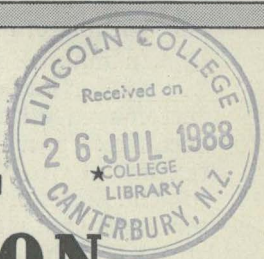
CANTERBURY AGRICULTURAL COLLEGE

SCHOOL OF
AGRICULTURE

UNIVERSITY OF
NEW ZEALAND



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COMPETITION FROM SYNTHETIC PRODUCTS

II.

Dr. I. E. Coop, Professor of Agriculture
(Animal Husbandry)

Margarine

The case of margarine-butter competition is in many respects similar to that of the synthetic fibre-wool position. Few New Zealanders have any experience of margarine, probably only those who have lived in Europe during the war. Margarine is a mixture of vegetable fats specially blended to simulate butter. In certain parts of the world, notably in the Tropics, plants are grown for the production of vegetable oils, such plants as the peanut and the coconut. In other countries, such as U.S.A., vast quantities of oil-bearing seeds, such as cotton-seed and soya beans, are also grown. The oils can be pressed out or extracted from these materials. The liquid oils are then hardened by a process known as hydrogenation, whereby they are converted into solids or fats. By controlling the degree of hydrogenation one can make a hard fat or a soft fat.

In making margarine a suitable blend of these fats is taken—for instance, a mixture of hydrogenated coconut oil, cotton-seed oil and peanut oil. The blending is important, because it is a means of controlling the final hardness and texture of the margarine, so that one can make a hard one for the summer use and a soft one for winter use. A butter-like flavour is developed in the blended fats by adding about 15% of milk which has been treated in a special way to bring out its flavour. The milk serves also to emulsify the fats, for butter itself is an emulsion of butter-fat in water. As the fats are being emulsified in the milk, vitamin A and vitamin D are added to bring the vitamin content up to that of butter. Colouring matter for appearance, and salt for taste, are also added. The final product is a material which, if well made, tastes and looks very like butter. There are some people who are unable to tell the difference between butter and margarine, but the great majority have little difficulty, and almost universally prefer butter. From the scientific and nutritional point of view, margarine as made in the above way is not inferior to butter. It has the same food value. The texture and consistency of butter, which gives the latter its famous ease of spreading on bread, is better than that of margarine, as also is the palatability, taste and aroma. These differences

are, however, not very great, and may in time be overcome by margarine manufacturers. A further factor at present in favour of butter is prejudice—the fact that housewives have for thousands of years been using butter.

During the war the fat ration in Britain has been 4oz margarine, 2oz butter and 1oz lard per person per week. In other words, in the very centre of our butter market the population have now been eating twice as much margarine as butter for six years. Thus the British housewife is now well accustomed to using margarine; she likes it, and her preference for butter may slowly be breaking down. The price of margarine is about half of that of butter, e.g., 9d per lb, as compared with butter at 1/6 per lb. While purchasing power is high and supply low, as it has been in Britain during the war, people have bought their full ration of butter and margarine, and would have bought more if they could have got it. The problem is, what will happen in several years' time when supply is back to normal and purchasing power declines? Will the British housewife then buy butter when she can buy margarine at half the price, even though she would prefer to eat butter? What effect will her accustom to margarine and the knowledge of its nutritional value have? These are questions which belong to the realm of prediction.

As in the case of synthetic fibres, control of both research and production is in the hands of a few very powerful firms. Their work is highly organised. They are striving to rectify the few remaining defects in margarine in its comparison with butter. The British Government is committed to a policy of colonial development, and it is from the Colonies that the raw materials for margarine come.

At present there is a demand for all the margarine and all the butter which can be produced but our minds go back to the years before the war, when there was over-production and mal-distribution of food. Thus the future of butter must be considered in the light of world economics as well as in competition with margarine.

In as far as our dairy industry in New Zealand is able to do anything about these problems, it will have to consider the following points. First, it should endeavour to keep production costs down so that the price differential between butter and margarine is reduced. Secondly, it should continue and expand research to maintain the slight superiority of butter and to increase it if possible. Thirdly, it should investigate alternative uses for milk, such as the manufacture and marketing on a large scale of dried whole milk and similar milk products.

The fundamental difficulty with both wool and butter is that they are animal products. The conversion of plant food by the animal into products for human use is inefficient. Thus synthetic protein fibres can be produced at yields of about 200lb per acre, as against 20lb of wool, whilst the yield of margarine per acre is three times that of butter. This enables a greater concentration of production, assisted incidentally by low-cost native labour, which permits synthetic products to be manufactured at a cost considerably lower than that of the natural products. Quality and price are the two important factors. The synthetic fibre and margarine manufacturers are striving hard, and with some success, to catch up to the natural article in quality. Only by our maintaining a superiority in quality can we expect to receive a superiority in price.

THE CONTROL OF EXTERNAL PARASITES OF SHEEP

G. B. McLeod, B.Agr.Sc., Rangiora High School

The control of external parasites of sheep is an annual problem for the sheep farmers of New Zealand. While most farmers dip their sheep carefully with a view to removing keds and sometimes lice from the animals, there are others who carry out the dipping operation merely to comply with the stock regulations. The latter are not only careless in the actual dipping, but they are not greatly concerned if they find that several sheep have not been dipped, although they are quite aware that these sheep will, in a few months, re-infest the whole flock. Of course, there is also the high country sheep farmer who cannot muster all his sheep because there will always be those which evade the best musters. These sheep remain out on the run to cause re-infestation of the other sheep when they are turned out on the ranges to graze after being dipped.

It is obvious, then, that many flocks will continue to carry keds and lice even if the dipping material used is a good one. There are many dipping materials on the market, and some of them give excellent results if properly used in the dipping of all sheep; but the careful dipping of all sheep on any property is not sufficient. Dipped sheep must not contact others infested with keds or lice after dipping, because there are few dipping materials which will give protection against re-infestation for a period greater than three months.

We come, then, to the question of how we can best attack the problem of freeing our New Zealand sheep of keds and lice. Obviously, an attempt to ensure that all sheep on all farms are carefully dipped will not give the desired result, for it depends for its success on the faithful co-operation of all sheep farmers. The only way open to us is to concentrate on the production of the "ideal" dipping material, which should have these qualities:

1. It will be harmless to the sheep and the wool.
2. It will destroy all keds and lice on the sheep at dipping time and remain effective in the fleece to destroy immature forms emerging from pupæ or hatching from eggs.
3. It will be a stable solution prepared easily by the most careless operator with water of all types.
4. It will give its full insecticidal effect in the fleece even if the sheep is immersed for a very short period in the dipping bath ($\frac{1}{4}$ -minute).
5. It will protect the sheep against re-infestation for a period of one year, or at least from dipping time until shearing.

The dipping materials which have been available to the farmer in the past have not measured up to these requirements. If they had, the New Zealand sheep farmers would not be spending £120,000 annually on materials which, after used, still leave them with keds, and in some cases lice, in their flocks. Most of the dips, however, have complied with the requirements of 1 and 2. None has the qualities outlined in 3 and 5, while most manufacturers insist on immersion of the sheep for one minute, which is seldom achieved in practice.

Most dips rely for their effectiveness on compounds of arsenic, phenols and sulphur, and with others some of these materials plus extracts of derris are used to give what is called the "quick-acting effect." Although sold under different trade names, many dipping materials offered for sale are almost identical in chemical composition. One year a farmer may use one of these with such poor results that he tries another, which perhaps gives excellent results. He condemns one and praises the other without having any knowledge of their composition, whereas the difference in results is only an expression of the difference in management of the flock after dipping. Perhaps in the first case there had been re-infestation of the flock by keds, while in the second case the flock was not similarly exposed.

The farmer does not obtain any guidance concerning the quality of sheep dipping materials offered to him, ex-

cepting, of course, from those who offer them for sale. The stock regulations stipulate that sheep should be dipped at some time during a particular period of the year, but there is no statement about the quality of the dipping material which should be used.

Recent research into sheep dips at Lincoln College has shown that some proprietary materials do not possess the qualities which their manufacturers claim for them. For instance, it has been shown that Ked pupæ immersed for a week in a dipping fluid which was claimed to "sterilise the egg" and then placed in an incubator, gave an 80% hatching. All the components of popular sheep dips were tested singly, and none gave satisfactory results in ked control. It must be admitted that many pre-war dips which were mixtures of several insecticides, were very effective in controlling ticks and lice. However, during the war years most of the dips offered to the farmer failed to give satisfactory control of keds, and the only difference between those dips and pre-war dips was the lack of derris or rotenone, which is the active principle of derris. Results of trials at Lincoln College have shown that derris powder, the pure ground root of the tropical plant *Derris eliptica*, used at the rate of $\frac{1}{2}$ lb per 100 gallons of water, is a dipping suspension which will give complete control of keds on sheep, provided they are carefully isolated after dipping. Also, the cost of derris dipping is about a quarter of the cost of dipping with other materials. Again, derris is non-poisonous to the sheep and harmless to the wool, although this year an obscure type of lameness in sheep has in some cases followed dipping of the sheep in derris suspension. This problem is under investigation at present. Derris dipping offers another advantage to farmers, because it can be used with safety in the dipping of ewes and lambs before weaning, and this is important in cases where flocks are heavily infested with keds.

The problem of lice control is one which cannot be easily solved by using derris. Trials have shown that although derris dipping destroys all adult lice on dipped sheep at dipping time, it fails to keep the sheep free of these parasites, despite the fact that the sheep are isolated after such dipping. It is not known how other dipping materials compare with derris in this respect, and this matter is being investigated.

From what has been stated already, it can be seen that no dipping material possesses the qualities of the "ideal sheep dip." There is some reason to expect that a closer approach to this ideal will perhaps be achieved by the use

of D.D.T. and Gammexane, two new insecticides which give promise of great achievements in the field of the control of external parasites of sheep.

In conclusion, it must be stated that if a sheep-dipping material can be obtained with the qualities of the "ideal" dip it should be possible to eradicate keds and lice from the sheep of New Zealand. A flock of sheep, once free of keds and isolated from other sheep, will remain free throughout their lives. This has been proved in small-scale trials, as well as on many farms. A carefully planned eradication programme will be necessary, and this must go hand in hand with a concerted effort by all sheep farmers. Such a programme will be premature unless the ideal dipping material can be obtained, because only a really satisfactory dip will overcome the difficulty of re-infestation of flocks by straggler sheep in the run country. Good intentions, careful mustering and good dipping technique alone will not overcome this difficulty.

HYDATIDS

Echinococcus granulosus (Batsch, 1786).

AN EXAMPLE OF AN INTERNAL PARASITE

L. Morrison, B.Sc. (Agric.), Lecturer in Entomology.

The term hydatid which comes from a Greek word meaning a drop of water, is used to denote a cyst containing a clear, watery fluid, occurring as a diseased formation in the tissues of animal bodies, and especially to the one formed by and containing the larva of a tapeworm. Although the terms cyst and bladderworm may be applied to the watery sac containing any tapeworm larva, hydatid should be restricted to the one formed by the tapeworm *Echinococcus granulosus*. As a noun the word is chiefly used in the plural, and as an adjective in the singular.

The adult tapeworm *E. granulosus* is a parasite which lives in the intestines of a dog, wolf, fox and other Canidae. It may occur in cats (Felidae) but it does not develop to maturity and lives but a short time in this host. Its larval stage, generally known as hydatids, can develop in most mammals. The usual intermediate hosts (i.e., the animals in which the larvae develop) are food animals, sheep, cattle and pigs. These hosts become infected by eating the eggs passed with the dog's faeces on pastures and elsewhere.

Dogs become infected with the adult worms by eating portions of sheep, cattle and pigs infected with hydatid cysts. Man is also frequently infected with hydatid cysts. This infection in humans is accidental since man cannot transmit the parasite back to dogs except under most unusual circumstances.

E. granulosus is world-wide in distribution. It occurs most frequently in sheep and cattle-raising districts of New Zealand, Australia, Iceland, Argentina, Uruguay, Chile, Algeria, Egypt and Cape Colony. It occurs to a lesser extent in North America and European countries.

The mature tapeworm *E. granulosus*, which measures from one-fifth to one-third of an inch in total length, is one of the smallest tapeworms known and is by far the smallest of the seven species of tapeworm which have been recorded from the dog in New Zealand.

Appearance

Since the adult worm is not more than one-third of an inch long and one-twenty-fifth of an inch wide it cannot be seen readily in the semi-fluid faeces passed by a dog after it has been treated for worms. If the faeces are collected and diluted with a 5% solution of formalin the worms may be sorted out if the material can be viewed through a dissecting microscope or good hand lens. The large tapeworms, and some may measure 16ft. long by one-third inch wide, commonly passed by dogs when treated for worms, belong to some of the other six species of dog tapeworms which form cysts in ruminants, pigs, rabbits, dog-fleas and lice, but have no connection with true hydatids.

E. granulosus although so small, has the typical tapeworm features including absence of pigment. The narrower head end is the scolex and it bears the organs of attachment in the form of hooks and suckers. On the end of the scolex is a prominent rostellum or small beak, at the apex of which is a crown of from 30 to 36 hooks. The four muscular cups or suckers arranged equidistantly around the scolex are round and prominent and set well back from the rostellum. Immediately behind the scolex is a narrow portion known as the neck. This is the budding zone which continues, throughout life, to grow new segments to replace those lost posteriorly. The neck connects the scolex to the body which is a strobila (i.e., built like a fir cone, one piece behind the other) of proglottides (i.e., tongue or strap-like segments). Most tapeworms are composed of an enormous number of proglottides but *E. granulosus* has only three in addition to the neck. The first is nearly square and contains the developing genital organs. The second, about twice

as long as wide, contains the fully mature genital organs. The terminal proglottid may be as long as the rest of the worm and contains the uterus filled with eggs. Well prepared specimens viewed under a microscope show the longitudinal excretory vessels passing along each side of the worm and connected by cross ducts at the posterior border of each proglottid. The adult worms live in the intestines of the dog attached to the gut wall by hooks and suckers. They subsist on the digested food of the dog and the nutrient is absorbed through the entire surface of the body.

Life-Cycle

Periodically the terminal proglottid containing from 500 to 800 eggs separates from the parent-worm and passes to the ground in the faeces of the dog. An individual worm may continue shedding segments for years. For a short time the liberated proglottid retains some power of movement and may creep over the droppings or up blades of grass shedding minute eggs as it proceeds. Although the newly shed eggs are sticky and may adhere to the dog's coat and other objects they quickly dry out and are liable to be blown about by the wind. The embryo is well protected within the eggshell and can remain alive on the ground for long periods. It can withstand complete desiccation and exposure to bright sunshine for nearly three weeks. The eggs sink in water and if they are immersed in deep water for three weeks the embryo is killed through lack of oxygen. Low temperatures cannot be relied upon to destroy eggs for they have been known to remain alive in ice for over four months.

The egg is the only stage which can infect the intermediate hosts, chiefly sheep, cattle, pigs and man. The domestic animals are liable to pick up eggs when grazing and man is commonly infected by transferring the eggs to his mouth on his fingers after handling dogs. In France hydatid disease is appropriately termed "maladie des mains sales". It is believed that the transference of eggs to the mouth by eating contaminated vegetables or food contaminated with tapeworm eggs brought by flies or by drinking-contaminated water, although possible, is of minor consequence. Adults are liable to swallow eggs if they have been handling dogs and then use their fingers for whistling or rolling cigarettes or eating food without first carefully washing hands. Children are liable to swallow eggs - and the majority of humans who contract hydatid disease probably do so in childhood—by petting dogs or playing on egg-infested ground and putting the unwashed fingers to the mouth.

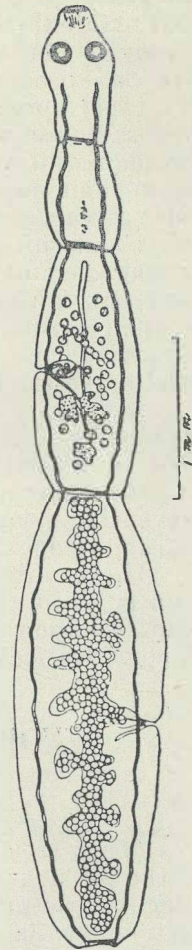
When the egg is swallowed the shell is dissolved off in the stomach and the liberated hexacanth or six-hooked embryo bores through the gut wall to reach the bloodstream and be transported through the body until arrested in some organ or tissue. There it settles down and unless destroyed by the white blood corpuscles soon develops into a hydatid cyst. Hydatids occurs in sheep, cattle and pigs in the lungs and liver and much less frequently in the other organs. In man, although they occur most commonly in the liver and lungs, they may also develop in the spleen, kidneys, peritoneum, brain, heart, genital organs and bone.

The hydatid cyst which develops from the embryo is a double-walled sac filled with a clear fluid which acts as a buffer and protects the developing scolices or future tapeworm heads. These scolices are formed by the budding off of brood capsules from the inner or germinal wall. Within each brood capsule a number of scolices are formed. Often the scolices break out of their brood capsules and occur free in the liquid, hence the term "hydatid sand". Very often there is the formation of daughter cysts within the original mother cyst and although smaller, they have the same structure. Then endogenous cysts may arise from the germinal layer, from brood capsules or from scolices, and float freely in the hydatid fluid. Hence a hydatid cyst may contain thousands of tapeworm heads. This explains why a dog, if it is infected with adult *E. granulosus* worms, normally carries not one or two but thousands. Cysts usually grow very slowly and their size depends chiefly on their location in the body and their age. If in the peritoneal cavity and not subjected to undue pressure from surrounding organs they may reach the size of a child's head. When found in sheep, it is usually in those slaughtered for food and in such case the hydatids are not old enough to have reached full development. When found in man the infection may have existed for many years. Secondary hydatids may arise through leakage from a cyst or through the puncture of a cyst liberating daughter cysts, brood capsules and scolices to pass to other parts of the body and commence development.

The life cycle can only proceed further by the dog devouring cysts and this normally happens when dogs have access to raw, infected livers and lungs of sheep, cattle and pigs. When the dog swallows a cyst the numerous scolices as they pass along the intestines attach themselves to the mucous wall and each grows a neck which quickly buds off three proglottides. In seven weeks' time the worms are sexually mature and shedding ripe proglottides.

Points of Human Interest

Hydatids is an extremely serious disease in New Zealand. Every year thousands of pounds are lost to the farming community through the condemnation of lamb livers. Every year about 100 people are treated in hospitals for this disease and each year about 15 people die from the disease. 50% of sheep dogs in New Zealand carry *E. granulosus* and in some districts 100%. Hydatid infection in sheep varies from 5% in lambs to over 60% in older sheep. The adult worms can be expelled from the dog by the administration of the drug Arecoline hydrobromide which is practically 100% efficient. Since this drug does not destroy the eggs in the mature worms it is essential to tie up dogs when dosing and keep them tied up for an hour or more until all worms are voided. All excreta must be destroyed by burning or burying. The life cycle can be completed only by the dog swallowing cysts. Since these cysts are available to the dog almost wholly in infected lungs and livers of sheep, the dog should not be fed on raw livers and lungs nor have access to them in dead sheep in the field. The dog should be fed on other than raw lungs and livers. When sheep are slaughtered, the offal, chiefly lungs and livers, should be burned or buried deeply or boiled, or put into 3% formalin solution, or into sheep dip, or thrown on to a horizontal, fine-mesh, wire platform raised 6ft above the ground for birds to devour. Exposure of offal on a platform, however, would encourage the breeding of blowflies. Dogs should be handled as little as possible and should not be petted by children. Careful washing of the hands should be practised after handling dogs and before eating, or rolling cigarettes, or putting the fingers in the mouth to whistle.



Adult *Echinococcus granulosus* showing scolex with organs of attachment and Strobila of proglottides.

Hydatids was once a serious disease in Iceland where its history dates back to the 9th century. It reached its highest incidence in 1867, since when there has been a remarkable drop in its incidence. An Icelandic doctor, O. J.

Ofeigsson, M.D., reviewing the position in that country in 1937, stated that the satisfactory improvement was due chiefly to (1) decrease in poverty, (2) better hygiene, (3) Krabbe's discovery in 1863 of the life-cycle of *E. granulosus*, (4) rapid spread of knowledge of this discovery among doctors and laymen, (5) more and better doctors, (6) laws forbidding all unnecessary dogs, resulting in a great reduction in their numbers, (7) quarantine for two days, once or twice a year, of all dogs, during which they are treated with baths and suitable drugs, (8) warnings to people against petting dogs and careful washing of hands after touching them, (9) laws forbidding farmers to slaughter their sheep on their farms and permitting only authorised slaughterhouses which are supervised rigidly, (10) inspection of all meat by veterinary surgeons, (11) burning or burying of all infected organs of sheep and cattle. Dr. Sambon of London says, after visiting Iceland in 1920 "Nowadays Echinococcosis (in Iceland) has diminished in frequency as strikingly as yellow fever at Panama, following the application of preventive measures judiciously based on true and etiological knowledge."

The country with the best recovery is Iceland. The country with the best programme is Russia. The three countries known to have schemes for the systematic dosing of dogs are Iceland, Russia and New Zealand.

SYNOPSIS OF SOME OF THE DAIRY REGULATIONS

(This article is intended to cover briefly the section in the syllabus in Dairying for the School Certificate:—"Regulations under the Dairy Industry relating to the production of milk and cream on the farm."—Editor.)

The general purpose of the regulations is to ensure clean and healthy conditions under which milk, cream, butter and cheese are produced. Accordingly provisions have to be made for the inspection of dairies and of the manufacturing premises of dairy companies.

Under the Act the following are all considered to be dairies:—

- (a) A milk house; milk shop; dairy factory, and any other place where dairy produce is collected, deposited, treated, separated, prepared or manufactured, or is sold, or offered, or exposed for sale, and includes:

- (b) A farm, stock-yard, milking-yard, paddock, shed, stable, stall, and any other place where cows from which the milk supply of a dairy is obtained are depastured or kept.

It should also be noted that dairy produce means milk, cream, butter or cheese, and includes any other product of milk or cream. Milk may also be the milk of cows, goats, or sheep.

Appointment of Inspectors and Analysts

From time to time inspectors and analysts may be appointed to see that the provisions of the Act are carried out. Stock inspectors are deemed to be inspectors under the Dairy Act, and in addition to the powers given them by the Stock Act and the Dairy Industry Act, they have the powers and functions of inspectors under the Sale of Food and Drugs Act. An occupier of land is entitled to ask an inspector to show his authority.

Powers of Inspection

The Dairy Act gives the following powers to an inspector:—

- (a) He may, at all reasonable times, enter, inspect and examine any dairy, and may also inspect and examine any stock, utensils, machinery, apparatus or works in a dairy, or used in connexion with a dairy, or with dairy produce, and also any buildings, conveyance, etc., used for the storage or carriage of dairy produce.
- (b) He may at any dairy, or elsewhere, inspect and examine any dairy produce, or the food or water supplied to any dairy, or to the stock in or about any dairy, and also demand, and without payment, take samples thereof for inspection or analysis.
- (c) He may at any time, and in any place, detain and open any package containing, or supposed to contain, dairy produce for the purpose of inspecting or taking samples of the contents thereof, or of ascertaining whether such package bears or contains any false description or brand.

If an inspector makes a request for any information along the following lines it must be supplied to him by the owner or person in charge of the dairy. On request a list must be furnished to the inspector of the customers or other persons supplying milk or cream to the dairy, or supplied with dairy produce from the dairy. Also personal assist-

ance and information must be furnished to the inspector to enable him to search for and discover any source of contamination, infection or disease to which any stock or dairy produce may be exposed.

If an inspector considers that certain defects exist he may order them to be remedied and his order must be carried out. He must, however, set out his requirements in writing and they must be based on one or any of the following defects:—

- (a) That any dairy is in an unclean or unwholesome condition.
- (b) That any dairy produce produced in, or stored on any dairy, is likely to be contaminated by reason of any structure or other thing situated in the neighbourhood of the dairy, or of any operations carried on, or of any conditions obtaining in the neighbourhood thereof.
- (c) That any utensils, machinery, or apparatus in or about the dairy or used in connection with dairy produce is in an unclean or unwholesome condition, or is otherwise unfit for the purpose.
- (d) That any building, conveyance, etc., used for the storage or carriage of dairy produce is in an unclean or unwholesome condition, or is otherwise unfit for the purpose.
- (e) That any stock in or about a dairy or used in connection therewith or with dairy produce are diseased.
- (f) That any person employed in or about a dairy is affected with any contagious or infectious disease, or is a member of a household where any person is affected with any such disease, or
- (g) That any food or water supplied to stock, or any water used in connection with a dairy is impure or unwholesome.

Duties of Owner where Stock is Diseased or where Produce Condemned.

If any disease appears in any stock in or about a dairy, or if any person living or working in or about a dairy is found to be affected with a contagious or infectious disease, the owner or occupier of the dairy must at once separate the diseased stock from the healthy stock and isolate the affected person. He must take care to prevent the milk or cream from diseased stock being mixed with other dairy produce, or being in any way sold or used as food. If an

inspector in writing, signed by him and delivered to the owner or person in charge, condemns any dairy produce as unfit for human consumption, all such produce must not be sold and must be disposed of as directed.

Precautions to be followed in Setting Up a Dairy.

The Act prohibits the following matters:—

- (a) The keeping, housing, penning, or wandering of pigs within 50 yards of the dairy.
- (b) No fowl-house, manure heap, cesspool, or closet is to be erected within 20 feet of any dairy, or of any enclosed yard or building where cows are kept.
- (c) No drainage from stock or pigs can be allowed to flow into or, within 50 yards of any dairy, or the open water supply thereof, or of any enclosed yard or building where cows are kept.

Before supplying or selling milk to any dairy the milk must be properly cooled and cream must also be cooled after being separated.

Dairy produce intended for sale must not be deposited or stored in any room used for domestic purposes or in any place which may render such produce unwholesome or injurious to health. Any person purchasing or taking by way of sale, milk or cream, may ask to take a sample for analysis by a recognised analyst. The purchaser must then, in the presence of the seller, if the latter requires it:

- (a) Divide the sample into two equal or nearly equal portions, and enclose each portion in a clean bottle.
- (b) Seal one bottle with his own seal and permit the seller to seal the other with his own seal.
- (c) Retain for analysis the bottle sealed by the seller and permit the seller to retain the other sealed bottle.

Supplying Dairies.

Under the Dairy-produce General Regulations, 1933, and amendments, certain requirements are laid down for supplying dairies. The owner or occupier must comply (inter alia) with the following provisions:—

1. The reloader and vacuum-tank (if there is one) of the milking machine must be either in the open air or in a separate apartment from the milking-shed and if under the same roof as the milking-shed the reloader-room must be walled off by a draught-proof partition.
2. No internal combustion, or steam engine or water-heater using oil or other combustible fuel is allowed in the same room as the reloader or separator.

3. If 7 or more cows are milked an adequate plant for boiling sufficient water to cleanse the machine and attachments must be installed and maintained near the machine.
4. The body of the vacuum-tank must be in two parts or the diameter of the cover must be as equal as possible in size to that of the tank.
5. The releaser and vacuum-tank must be coupled together by a short removable connection.
6. All pipes, etc., must be as straight as possible with sufficient fall and the milk pipe must be of brass tinned on the inside; iron piping is not allowed in the vacuum or releaser system.
7. No machine, pump, or engine new or used, should be erected before being inspected and passed by an officer of the Dairy Division and before a notification is sent to the director or such officer.
8. All rubberware used in connection with the milking and machinery must comply with the regulations.
9. Immediately after the milking all utensils, cans, etc., must be properly washed and scalded.
10. The floor of the milking-shed, yards and exits must be made of concrete or other materials unaffected by moisture having a smooth and easily cleaned surface.
11. The separator-room must be well lighted and ventilated and have a floor and drain of concrete or other material.

“I believe that the country, which God made, is more beautiful than the city, which man made; that life out-of-doors and in touch with the earth is the natural life of men. I believe that work is work wherever I find it, but that work with nature is more inspiring than work with the most intricate machinery. I believe that the dignity of labour depends not on what we do, but on how we do it; that opportunity comes to a boy on the farm as often as to the boy in the city; that life is larger, and freer, and happier on the farm than in the town; that my success depends not upon my location but upon myself—not upon my dreams but upon what I actually do, not only luck but upon pluck. I believe in working when you work and playing when you play, and in giving and demanding a square deal in every act of life.” So writes an American—Edwin Osgood Glover.