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Investigation of Animal Diseases.

Formation of a New Division.

A. H. COCKAYNE, Director-General of Agriculture.

IN recent years great prominence has been given to the extensive live-stock losses which occur in New Zealand through disease. There is naturally on the part of the farmer a great desire that these losses should be reduced. Two main ways are applicable to bring this about. First, by the adoption of methods of management, particularly those of feeding, breeding, and care of live-stock which tend towards the prevention rather than the encouragement of ill-health. Secondly, by actual direct treatment of the animal itself before or subsequent to contraction of the disease.

In many cases both these methods, where they are known to be effective and practicable, can be put into operation by the individual farmer without any reference to what his neighbours may or may not be doing. But there are other diseases which cannot be adequately controlled by the individual, and his efforts may be greatly nullified or rendered inoperative unless farmers in general adopt similar practices. The elimination of tuberculosis and hydatids are cases in point.

Reduction in disease is essentially dependent on the farmer knowing what to do, and his ability to put his knowledge into effect. What to do or what not to do depends upon available knowledge. This knowledge must be supplied to the farmer before he can adopt any effective measure calculated to bring about an improvement in the disease position in his stock or dominate his management in such a way that disease may be prevented.

The value of expert advice and its widespread influence on the prevention and control of animal disease is so great that it is imperative in any campaign for the reducing of disease losses to make full use of this avenue. Thus, the first step in the campaign should be the setting-up of a Dominion-wide veterinary instructional service to farmers. Expert agricultural instruction and extension the world over is based on knowledge as it exists at the time. It has amply proved its worth in all countries, and the more intensive it is the more valuable it becomes. It guides and develops individual action. It guides and develops national action. It is still more valuable and important when linked to comprehensive research. An instructional service influences and develops research activities, and in turn uses the results of research in the form of practical conclusions which it incorporates in practical farm advice. In this way existing knowledge immediately becomes available and is reflected in farm practice.

Existing knowledge is, however, far from complete. Indeed, it never will be complete, and continuous research is therefore indispensable. Thus, extension and further research are both essential in reducing our losses through animal disease, but as extension is more immediately applicable full use should be made as rapidly as possible of available knowledge by full and complete veterinary instructional service to farmers.

National Responsibility.

I do not want to discuss here the actual machinery, administration, and finance that would be essential in a properly organized veterinary service. It is as well, however, to point out that the economic stability of New Zealand is more intimately concerned at the present time, and perhaps even in the future, with the control of animal diseases and their effect on production than any other country. Therefore it might well be agreed that the State should assume full responsibility for the maintenance of a veterinary service, but if this objective cannot be achieved a liberal State subsidy to veterinary clubs would appear to be sound.

Repeated statements on animal disease in New Zealand have led to a general idea that we are suffering more severely

Dr. J. F. Filmer, appointed Acting-Director of the Division of Animal Research.

[Van Dene Studios photo.

Dr. C. S. M. Hopkirk, Officer in Charge of Wallaceville Veterinary Laboratory.

[S. P. Andrew, photo.

than many other countries. This, however, is by no means the case. Our 20-odd per cent. of dairy-cow replacements is no greater than herd replacement in any other dairying country. Our 7-per-cent. to 9-per-cent. loss of sheep each year, high as it is, is equalled in many overseas sheep raising areas, and we are singularly free from many specific diseases which devastate flocks and herds in other countries. Our stock is freer from tuberculosis than the stock of any other country with the exception of certain areas in the United States of America where extensive and costly methods of eradication have been in operation for many years.

In most pastoral countries the potential production losses through animal diseases are calculated at not less than 10 per cent. to 15 per cent. Our position is certainly not more serious, but such a figure is serious enough, and particularly so as the figure appears to be rising rather than falling. This is not to be wondered at when it is recognized that, other things being equal, increased production is represented either by increased production of the individual animal or by increased density of stocking which intensifies disease losses.

Estimate of Losses.

Our live-stock products are worth approximately £60,000,000 per annum, and if disease losses represents a potential production loss of 10 per cent. our disease bill runs into £6,000,000—a figure certainly high enough to warrant every effort being made to lessen this serious leakage. The future prosperity and stability of our pastoral interests, overwhelming in importance in our economic structure, are intimately concerned with reducing the costs of production. Losses through animal diseases at once raise costs, and therefore a reduction of these losses is imperative. Our aim, therefore, should be to utilize fully our existing knowledge, and to embark on a programme of research with the intention of bringing forth fresh knowledge capable of being put into practical effect.

Research into the control of animal disease in New Zealand offers difficulties quite apart from equipment and personnel, far greater than is generally realized. There are at the present time many methods whereby disease losses, particularly in the nutritional direction, could be reduced, but most of them would mean the employment of management methods which would so raise the cost of production as to nullify such action being taken. Mastitis could perhaps be reduced by the elimination of the milking-machine, but this action, unfortunately, would eliminate dairying. Hogget-mortality could be reduced—in fact, well-nigh eliminated—by hand-feeding with crushed oats and other bought-in feeds whenever necessary, but from the economic standpoint the cure would be worse than the disease. These two examples merely serve to show that, although much of our management is economically sound, and has made our grassland farming the envy of the world, it encourages rather than discourages animal disease.

Animal Nutrition.

It is theoretically sound from the production and disease-reduction standpoints that our live-stock throughout life should be nourished on even, rather than uneven, planes of nutrition, but in grassland farming this is not possible, and the higher the production per unit area, the more uneven does the plane of nutrition tend to become. Top-dressing is no panacea; in fact, it often widens the nutritional disparity between the seasons. Nevertheless, no one would dream of reducing permanent pasture or reducing top-dressing. Such a policy would raise

Mr. P. W. Smallfield, appointed Officer in Charge of Ruakura Animal Research Station.

our costs of production to a point higher than that brought about by animal disease.

Thus the difficulties ahead of animal research in New Zealand are greatly intensified by the management methods that we must in essence continue. It surely will not be economic to change them. Therefore animal research into many of our major disease problems has difficulties ahead of it essentially connected up with our management methods.

Two factors stand out prominently—breeding and nutrition. In any research programme adopted these factors must be emphasized, as they are fundamental. In New Zealand genetics or scientific breeding are as yet untouched and nutritional studies have so far been properly oriented to fit in with our practical farm economy. Up to the present the Department of Agriculture has been of far greater service to the farming community in the control of animal disease than is generally recognized. It has, however, not had a

staff sufficient to carry out adequate veterinary or disease-control instruction, nor has it had a staff sufficient for the carrying-out of adequate research work. Both these weaknesses must be remedied before adequate service can be rendered.

New Division.

So far as research is concerned it is recognized that all the Department's facilities in that direction and all the personnel capable of contributing should be co-ordinated. In order to bring this about a Director of Animal Research, Dr. J. F. Filmer, has been appointed and a new Division created. Its duties are the prosecution of animal research, with special reference to the control of animal disease. Wallaceville Laboratory and staff, Ruakura Farm of Instruction and staff, the Chemical Section, and other officers from various Divisions have all been amalgamated into the new Division. In fact, all the Department's facilities for animal research have been brought together under unified control for the prosecution of animal-research work. Certain essential personnel, particularly in pathology and genetics, are lacking, but this should be remedied at an early date. It may be necessary to supplement the facilities of Ruakura and Wallaceville. Indeed, it looks obvious that this must be the case if the handling at all adequately of some of our major problems is undertaken.

Two features with regard to the creation of the new Division under a Director of Animal Research will be the ability to secure full co-operation with the whole of the field staffs of the Live-stock and Fields Divisions and, on the other hand, to secure co-operation with organizations outside the Department carrying out animal research.

In its extension work in animal husbandry the Department also seeks the fullest measure of co-operation from the farming community. This co-operation has always been forthcoming in the past, and I know that it will be just as spontaneous in the future.

Officers' Careers.

Dr. Filmer was born in Victoria, Australia. He studied at the Melbourne University, where he obtained the degree of Bachelor of Veterinary Science. From 1919 to 1925 he was in private practice.

In 1925 he joined the staff of the Agriculture Department of West Australia, holding the position of Senior Veterinary Officer. He remained with the Department until 1936, when he was appointed to the Western District Research Association of West Australia.

Dr. Filmer joined the New Zealand Department of Agriculture in 1938 as Veterinary Research Officer, Wallaceville.

Shortly afterwards his thesis on "Enzootic Marasmus" was passed by the examiners for the degree of Doctor of Veterinary Science of Melbourne University.

Dr. C. S. M. Hopkirk joined the Department as a clerical cadet at the Wallaceville Veterinary Laboratory in 1912. Later he studied at Melbourne University, and was awarded the degree of Bachelor of Veterinary Science in 1923, when he was appointed Veterinarian and Acting Officer in Charge at the Wallaceville Veterinary Laboratory. Two years later he was appointed Officer in Charge, a position he has held since.

In 1935 Dr. Hopkirk was awarded the degree of Doctor of Veterinary Science.

In addition to representing the Department in Australia at various veterinary congresses, Dr. Hopkirk went abroad in 1938 to study various veterinary problems in other countries, and only recently returned to New Zealand.

He was a member of the N.Z.E.F. during the Great War, and served overseas.

Mr. Smallfield received his secondary education at St. John's Collegiate School and at the Auckland Grammar School.

During 1915–16 he attended Auckland University College, commencing the course for the B.Agr.Sc. degree. He also attended engineering lectures at the School of Mines. During 1917–18 he was in residence at Canterbury Agricultural College, Lincoln. In May, 1918, he went into camp at Trentham, and was attached to the New Zealand Engineers.

He returned to New Zealand in October, 1919, and then to Canterbury Agricultural College, where he remained in residence until December, 1920. He completed the course for the degree of B.Agr.Sc. and gained first place in practical and theoretical work at the college diploma examinations, for which he was awarded the college gold medal.

In February, 1921, he joined the staff of the New Zealand Department of Agriculture as an Assistant Instructor, and in August, 1923, he was transferred to the Ruakura Farm of Instruction as officer in charge of the instructional work. In 1928 he was promoted to Fields Superintendent of Auckland Province, and was among the first to qualify for the newly instituted degree of Master of Agricultural Science.

Last year Mr. Smallfield was awarded the Bledisloe Medal.

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Planting Pampas-grass.

A CORRESPONDENT, P. S. P. (Waipawa) asks—(1) Is there more than one strain of pampas-grass, and, if so, which strain is the most palatable for stock? (2) Where can I obtain pampas-grass seed, and when should this be planted? (3) Would pampas-grass grow well in swampy ground where the water-level is only about 1 ft. to 2 ft. below the ground-level? (4) If pampas-grass were planted along the side of a drain, would the roots tend to block the drain as do willows?

The Fields Division replies that departmental trials in which pampas-plants from a number of sources have been grown and fed off in comparison with plants claimed to be selected for palatability have not substantiated the claims. It is possible, of course, that, as with other fodder plants, selections could be made of more succulent and palatable types. Age and rate of growth appear to be the most important factors when stock make a selection in plantations, the younger and more vigorous plants generally being eaten first.

Pampas-grass seed is not available commercially in New Zealand. Investigations have so far shown that only in North Auckland does the plant produce viable seed, and it is even here a shy seeder.

Seed should be sown under glass in September or October, the seedlings being pricked out into boxes or the open ground under shade when big enough to handle. A fine, firm seed-bed is required, and the seed should be covered with a sprinkling of sand only. When pricked out, the seedlings should be kept watered. Such seedlings transferred in the autumn to rows in the garden should be ready to transplant into permanent positions in the spring after danger of frost is past.

Pampas-grass has seeded freely on the Whangarei Harbour Board reclamation areas, and seedling plants are obtained from this source. The plant is also propagated by rooted cuttings from old-established plants. These cuttings strike best when the plant has been cut back in the autumn to the butt and allowed to sprout again.

Pampas-grass thrives best on a rich, fertile, free-draining soil. It will not grow well where the ground lies water-logged during the greater portion of the winter. It does well on drained swamp land, but not where the swamp is undrained.

Pampas-grass makes an excellent break-wind when planted alongside a drain. The roots do not interfere with the drain in any way, but rather to hold them. The leaves drooping over the drain save a considerable amount of cleaning. Pampas-grass to establish and thrive must be adequately fenced from stock. When fed off in a plantation it must be protected from stock for the rest of the year or until full growth has been made again.

Additional examples of the success of surface-sown pasture in North Taranaki indicate that this method of renewing run-out or badly poached pastures is becoming a generally-accepted means, especially when root-crop growing is proving so uneconomical. Where sheep are run in conjunction with dairy cows they are proving of value in tramping in the surface-sown seed and also for the light first grazing after-establishment.

Irrigating With Economy and Efficiency.

Border-dyke Method Calls for Minimum of Labour and Gives Maximum Efficiency.

R. B. TENNENT, Director of the Fields Division.

SINCE the inception of irrigation in Canterbury farmers served by irrigation are particularly anxious to know something about the most expeditious and economical method of spreading water on the land.

There are several ways in which this can be done, the method used being to a large extent dependent on the contour of the country and the " head " of water (*i.e.*, volume of supply) available. Where the country is comparatively flat, as obtains over most of the areas served by irrigation in Canterbury, what is known as the border-dyke system is undoubtedly the most efficient method of applying water. This method, which at the beginning calls for considerable labour in levelling and in the installation of a head-race and gates, can be viewed as the nearest approach to automatic irrigation, necessitating the minimum amount of labour in spreading the water and securing the maximum efficiency from the water used.

Provided the initial preparation of the land is carefully carried out, the border-dyke method of irrigation briefly described in this article gives the maximum of efficiency with the minimum of labour and utilizes the water in the most economical manner.

The essentials to successful border-dyke irrigation are :—

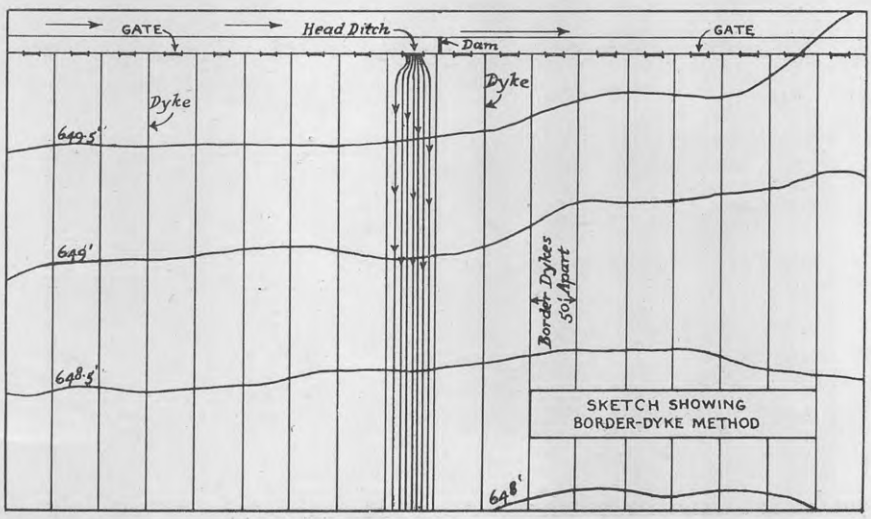
(1) Careful and proper levelling ;

(2) An ample-sized head-race provided with well-built, water-tight gates ; and

(3) An adequate head of water ranging from five to seven cusecs, according to the length and width of the border checks intended to be irrigated.

While irrigation undoubtedly will benefit annual crops such as wheat, turnips, &c., due to the fact that these crops require sowing each year and necessitate cultivation—which consequently tends to upset prepared lands—it is considered that the ultimate development of irrigation, particularly under the border-dyke method, will be along the lines of utilizing water on such permanent crops as grass and lucerne. This will obviate the necessity of annually relevelling the land.

It is not intended here to go into full details as to the preparation of the series of border-dykes, which is fully explained in the Department's Bulletin No. 120, " Irrigation " (price 1s.).



1.

A study of this plan gives a general idea of a typical field laid down in the border-dyke system. Note that the head-race is approximately at right angles to the fall of the land. The less the fall the narrower and shorter will be the checks.

2.

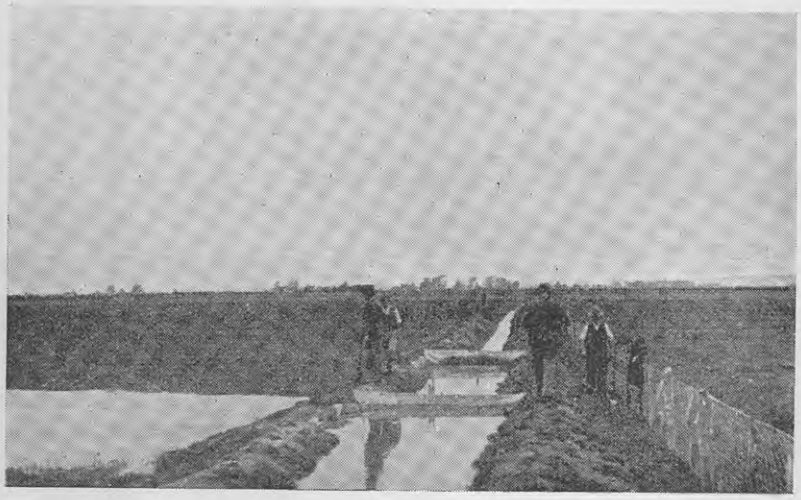
After being ploughed, the field is divided into long, narrow strips or checks, this operation being carried out by a grader or other suitable implement. These checks are separated from each other by low, flat walls over which an implement, such as a mowing-machine, can readily pass.

3.

A head-race is formed at right angles to the series of checks, and in this head-race gates leading into the various checks are built. The head-race must be of sufficient size to carry an adequate head of water.

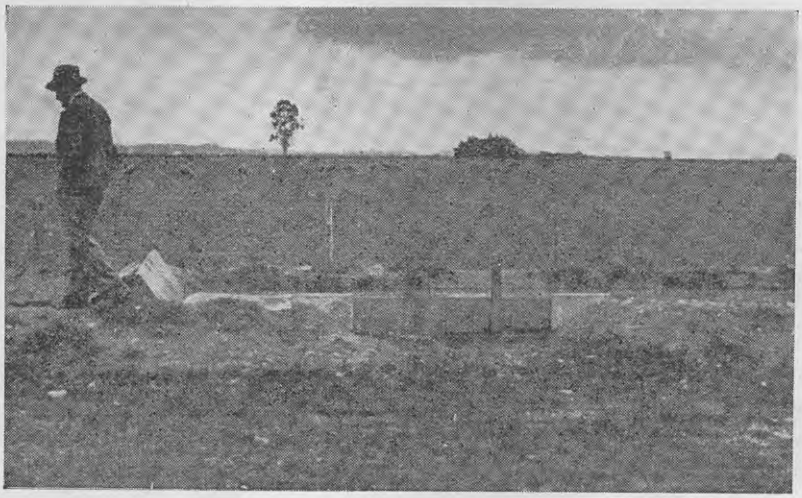
4.

When the crop has been sown and is ready to be irrigated water is turned into the head-race, where a canvas dam is placed at a point in the race to divert the water into one or more checks.



5.

The head-race fills up, and as the water flows through the gate a second dam is put into position in readiness to irrigate the next borders.

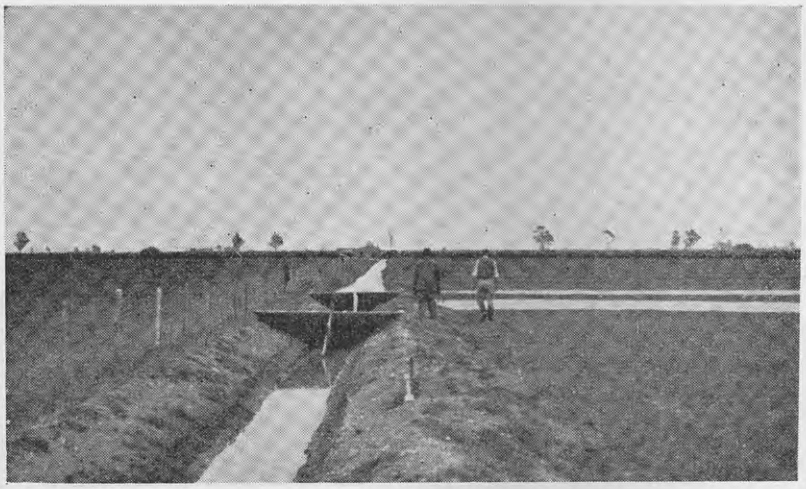


6.

The dam is now in position in the head-race, and the gate leading into the check to be irrigated is ready to be lifted. A suitable gate can be constructed of 1 in. timber let into concrete ends, and should, when closed, rest on a wooden sill.

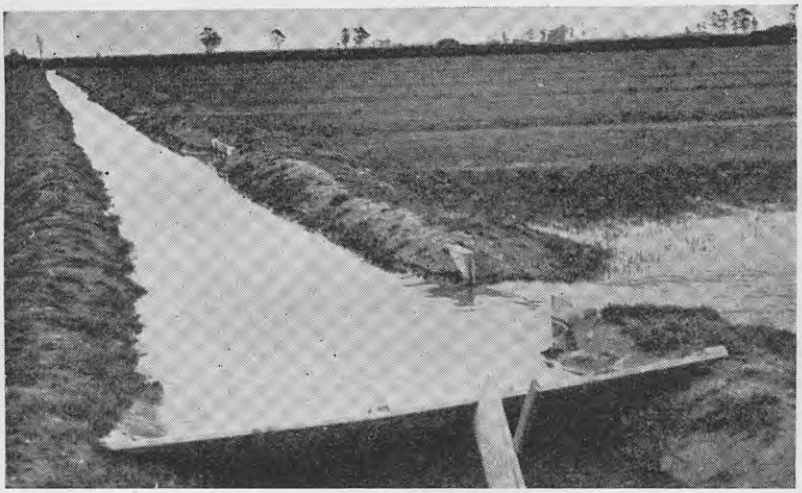
7.

As soon as the gate is lifted the water pours into the check and begins to flow down it, the fall of the land being from the head-race to the end of the check.



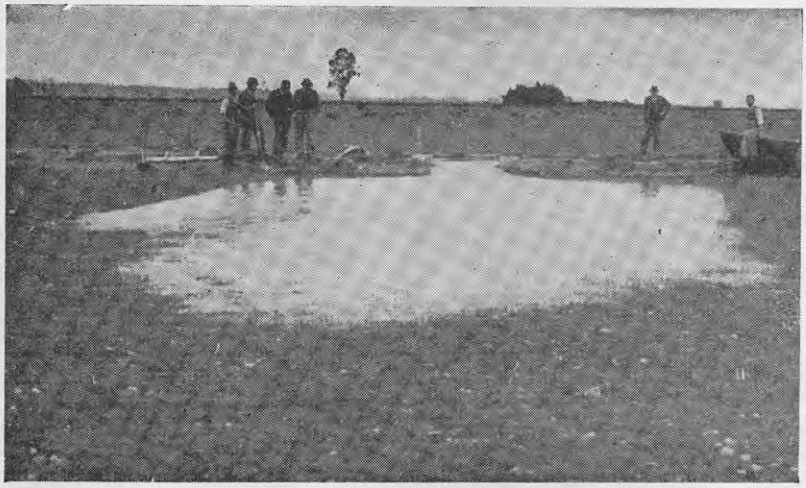
8.

So that no delay will occur in turning water from the head-race into the checks, two dams are used. These dams are used alternatively to turn the water from the head-race into the checks.



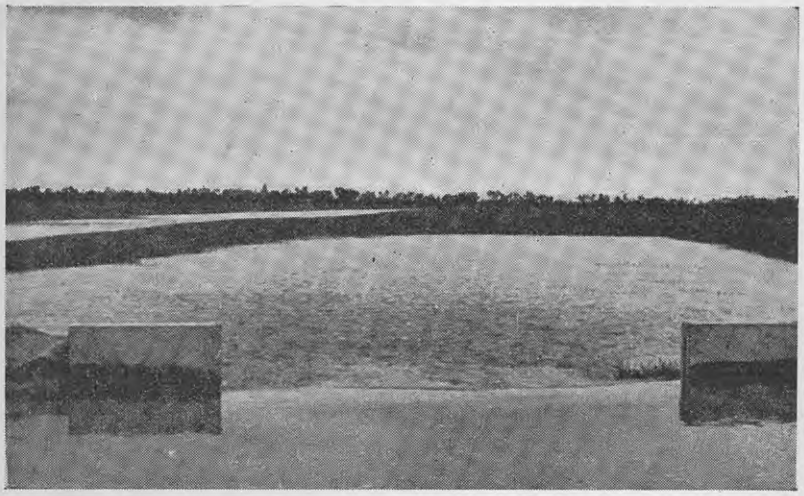
9.

The importance of having a sufficient head of water to flush down a check rapidly cannot be overemphasized. This prevents the water-logging and wastage which would occur if only a limited head of water was available.



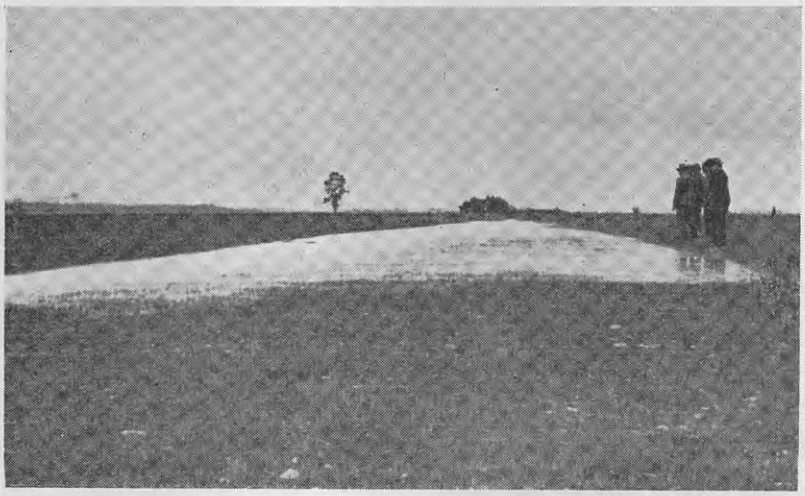
10.

When the water enters the border it spreads fanwise to the border-dykes at the right and left as it flows forward.



11.

The water then moves in a shallow sheet over the width of the check on its way to the end of the field.



12.

The gate in the head-race should be closed when approximately three-quarters of the check has been irrigated. In practice, it will then be found that there will be sufficient water in the check to complete the irrigation.

13.

The low dykes at the side of each check are, when properly made, about 3 ft. 6 in. wide and about 6 in. high. This is sufficient to retain the water in the check and still allow harvesting implements to cross over the field in any direction.

14.

By this method light, flat, stony land as shown here can be rapidly irrigated and transformed from inferior to high-producing pastures. Under measured conditions the pasture shown here in its initial stages of irrigation gave this season a herbage increase of approximately 1,000 per cent. over non-irrigated pasture in South Canterbury.

Quality of Milk and Cream.

The Influence of Soil and Pastures.

Contributed by the DAIRY DIVISION.

WITH the exception of the testing of pedigree cows for yield, the Dairy Division of the Department of Agriculture has one object in view—namely, the maintenance and improvement of the quality of milk products. It does not supervise the production of milk for human consumption.

In the manufacture of butter or cheese, the quality of the milk practically determines the quality of the finished article. It is not correct, however, to assume, as it so often is, that all defects in quality are due to neglect by the dairy-farmer. The foundation of the quality of milk, perhaps more particularly for buttermaking, is the soil and the pastures. To put it another way, the soil and the management of the pastures largely determine the class of herbage which the cows eat.

To illustrate this point, it is only necessary to point out the difference in the quality of the butter made in the southern portion of the North Island, where only a comparatively simple treatment by pasteurization is required, in comparison with other districts where a much more intense treatment is necessary to get rid of feed flavours.

Feed Flavours.

Certain feeds impart flavours to milk which are carried into the produce made from it. Outstanding examples of these feeds are turnips, rape, land-cress, buttercups, water-cress, and flax. Mixed pastures in which clovers predominate also cause feed flavours, and the work carried out in recent years by the Plant Research, the Dairy Research Institute, and the Department of Agriculture has shown the amount of contamination to be expected from certain mixtures.

Both soil and pastures play an important part in the quality of butter and cheese, and the variations in the pasture at different periods of the milking-season necessitate variations in the processes of the cheese and butter makers, who must vary their methods according to the condition in which the milk and cream is received. This article outlines the difficulties encountered in dairy factories as a result of these seasonal variations.

In addition to feed flavours, there is a difference in the character of cream produced on varying types of land under ordinary methods of manufacture. These differences give the butter characteristic flavour and body.

It is comparatively easy to recognize the difference in the colour of a can of Jersey cream and one from a herd of the lower-testing breeds. The experienced buttermaker will have no difficulty in distinguishing between two cans of cream from the same breed, one of which is produced from rich low-lying pastures, and the other from pastures growing on poor soil. The difference can perhaps be best described by contrasting the appearance of a drum of oil paint and one of distemper, the first can of cream being rich in flavour and colour and having a bright lustre, while the second is pale and characterless and lacking in flavour.

Quality of Butter.

Butter made from cream produced on good undulating or even hill country where coarser grasses predominate will have a firmer body and be freer from feed flavours than butter made from cream produced on level country growing a luscious, soft pasture.

It must therefore be recognized that the quality of the milk and cream produced depends in the first instance on the class of land, and while feed flavours are taken into account when grading milk and cream, the other points mentioned are not, providing milk or cream are in good condition in other

respects. It is generally accepted, however, that in cream which is of poorer general character any defect will develop into a much more objectionable flavour than it will in cream of the better class. The development of acidity, for instance, in poor cream is sometimes accompanied by a metallic flavour which is not found in good cream.

Seasonal Influences.

It will thus be seen that many influences on milk and cream quality are not under the direct control of the dairy-farmer. Many of these influences are seasonal, and by good herd and pasture management they can be reduced. Two particularly bad flavours are produced by land-cress and wild garlic, which have a prolific growth in certain areas in the spring, and which cannot be altogether removed from cream by any process at present known. On some farms at least it should be possible to keep the dairy cows off the paddocks in which these plants are prevalent until their growing season is past.

Climatic and seasonal changes must also be taken into account by the buttermaker, who must vary his manufacturing methods accordingly. Having practically only the fat to take into account, the changes to be made from time to time are largely variations in temperatures to suit the changing condition of the fat, which will be soft in the early spring and gradually harden as the season progresses. A return to spring conditions of production in the autumn will disturb this gradual hardening and require a reversion to spring methods.

Troublesome Period.

Feed flavours will be most troublesome in all districts in the early months of the year, and some of them will be prevalent in certain areas more or less during the whole year, but the equipment in creameries permits of a wide variation in the treatment. However, this variation is not always sufficient to maintain the standard which would be achieved if the treatment were less severe, nor can the extra treatment be carried out without cost and loss of fat.

In the spring when most of the milk is being produced by cows which have just come in, the cheesemaker finds that the proportion of casein is high in comparison with the amount of fat which it contains, and he must carry out the cheesemaking process to suit this condition. As the season advances the percentage of both fat and casein will increase, but the ratio of casein to fat will be reduced, and the manufacturing methods have to be altered to suit the new conditions.

Covering of Stands.

A heavy night's rain in districts where milk-stands are not covered will reduce the test by diluting the milk, and this again requires an adjustment of methods. On the other hand, a dry spell will reduce the casein and require another adjustment, while the yield of cheese will fall in both cases.

A return to practically spring conditions in the autumn, after a dry summer followed by rain, is another contingency which frequently arises and once more a change is required.

To a small extent feed flavours can be dealt with by raising the pasteurizing temperature of the milk, but in cheesemaking the margin is small, as the maximum must not exceed a comparatively low figure in order to avoid difficulty with the cheddaring process later in the day.

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Decline in Fruit-farming Area.

Contributory Causes for Decrease in Acreage.

W. K. DALLAS, Director of the Horticulture Division.

IN recent years there has been a decrease in the total area devoted to the culture of pip, stone, and citrus fruits in the Dominion.

In 1925 there was a total of 3,088,891 trees, as compared with 2,460,089 trees in 1937, representing a decrease of 628,802 trees. On the basis of 120 trees to the acre, the reduction is 5,240 acres.

The principal contributory causes for the decrease in acreage are as follow, approximate figures being given: Neglect, 40 per cent.; trees removed from unprofitable orchards, 16 per cent.; ground unsuitable, 15 per cent.; uneconomic varieties, 10 per cent.; lack of water, 4 per cent.; flood, 4 per cent.; subdivision of land, 4 per cent.; change to dairying, 4 per cent.; disease, 1 per cent.; frost, 1 per cent.; illness of owners, 1 per cent.

From the orchard-registration records the following table showing the numbers of fruit-trees (pip, stone, and citrus) in registered orchards in the Dominion classified in districts in certain years from 1925 to 1937 (both inclusive) has been prepared :—

District.	1925.	1928.	1930.	1931.	1936.	1937.
Whangarei	165,523	119,069	105,257	112,008	115,152	92,748
Auckland	425,534	413,513	404,961	425,968	444,040	399,997
Gisborne	42,435	43,090	35,551	35,748	38,165	33,595
Hamilton	80,439	67,308	48,728	55,492	51,705	42,676
Thames	62,136	51,506	50,239	52,349	68,193	58,947
Hastings	287,945	299,732	317,983	344,000	356,112	369,695
Palmerston North and Masterton ..	115,888	99,995	98,421	97,248	91,837	74,224
Wellington	12,264	7,533	5,092	4,952	5,842	3,715
Nelson	263,847	205,818	203,404	196,687	187,874	181,354
Motueka	331,751	320,481	263,872	265,070	249,518	241,247
Mapua	330,202	291,397	276,595	278,616	270,518	263,152
Blenheim	88,838	62,863	59,684	62,260	64,165	61,454
Christchurch	325,883	313,991	277,572	290,357	263,369	234,125
Dunedin	281,068	280,283	260,021	268,320	268,310	243,703
Alexandra	275,138	207,909	167,657	176,290	166,301	159,457
	3,088,891	2,786,494	2,575,037	2,665,366	2,641,121	2,460,089

Control of Creeping-fog Grass.

Eradication by Ploughing or Rotation of Crops.

A. F. GREENALL, Instructor in Agriculture, Balclutha.

CREEPING-FOG, botanically known as *Holcus mollis*, although one of our worst twitches, is fortunately rare. It occurs, however, in certain parts of Canterbury, Otago, and Southland, and proves troublesome in both pastoral and arable land.

It is similar in appearance to its first cousin, Yorkshire fog (*Holcus lanatus*) in that it has red and white veins on the leaf sheath, a soft hairy leaf, and a pink-tinged, feathery flower-head, but it differs from Yorkshire fog in that it is a strong twitch with strong underground stems, or rhizomes, which, if either left attached to or broken away from the parent plant, can form an independent plant. Further, the seeds show a distinct spike, or awn.

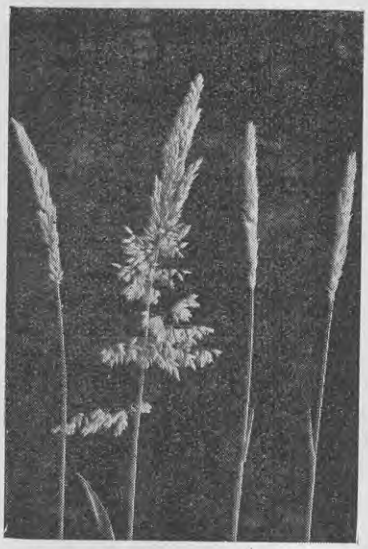


Fig. 1.—Heads of creeping-fog and Yorkshire fog. Note the longer awns on creeping-fog (two heads on right). [*H. Drake, photo.*

In common with all twitches, it is a nuisance in arable land because of its underground method of spreading, and it is useless in the large majority of pastures as the leafage it provides is not relished by stock, nor does it possess great feed value once it is eaten. It is usually obvious when present, as it occurs in patches which are light green in colour compared with the surrounding sward, and it can be easily picked in even a close-grazed pasture by raking off dung pats, when the rhizomes can be detected at the union of dung and soil.

> Two methods which are used in the South Island for the eradication of creeping-fog are discussed in this article. The first is by ploughing, followed by the frequent use of the cultivator, and the second by a rotation of crops. Each depends on climatic and farm conditions.

This tendency for the rhizomes to approach close to the surface soil is of importance in the control of this and other rhizomarous twitches, and it seems to be due to the fact that rhizomes are really underground stems and require, in common with most leafy parts of a plant, a good air-supply.

Plough and Cultivator.

Where arable farming is practised and creeping-fog is severe and climatic conditions hot and dry for several months of the year, good eradication can be obtained by the method well known to most farmers on the Canterbury Plains —that of ploughing, followed by frequent use of the cultivator. Twitch and chain harrows are also used, when the twitch is pulled to the surface, freed of all soil, and thoroughly dried out. In very severe cases forking and burning are resorted to.

It is essential that disk harrows should not be used, as they merely serve to cut the twitch into bits, which cannot be gathered by cultivators or harrows, with the possibility of each piece forming a separate plant.

Even in Canterbury, where the rainfall is 25 in. and hot, drying winds are experienced, this method meets with indifferent success if much rain is experienced, as it results in new growth and prevents continual cultivation. When such inclement weather is usual, or in high-rainfall districts, it is better to utilize a rotation of crops. Any crop which is ordinarily strong growing will serve the purpose provided it allows intercultivation followed by a smother crop.

In this case it is best to "bide one's while" until a pasture is six or seven years old and the twitchy underground stems have approached the surface.

The pasture is then deep-ploughed either with or without skimmers, care being taken to plough deeply and turn down a solid, unbroken furrow. This is followed by a heavy rolling along and not across the ploughing. Fairly shallow cultivation is then resorted to, care being taken not to turn up any turf. Cultivation should aim at fineness and consolidation and the necessity for keeping the turf buried.

Frequent Intercultivation.

This should be followed by the sowing of rape, turnip, or chou moellier in ridges, and frequent surface intercultivation should be resorted to during the growing period. Swede turnips appear to be the best crop for the purpose in South Otago, as feeding off is finished in August and immediate cultivation can be carried out for the smother crop to follow. In areas where haymaking is useful and advisable a crop of oats and tares, spring-sown as soon as possible after the previous crop is eaten off, provides a good smother. In South Otago a heavy sowing of spring oats is quite good.

With any luck at all it will be found that when the oats are cut there will be practically no creeping-fog. Should the autumn sowing of grass be possible and favoured, this should be done. Only a medium-depth furrow should be turned, and it is essential to include a dense, strong-growing grass such as certified perennial rye-grass in the mixture and to use adequate manure at the time of sowing.

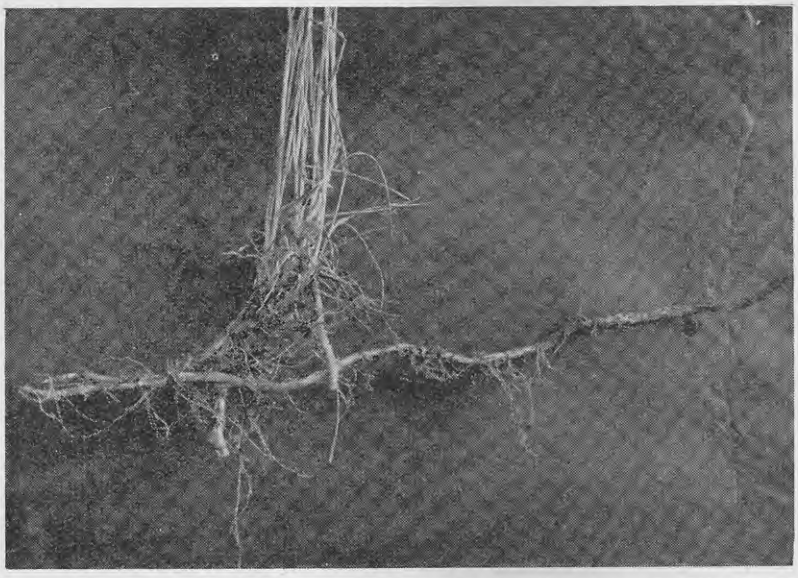
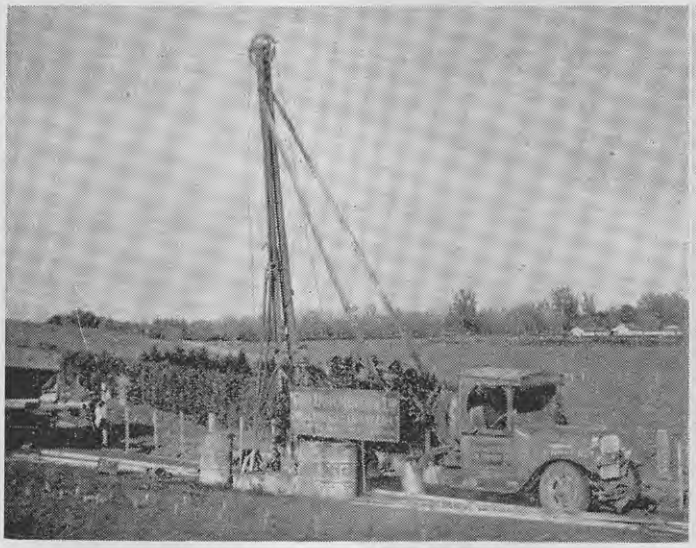
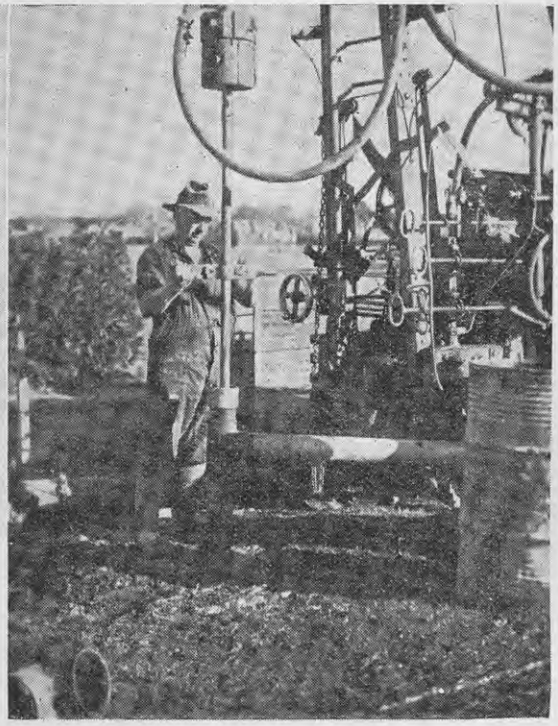


Fig. 2.—Part of a plant of creeping-fog, showing the strong twitchy habit.
[*H. Drake, photo.*

In South Otago liming with 1 ton of carbonate of lime gives good results, and sowing should take place before the end of March or the beginning of April to ensure a good strike and establishment of clover. If the spring sowing of grass is preferred a catch crop of greenfeed oats, black barley, or Italian rye-grass would follow on stubble cultivation of the previous oat crop.

There are areas in the Te Houka and Pukeawa districts of South Otago where this method has received a good trial and has, to date, proved efficacious.





Above: A modern drilling-plant suitable for deep bores.
Right: The borer at work.

Augmenting the Farm Water Supply.

Methods of Tapping Additional Sources.

P. S. SYME, Instructor in Agriculture, Warkworth.

WHEN a drought is experienced succulent feed is usually scarce, and farm live-stock, particularly cows in milk, make abnormally heavy demands on the water available. Any deficiency is therefore quickly reflected in falling milk-yields.

The importance of a good and plentiful supply of water on a dairy-farm may be readily understood when one considers the high percentage of water in milk, the wastage due to perspiration in hot weather, and the quantity required for the normal bodily functions of the cow, so that it is not surprising to learn that during a dry summer an average cow in milk may easily consume as much as 20 gallons of water per day.

Water for Cleaning.

In addition to water required for drinking, a considerable quantity is needed for cleaning the milking-plant and for cooling purposes. The quantity required for cooling depends largely on its temperature, but it may be safely assumed that about 6 gallons of water will be required to cool each gallon of milk or cream.

> In times of drought the value of a good water-supply is perhaps best appreciated by the farmer who possesses a bad one. While, generally speaking, New Zealand dairy-farms are favoured with enough water, it is sometimes advisable to augment the supply, and various methods of tapping additional sources are described.

Where whole milk is sold the additional water needed for cooling purposes may prove a considerable item, and a herd of fifty cows supplying a cheese-factory may easily need 1,200 gallons per day for efficient working. Under abnormal weather conditions this quantity may at times be greatly exceeded, and no allowance is made here for water used for domestic purposes or for other stock carried on the farm.

Generally speaking, New Zealand has been highly favoured with a plentiful and well-distributed rainfall, and even in some districts where the rainfall is low the melting snows of winter seem to make natural provision for the frequent droughts of summer, so that the problem of water-supply is sometimes most easily solved where it might be expected to be most acute.

The water-supply available on most farms is usually a matter of chance rather than of choice. Frequently, regardless of defects in quality or quantity, the farmer must simply make the best use of whatever water-supply Nature has provided.

The following brief notes relating to the more common sources of supply may prove of interest :—

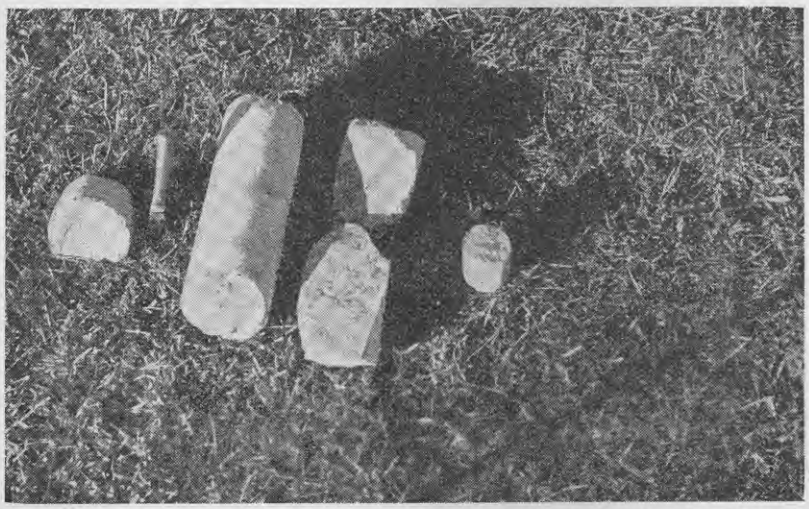
Dug Wells.

The quality of the water obtained from dug wells depends largely on the nature of the strata in which the water is collected. In some localities it may be peaty or contain too much iron, the latter being a serious defect which leads to the rapid corrosion of milking-utensils and greatly shortens the life of pipe-lines.

The site of the well should be carefully chosen to avoid pollution from surface or subsoil drainage, the recognized safe depth being 6 ft. for clay and 12 ft. for fine sand. It is frequently advisable to dig the well higher up a slope if the water-table lies near the surface, as this provides a greater depth to ensure proper filtering for surface water.

Drilled Wells.

The water from drilled wells is usually clean and safe, although it may sometimes be strongly mineralized. Even with drilled wells care should be taken to prevent pollution, as surface water may seep downwards outside the casing.



Even hard rock can be pierced. Rock cores obtained when drilling in difficult country.

Deep Springs.

Provided that it is free from surface contamination, spring water is usually safe. It should be noted, however, that contamination may sometimes occur through seepage at some distance from the spring. In many districts spring water is frequently impregnated with minerals.

Running Water.

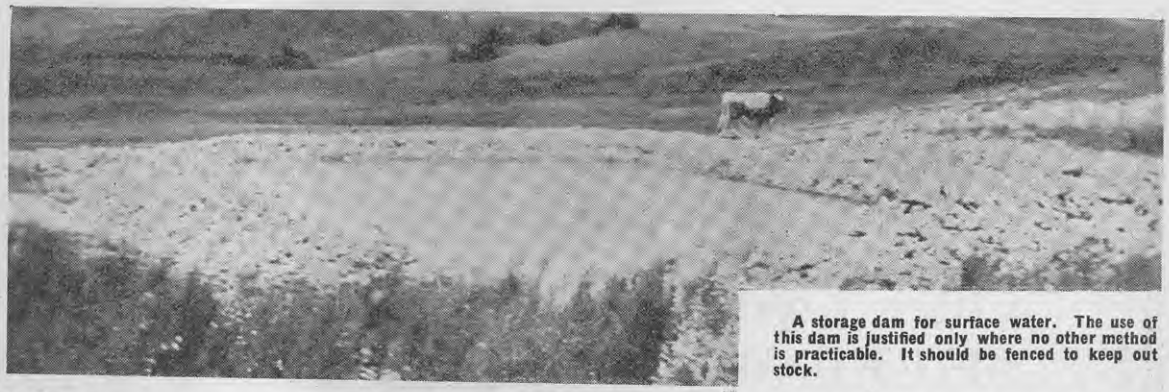
Permanent streams may provide a good supply if there is ample volume and a good flow. There is considerable danger of pollution, however, if the water is sluggish or stagnant.

Even though a free supply of excellent running water may be available on a farm it may at times prove too expensive to utilize. Where it is centrally situated or where it can conveniently be used to operate a ram, running water may provide a very cheap source of supply. Very frequently, however, it costs more to utilize water from streams than to put down a bore at the cow-shed.

Where, as often happens, the stream is situated on the boundary of the farm, reticulation costs are high and may amount to a much as £3 per acre. Where the water is obtained from a bore near the centre of the farm the cost of reticulation may be only about £1 5s. per acre on farms of 100 acres to 150 acres. Further, unless an automatic pumping outfit is installed account must be taken of the time expended in constant journeys to start the pump. For this reason the pump and well on a dairy-farm should be situated at the cow-shed wherever possible.

Rain Water.

The purity of rain-water depends largely on the atmosphere and on the collecting surface. Where rain is collected from roofs, provision should be made for running the first fall to waste, and a sand filter should be fitted to ensure the purity of water used for domestic purposes.



A storage dam for surface water. The use of this dam is justified only where no other method is practicable. It should be fenced to keep out stock.

Storage Dams.

Storage dams are very liable to be polluted and to harbour stock parasites. For this reason they should be employed only if no other source of water is available. Where such dams must be used it is imperative that they be fenced to keep out stock and, if possible, sheltered from the sun by a belt of trees. The formation of a green slime frequently seen on such ponds can be readily and safely prevented by the use of chemicals.

Boring for Water.

Where streams, lakes, or natural springs are available the problem to be solved is one of distribution rather than supply. It is in country which is devoid of permanent visible surface water, but which can be made to carry excellent pastures capable of heavy stocking, that the problem of an efficient water-supply becomes of paramount importance. Without water, even though it can be made to carry a good pasture, the land may be almost useless for dairying purposes. If, however, a permanent supply of water can once be assured the value of the land is greatly enhanced, and the pastures may profitably be developed to their maximum productiveness. On such farms the only alternative to storage dams—and the only plan offering prospects of completely solving the water problem—lies in sinking a bore to tap some underlying water-bearing stratum.

Although in some localities boring has proved quite impracticable, experience has shown that over considerable areas—many of which comprise hundreds of square miles—water will be encountered by this method at practicable depths with almost complete certitude. From his previous experience on such areas the borer will willingly work on terms of "No water, no pay," and to anxious inquiries as to the most likely site for the bore he will simply reply, "Tell me where you want your shed."

Water Diviners.

In selecting a site for the bore many farmers are content to rely on the judgment and experience of the borer. Others, before boring, insist on employing the services of some professional dowser in whom they repose implicit faith.

A dowser at work. Many people believe that underground water can be detected in this way.

Is it possible to divine water? This long has been, and possibly always will be, a much vexed question, in which both protagonists, the believer, and the sceptic speak with strong conviction. It is certain that the diviner himself is a true believer and is in no sense a charlatan. Many instances have been recorded in which predictions have been completely realized and the professional reputation of the diviner thereby established. The sceptic maintains that this is due merely to coincidence, chance, or to the fact that over the area in question water will be found anywhere.

It may be stated, however, that many professional water-borers with a long experience at their trade—men who have worked with and without diviners under a wide range of conditions—utterly disbelieve in any process of divining, and scoff at the very mention of the word.

Cost of Boring.

Although in certain localities boring for water may be an obvious gamble, in many districts it can be quite confidently expected that a good supply will be encountered at no great depth. While the charge must necessarily be influenced by the depth and hardness of the strata to be pierced the costs, although at first sight high, are relatively trivial when compared with the enhanced value of the property and the benefits which accrue from the possession of a good and dependable water-supply.

The following costs may be taken as fairly representative of normal working conditions: Drilling, 2s. 9d. per foot; 2½ in. casing, 2s. 7d. per foot; 2 in. deep-well pump, £2 10s.; pump-head, 12s. 6d.; 12 ft. brass gauze sand screen, £9.

Based on these figures the total cost of a 2½ in. bore is usually in the vicinity of £30 to £40. Frequently, even this moderate cost may be substantially reduced by using 1¼ in. pump and pump-pipe.

Even where a bore might not be regarded as absolutely essential and merely intended to augment an existing supply or to replace a storage dam or some polluted source, its cost will quickly be repaid by additional convenience and higher production. Where the existing source is polluted and where young stock, in particular, are reared, the benefit of the change-over will be quickly demonstrated by the reduced mortality and the more vigorous growth resulting from the greatly lessened risk of infection by water-borne internal parasites.

(To be continued.)

"Scabby Mouth" and "Pink Eye" in Sheep.

Methods of Treatment Described.

C. V. DAYUS, M.R.C.V.S., District Superintendent, Live-stock Division, Dunedin.

CONTAGIOUS ecthyma, or contagious pustular dermatitis, perhaps better known as "scabby mouth" or "sore mouth," and contagious ophthalmia, more popularly referred to as "blindness," are two diseases which are not often referred to and yet are of some importance and should be of interest to many sheep-farmers in the Dominion.

Contagious ecthyma has a wide distribution. It occurs in New Zealand and in many other parts of the world—*e.g.*, Australia, South Africa, America, and England—and in these countries it has been studied by several investigators. In New Zealand the mortality from the disease is negligible, but the symptoms are alarming when first discovered, and affected sheep lose condition and suffer a pronounced setback, the severity of which is governed by the virulence of the outbreak and the extent of the lesions—that is, the degree of injury—on the mouth.

The term "ecthyma" means an inflammatory skin-disease attended with an eruption of superficial pustules of varying size. The disease affects both sheep and goats, but in this country we are really concerned only with its appearance in sheep. It is characterized in sheep by an eruption about the mouth, and the infection may also be conveyed to the udders and teats of the ewes.

First Symptoms.

The first symptoms usually noted are a swelling of the lips, with the development of more or less warty, moist scabs. This swelling of the lips gives the affected animal a distinctive appearance, which is readily noticed. Actually, the eruption at first is red and papular, then vesicular, and subsequently scabby. The scabs are brownish-grey in colour, and are moist in the early stages; later they dry out, becoming hard and very often cracked.

The rapidity of spread through a mob of sheep leaves no doubt as to the infectious nature of the disease.

As those farmers who have experienced outbreaks of this disease will remember, it is one primarily affecting young sheep — lambs and hoggets. Older animals may sometimes contract the disease, but in them the infection is usually of a milder type. It has been recorded that a mild infection can sometimes occur in man. In natural outbreaks the lesions of contagious ecthyma are confined to the lips and udder, indicating that the infection is a localized affair resulting from direct infection of the affected area. There is no doubt that the udder lesions sometimes seen in ewes are the result of direct infection by the lips of the lamb during sucking.

Two diseases which are of importance to sheep-farmers in New Zealand are dealt with in this article, which outlines methods of treatment for contagious ecthyma, better known as "scabby mouth," and contagious ophthalmia, more popularly referred to as "blindness" or "pink-eye."

Virus Disease.

Contagious ecthyma is a virus disease, and is due to a specific filterable virus. A virus is some type of infecting agent which is beyond the limit of visibility—that is, it is too small to be seen by the highest powers of the microscope. The generally accepted hypothesis regarding the general nature of viruses is that they are independent living micro-organisms. Such knowledge as has already been gained of virus diseases is of comparatively recent origin, and it is interesting to record that the virus of foot-and-mouth disease was demonstrated in 1898. This

was the first human or animal disease shown to be due to an infective agent beyond the limit of visibility.

Many viruses, of which the virus of contagious ecthyma is one, can pass through the minute pores of special bacterial filters, and this is why they are termed filter-passing or filterable viruses. The term specific in the case of the virus of contagious ecthyma is used to indicate that this virus always produces the same disease and no other in susceptible animals.

There are, of course, many virus diseases, each with its own particular virus to account for it, in both plants and animals. A few examples are mosaic disease of potatoes, tomatoes, and cucumbers, acute poliomyelitis (more popularly known as infantile paralysis), mumps, smallpox, measles, common colds, cowpox, and distemper in dogs.

The virus of contagious ecthyma is highly resistant to destruction and may be preserved in the scabs on the ground for very long periods. This no doubt accounts for the recurrence of the disease on a farm after an absence of two or three years or even longer.

Infection.

The commencing infection in an outbreak is, in all probability, picked up from virulent scabs in a paddock, but the rapidity of spread afterwards would indicate that direct contact of healthy and infected sheep is a factor. Skin injury is not always essential for the entry of the virus, but frequently there is some slight irritation about the lips, especially when one considers that sheep are often grazing where there is scrub, gorse, thistle, or stubble. There are occasions where grazing under such conditions as these, a benign irritation is produced in the vicinity of the mouth which is not dependent on the existence of the virus.

Contagious ecthyma in New Zealand occurs from time to time in the spring, summer, and autumn months. The uncomplicated case runs a course of about one month from the time of the appearance of the first lesion until the scab drops off. The lesions heal spontaneously, leaving the lips smooth and without scars.

Medicinal treatment for this disease is not particularly satisfactory, but some benefit may be derived by cleaning the areas involved in badly affected animals and applying a preparation made by a mixture of one part of tincture of iodine to two parts of glycerine. Honey and boracic acid makes a suitable ointment. Repeated applications of the selected treatment are indicated.

There is, however, a method of prevention by vaccination which is practical in use and justifiable from an expenditure point of view, and can be used in those areas where contagious ecthyma is frequently observed.

Vaccination Method.

The vaccination method is employed with success in America, and more than a million doses are used annually in the State of Texas. The Chief of the Division of Veterinary Science at the Texas Agricultural Experiment Station informs me that farmers there declare that they would not be without the vaccine, because it saves so many lambs not only from direct losses from sore mouth, but many more from screw-worm attack in case the animals contract sore mouth. Fortunately, the fly responsible for screw-worm does not exist in New Zealand.

Inoculation of susceptible animals with properly prepared material from the lip lesions induces the formation of a benign local lesion which sets up a definite solid immunity that endures for at least eight months or even longer. A desiccated scab emulsion is prepared in New Zealand at the laboratory of the Department of Agriculture, and this has been used with success in my district and also in other parts of the Dominion.

The technique of vaccination is analogous to that of smallpox vaccination in the human subject. It is comparatively simple, and can be conveniently carried out on lambs at marking-time.

A small area of skin inside the flank is cleaned and the skin stretched with the fingers and thumb of one hand; then several superficial scratches about ¼ in. long are made with a scarifying instrument. One drop of vaccine is thoroughly rubbed into the scarified area with a small stiff-bristled brush.

It is necessary to emphasize that the skin should be lightly scarified, only the superficial layer being broken through; it is neither necessary nor desirable to draw blood. The areas scarified must not be large, and the amount of vaccine limited to one drop or so, otherwise the resultant "takes" will be unnecessarily severe.

About the fourth or fifth day after vaccination there is evidence of reaction at the site of vaccination.

Contagious Ophthalmia.

The other disease is contagious ophthalmia in sheep, better known as "blindness" or "pink-eye." This complaint is quite well-known to sheepmen throughout the Dominion, and it was fairly prevalent in Otago and Southland last autumn and winter and also, I believe, in other parts of the Dominion. It is more prevalent in adult sheep.

In this disease there is pronounced inflammation of the membranes lining the eyelid (conjunctivitis) and also inflammation of the cornea (keratitis). The cornea is the transparent anterior portion of the eyeball.

A non-infectious inflammation of both these areas may occur from external injury or the introduction of some foreign body, such as dust, chaff, or grass-seeds. It may also be caused in lambs by irritation resulting from turned-in eyelids (entropion).

The infectious type which sets up these two conditions of conjunctivitis and keratitis in sheep occurs in New Zealand and several other countries. It has never been sufficiently studied, but in all probability this again is a specific virus disease.

First Signs.

Generally, the first indication of the existence of the disease is that a number of sheep are blind, and on closer inspection it will be found that the front of the eye is no longer clear and transparent but has assumed a hazy blue appearance, later changing to a milky-white opacity. If, however, the symptoms are more closely studied the first thing noticed will be a flow of tears from one or both eyes. The affected animal is particularly sensitive to light, and the eyes are frequently closed or kept partially closed in order to avoid as much light as possible.

The membranes of the eye will be seen to be congested and bright red in colour, and as the infection progresses the cornea becomes involved and is no longer transparent. The infiltration is often deep-seated, and the opacity spreads until it covers a large part of the cornea. The surface of the cornea may be quite smooth and intact, or it may be ulcerated.

Constitutional disturbance seems to be very slight or absent, but naturally there is some falling-off in the condition of affected sheep. Tears from infected sheep have been shown to transmit the disease to healthy sheep after a short incubation period. In naturally occurring cases there is a tendency to spontaneous recovery in approximately three weeks from the onset of symptoms. As the acute inflammatory stage subsides the eye gradually clears up, but occasionally in an odd animal there results permanent opacity of the cornea, causing blindness.

It has been established that a fairly lasting immunity develops after recovery from natural infection. No method of vaccination, however, has been evolved to afford any protection against this disease.

Treatment.

Treatment is not very practical because of the difficulties of repeated treatment of large numbers of sheep. If possible, an affected mob of sheep should remain isolated from the rest of the flock on the farm. They should be depastured in a paddock where there are no drains, creeks, or ditches, so that the minimum amount of damage is done through the temporary blindness.

Affected eyes may be treated by the installation of a few drops daily of a 10-per-cent. solution of Argyrol, or a cheaper preparation consisting of 2 grains of sulphate of zinc, 10 grains of boric acid, and 1 oz. of distilled water.

The eyelids could be lightly smeared with a small amount of a 2-per-cent. yellow oxide of mercury ointment.

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Efficient Utilization of Land.

Progress in Pasture Improvement in Top-dressing.

R. P. CONNELL, Land Utilization Officer, Fields Division.

ALTHOUGH the standard of grassland efficiency in New Zealand is quite high when compared with other leading pastoral countries and general adverse criticism of our farming is not at all justified, there is evidence that the available knowledge is not being fully applied to the utilization of our farm resources. Furthermore, the current trends in farm practice are not always completely reassuring.

In general, the ability of New Zealand to export farm-produce regularly and over a long period depends to a considerable extent upon whether the effectiveness of New Zealand farm labour exceeds that of competitive farm labour in other countries. Correlated with this is the important stark fact that the effectiveness of labour depends not only on the worker, but also upon the tools with which he works. In this case the tools are stock and pastures, and it is proposed in this article to discuss some important aspects of farm labour from this angle.

Although progress has been recorded in the sowing of superior species of grasses and clovers and in the practice of top-dressing, there is still a very large area of dairying and fat-lamb country in New Zealand which is capable of profitable improvement by these methods. The conservation of surplus grass and clover in the growing season in order to provide feed in the winter months is also examined in this article.

Area in Grass.

According to the latest available official statistics, out of a total occupied area of 43,199,000 acres the total cultivated area was 19,588,000 acres—*i.e.*, 45 per cent. of the whole occupied area. Further, 17,250,000 acres of the whole cultivated area were in sown grasses.

A question of considerable practical importance is what part of the area in sown grass is carrying or profitably could be made to carry high-class swards in which such species as rye-grass, cocksfoot, white clover, and red clover are dominant. A conservative estimate may be formed by taking into account the area being utilized to-day for dairying and fat-lamb production. It is possible to calculate from the data obtained in the dairy-farm survey carried out recently by the Census and Statistics Office that 4,250,000 acres are employed in dairying (according to this, one dairy cow requires 2·15 acres, and the production of butterfat an acre averages 105 lb. per annum).

In the 1936–37 killing season approximately 10,000,000 fat lambs were slaughtered. If, on the average, 2·5 fat lambs to 3 fat lambs are produced per acre, then the area devoted to fat-lamb production ranged from 4,000,000 acres to 3,300,000 acres. It may be noted that in a large group of fattening farms in mid Hawke's Bay the average production was 2·2 fat lambs an acre.

Hence, on this basis, the total area devoted to dairying and fat-lamb production is from 7,500,000 acres to 8,250,000 acres.

On this area of 7½ million to 8¼ million acres one may assume that generally the most profitable farm economy involves the establishment and maintenance of vigorous high-class pastures, of which the major constituents are the better strains of such species as perennial rye-grass, cocksfoot, white clover, and red clover, although one must not exclude the possibility of such pastures being employed advantageously on land additional to that already specified.

The main means to such pastures are appropriate top-dressing, the sowing of the superior strains of the pasture species mentioned, and proper grazing management, which is fostered by such measures as ensilage. It becomes of special interest, therefore, to note the position in

respect to top-dressing, the sowing of superior pastures, and the making of ensilage.

Top-dressing.

The national top-dressing position is disclosed by the following table, which gives for each land district the area of grassland top-dressed in the years 1932–33 and 1936–37, the latest available :—

Land District.	1932–33.		1936–37.	
	Lime only.	Total.	Lime only.	Total.
North Auckland	12,270	432,697	18,141	569,145
Auckland	23,020	916,076	27,773	1,138,226
Gisborne	1,008	32,073	1,583	50,873
Hawke's Bay	4,579	102,611	10,620	205,725
Taranaki	7,793	347,250	7,966	368,214
Wellington	12,415	311,870	22,130	449,642
Nelson	2,017	27,314	2,119	33,081
Marlborough	569	14,906	939	19,904
Westland	2,333	9,795	1,819	11,437
Canterbury	12,101	67,988	31,948	128,906
Otago	7,345	50,178	21,181	102,600
Southland	17,502	125,356	30,544	248,526
Total	102,952	2,438,114	176,763	3,326,279

The position disclosed is, up to a point, quite gratifying. It is noteworthy that more than half the total Dominion area top-dressed is in the Auckland Province. A prominent feature of the table is the rapid expansion in the top-dressed area during the period covered by the table in Hawke's Bay, Canterbury, and Otago.

Inadequate Programme.

While the expansion in top-dressing is significant of progress, the vital point is that less than half the area estimated to be used for dairying and fat-lamb production is being top-dressed. The advisability of top-dressing outside our fat-lamb and dairying territory cannot be ruled out, but if we confine ourselves to such territory our present top-dressing programme is glaringly inadequate. In brief, we are top-dressing 3,300,000 acres, and there are more than 7,000,000 acres utilized for fat-lamb production and dairying which may be expected as a rule to respond well to top-dressing.

A striking piece of evidence about the relation between top-dressing and cost of production was provided in the recent investigation into liquid-milk production for domestic use in the Wellington-Manawatu area.

The following table taken from the report shows the cost (in pence) of producing 1 lb. of butterfat :—

Manure per Acre.	Number of Farms.	Average Output of Butterfat.	Working-costs.	Interest-costs.	Labour-costs.	Total Net Cost.
		lb.				
½ cwt. to 1 cwt. ..	49	10,438	5,914	5,372	7,745	17,634
1½ cwt. to 2 cwt. ..	30	10,225	5,906	4,513	7,204	16,542

Seed-production.

Probably the best indication of the extent to which superior strains of the main pasture plants are being used is given in the accompanying return of the quantities of seed certified in recent seasons. The return, however, does not give a complete indication of the position, due partly to the fact that some of the certified seed is exported and some seed of superior strain does not come under the official system of seed-certification. It is considered, however, that these facts do not upset the general validity of the position indicated by the return.

The following table shows the quantities of seed finally certified in the seasons 1932–33 and 1935–36 :—

Pasture Species.	Season 1932–33.	Season 1935–36.
Perennial rye-grass (bushels) ..	245,667	279,305
Cocksfoot (lb.)	622,765	657,319
White clover (lb.)	33,731	56,092
Red clover (lb.)	3,763	23,620

From the above table, in conjunction with preceding considerations, the following deductions may be made :—

(1) If we use on our dairying and fat-lamb territory all the perennial rye-grass of superior strain that we produce, do no resowing and sow at the rate of 1 bushel an acre, then on the basis of the average seed-production of four years it would take a period of thirty-five years to forty years to sow the area specified.

(2) The corresponding periods for cocksfoot, white clover, and red clover are very substantially greater, those for cocksfoot, for instance, being 110 years to 120 years, and for the others greater still.

Basic Weakness.

Much could be said on the position just revealed, but the following comment must suffice. It is generally accepted that we have made valuable progress in the evolving of superior strains of the main pasture species, but when it comes to incorporating this progress in our farming in general it is clear that the achievement to date is not impressive.

Where is the basic weakness in the position ? Clearly the seed is not being grown in the quantities required to bring about a rapid exploitation of the superior strains in our general farming. The growers of the seed say that there is not a demand at a payable price for substantially greater supplies of the seed. It may be questioned whether substantially greater supplies even at a considerably lower price would go into use on typical dairying and fat-lamb territory.

It will be questioned by some, also, whether it should go into use, and it seems well to indicate that there is much evidence pointing to the conclusion that a basic step in the most profitable improvement in the pastures of much territory is the introduction of superior strains of the main pasture species. Whether this is done by ploughing and resowing or by surface sowing is apparently immaterial.

Grass Conservation.

Evidence provided by carefully conducted field trials has shown that the improvement of pastures by phosphatic top-dressing intensifies the need for conserving surplus feed from pastures provided during periods of rapid growth, and increases the amount that should be conserved. This is because phosphatic top-dressing increases the difference between rate of production in the period of slow pasture-growth and that in the period of rapid pasture-growth.

This is illustrated in the following table based on data in the Department of Scientific and Industrial Research Bulletin 31 by Hudson, Doak, and McPherson :—

Daily Yield of Green Herbage in Pounds per Acre.

Period of Production.	No Manure.	3 cwt. Super per Acre.	
		Summer Application.	Winter Application.
12th May to 28th August	9·2	20·9	24·6
7th October to 17th October	120·2	185·6	194·5
Difference between winter and spring production ..	111·0	164·7	169·9

The increase in top-dressing that has taken place in recent years has already been noted, and it becomes interesting to consider whether there has been a corresponding increase in the conservation of surplus pasture.

Ensilage and Hay.

In climates characterized by broken summer weather ensilage has been strenuously recommended as a valuable means of conserving surplus pasture growth. Hence, interest attaches to the trend in ensilage, as indicated in the following table showing the areas in acres of grasses and clovers cut for silage :—

Season.	Acres.
1930–31	114,301
1931–32	113,745
1932–33	116,495
1933–34	92,271
1934–35	80,595
1935–36	82,665
1936–37	78,385

As haymaking is complementary to ensilage in pasture conservation it is interesting to note the trend in haymaking over the same period, as disclosed by the following table of acres of grasses and clovers cut for hay :—

Season.	Acres.
1930–31	295,285
1931–32	317,847
1932–33	409,974
1933–34	378,141
1934–35	414,156
1935–36	453,353
1936–37	425,385

It will be noted that the upward trend in haymaking in general counterbalances the decline in ensilage. In view of the undoubtedly useful role of ensilage in

districts of uncertain summer weather it might be expected that ensilage would consistently grow in popularity in districts such as Taranaki and Auckland as a means of spreading over a greater period of time the annual job of conserving surplus pasture growth.

Auckland Position.

An interesting aspect of Auckland farming is that in the six-year period 1930–31 to 1936–37 there was a 32-per-cent. increase in dairy-cow population and a 22-per-cent. increase in the area of grassland used for hay or silage. However, during the same period there was a 30-per-cent. decline in the annual area of ensilage in the Auckland Province.

The following table shows the trend in hay and silage together :—

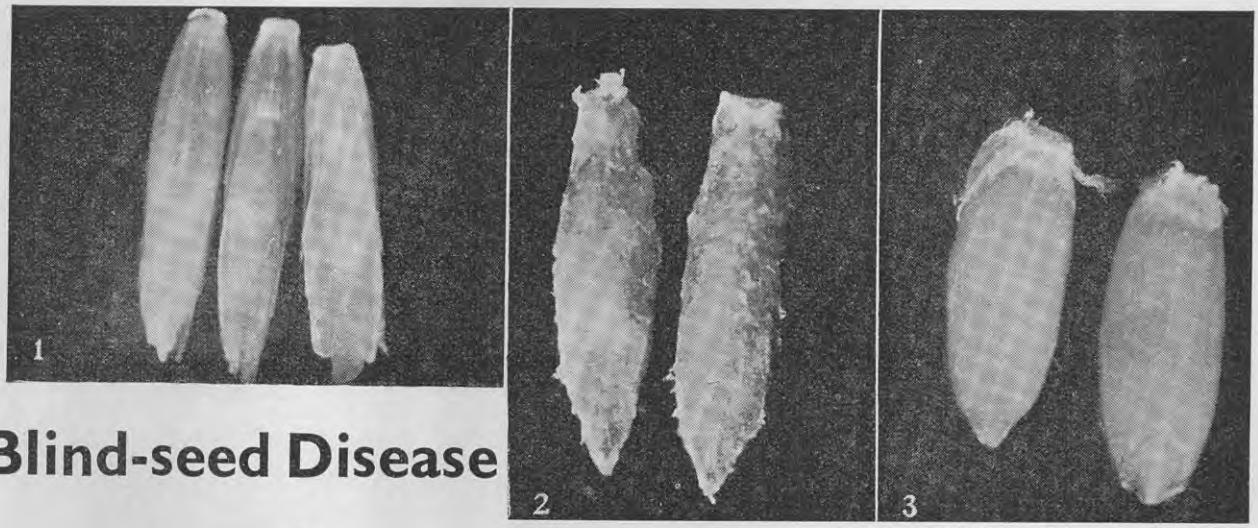
Season.	Acres.
1930–31	409,586
1931–32	421,592
1932–33	526,469
1933–34	470,412
1934–35	484,751
1935–36	536,018
1936–37	504,253

The full significance of these tables is to be seen when the tables are considered in conjunction with the relation between the seasonal production of pastures and the seasonal feed needs of reasonably well-fed dairy herds. In a paper presented to the annual conference of the Grasslands Association three years ago it was indicated that while 52 per cent. of the whole year's production of pastures takes place in the period October to December inclusive, only 30 per cent. of the feed requirements of a well-fed dairy herd fall in the same period.

From this it may be deduced that 42 per cent. of the grass-production of this period is surplus relative to the feed requirements in dairying. In other words, 42 per cent. of the pasture-production is available for haymaking and for ensilage. The official estimate of the area of land required for the keep of one dairy cow varies from 2·16 acres to 3·22 acres.

If we take an intermediate figure of 2·5 acres per dairy cow, the fact that there are, in round figures, 1,000,000 dairy cows in the Auckland Province indicates also that 2,500,000 acres are devoted to Auckland dairying. The conservation of surplus grass growth on 40 per cent. of this would give an area of 1,000,000 acres of haymaking and ensilage annually for Auckland dairying alone. Actually, the Dominion acreage for both dairy and other farm stock is, in round figures, 500,000 acres, while the Auckland acreage is but 250,000 acres—one-quarter of the acreage apparently available.

(To be continued.)



Blind-seed Disease Causes Low Germination of Rye-grass Seed.

J. C. NEILL, Mycologist, Plant Diseases Division, Plant Research Bureau,
and
E. O. C. HYDE, Seed Analyst, Department of Agriculture, Palmerston North.

IT has been known for many years that some apparently well-harvested samples of rye-grass seed may exhibit a phenomenally low power of germination. The trouble has been generally associated with localities subject to wet weather during spring and early summer, but is known to affect crops in all seed-growing districts.

Since the introduction in 1930 of certification for perennial rye-grass seed the incidence of the low-germination trouble has become a very serious matter. It would appear that the true perennial strains are more susceptible than the false perennials, and growers of certified seed have in some districts been faced with serious losses from this cause. Samples of apparently sound, well-harvested seed have tested as low as 12 per cent., and the average germination of all samples from the Manawatu, Canterbury, and Southland districts in 1937 was below 60 per cent.

Above illustration—(1) Blind-seeds before removal of glumes; (2) kernels of blind-seeds; (3) kernels of healthy seeds.

This article is a condensed summary of a more technical article on the same subject which appeared in the February number of the *Journal of Science and Technology*.

As the value of the seed is governed by its test, this means that to many growers the return was so greatly reduced as to be insufficient to cover the costs of harvesting and dressing. Growers who have had this experience are disinclined to shut up paddocks again for seeding, especially when feed is at all short. The general effect has been to maintain the price of high-germinating lines of certified seed at an unduly high level—at present from 17s. 6d. to 22s. per bushel—with consequent curtailment of its use for the laying-down of permanent pastures.

There is no doubt that the present production of certified seed — about 200,000 bushels — would be greatly increased, with consequent reduction in price, were growers assured that the germination would be reasonably good.

Cause of Low Germination.

In the past the trouble was generally ascribed to the effect of wet weather in preventing proper fertilization or ripening of the seed. In a way, that explanation still holds; but now we know that the wet acts only indirectly in favouring the attack of a parasitic fungus. The fact that the trouble was associated with a fungal infection of the seed was first brought to notice in 1932.* Only within the last few months has the whole life-history of this fungus been ascertained, knowledge that was indispensable if the problem of its control was to be tackled with any hope of success.

It is interesting to note that although the fungus appears to attack rye-grass wherever grown—it has been found here on seed of English, Scotch, Welsh, Irish, Swedish, and Australian origin—there appears to be no record of the disease in the technical literature.

*Hyde, *New Zealand Journal of Agriculture*, Vol. 44, No. 5.

So obscure are its symptoms that it has not as yet received a name. We have therefore christened it "Blind-seed disease," a name chosen because it describes the main symptom.

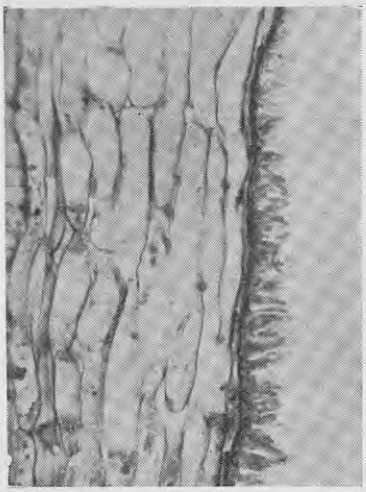


Fig. 2.—Highly magnified portion of coat of a blind-seed, showing continuous coating of slime-spores.

Life-history of Fungus.

There are three main phases in the life-cycle :—

(1) The blind seeds themselves in which the fungus carries over from season to season.

(2) Small fungus cups (Fig. 4) produced in the early summer by the fungus in blind seeds lying on the ground. From these, minute spores are shot into the air. Lighting on the open florets of rye-grass plants, these spores start the third or parasitic stage.

(3) In this parasitic stage the fungus attacks the developing seed, killing the embryo, and so reproducing the blind seeds of the first phase.

The blind seeds as found in a dressed sample cannot be distinguished from healthy seeds on outward appearance. When viewed by strong transmitted light, however, they are more opaque and, if the glumes are removed, the kernel often has a glistening or rusty surface (Fig. 1). If such a kernel is rubbed in a drop of water hundreds of sausage-shaped, colourless spores can be seen under the microscope.

These are the cause of the glistening appearance of the kernel, forming almost a continuous coating (Fig. 2). It is improbable that these surface spores play any further part in causing infection, as they soon die if kept dry.

Fig. 3 (a).—Cross-section of blind-seed, showing fungus threads in tissues of embryo and endosperm.

The fungus, however, has also ramified within the endosperm and embryo of the seed (Fig. 3), and remains alive there after storage for from a few months to a year or perhaps more.

If such a blind seed falls to the ground or is sown in the autumn the fungus within the seed slowly develops at the expense of the stored food in the endosperm, and, at about the time of flowering of rye-grass (November and December), sends up a small pinkish stalk about $\frac{1}{8}$ in. long which opens out at the top into a saucer-shaped disk about $\frac{1}{8}$ in. in diameter (Fig. 4). These can be found in numbers just protruding above the surface of the soil under rye-grass that has been infected the previous season.

If carefully dug up with a pocket-knife it will be seen that the stalk arises from a buried seed. The fungus cups are of a soft, waxy consistency, and last only two or three weeks before decomposing. The saucer-shaped upper disk consists of a tight packed mass of tubes, each containing eight spores and provided with apparatus to eject them for considerable distances into the air when ripe (Fig. 5).

The tubes ripen in succession, so that a continuous supply of spores is ejected

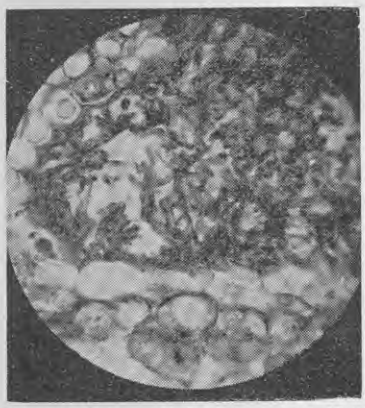


Fig. 3 (b).—Highly magnified section of a portion of the endosperm of a blind-seed, showing the ramifying fungus threads.

during the life of the disk. When one of these spores alights on an open floret of rye-grass it germinates and proceeds to attack the ovary. In this phase the fungus produces a quite different type of spore in enormous numbers and embedded in a mucilaginous slime (Fig. 6). This

Fig. 4.—Spore-bearing cups of the blind-seed fungus arising from seeds just below the surface of the soil.

Fig. 5.—Fungus cup discharging spores.

slime, with its contained spores, is washed by rain and probably carried by insects to other florets of the same spike or to other plants, to germinate in turn and create fresh centres of infection.

The effect on the seed depends on the stage to which it has developed when infection takes place. The early or primary infection more or less completely destroys the developing ovary, but the later secondary infections merely infect without noticeably affecting full development. The blind seeds are the result of these infections.

Control.

As the life-history has only just been worked out, little experimental work has yet been done on control, but it is proposed to undertake work on this problem immediately. The task is being approached from two angles. In the first place an effort is being made to select or breed resistant forms of perennial rye-grass, and, secondly, the possibilities of preventing infection are being explored.

The diseased seeds from the previous season are the source of infection. Measures such as heavy stocking and frequent use of the mower, which will reduce the number of seeds falling to the ground in the summer preceding the seed crop, might therefore be expected to give some measure of control. How effective these measures will be has yet to be ascertained. A factor which may possibly reduce their efficiency is the carriage of spores on the wind from distant sources of infection. It may therefore be necessary to treat adjacent paddocks, especially those on the windward side.

Experiments are also to be carried out to determine whether the sowing of disease-free seed is advantageous when it is intended to take a seed crop the first year. There is evidence that the fungus dies in the seed if it is kept dry for more than one year, and experiments will be carried out to ascertain the effect of seed drying and storage conditions on the survival of the fungus.

Another aspect to be investigated is the effect, if any, of the fungus on rye-grass plants apart from injury to the seed. Judging by the facts so far ascertained, it is unlikely that the fungus would have any serious effect on grazing qualities or deleterious effect on stock, but it is possible that the fungus can live within the tissues of the plant and so carry over infection apart from that caused by wind-borne spores.

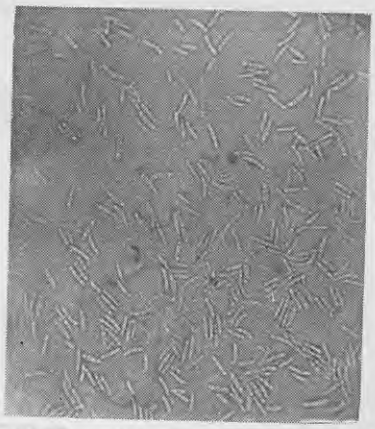


Fig. 6.—Slime-spores of blind-seed fungus.

Much, therefore, remains to be done before full knowledge of the disease and its control can be attained, but at least there is now a foundation from which to build.

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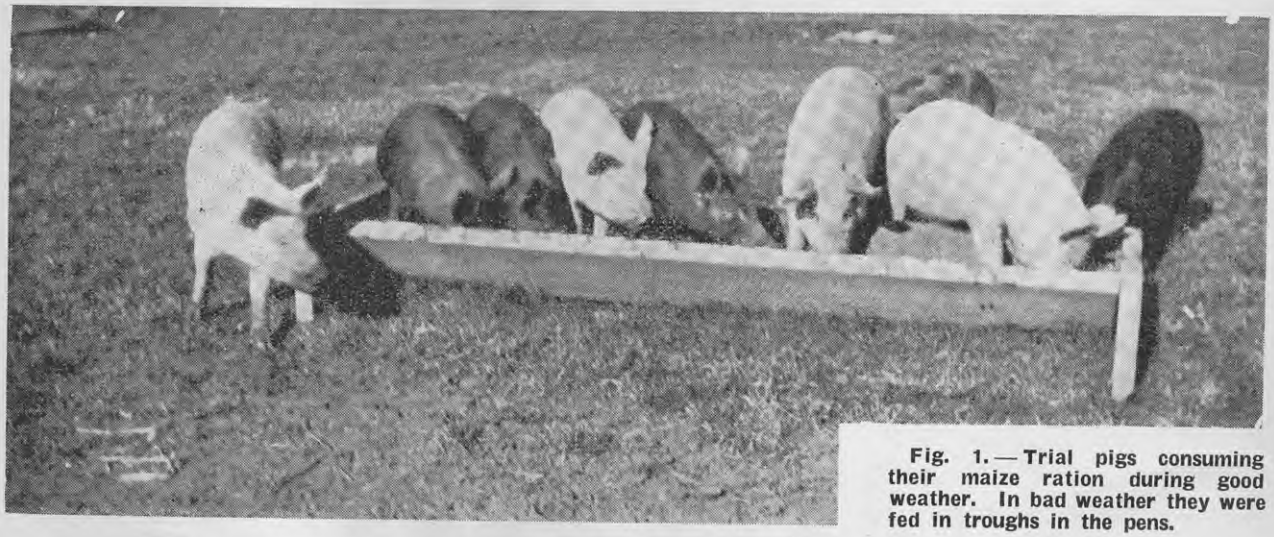

Fig. 1.—Trial pigs consuming their maize ration during good weather. In bad weather they were fed in troughs in the pens.

Maize Is Useful for Winter Feeding of Store Pigs.

Results of Experiments at Northern Wairoa Demonstration Farm.

E. H. ARNOLD, Instructor in Agriculture, Dargaville.

IN North Auckland, where some 250,000 dairy cows are milked each year, the returns from pig-keeping, which utilizes otherwise waste skim-milk, considerably augments the dairy-farmer's income. Where good types of pigs, suitable layouts and equipment, and efficient management methods are combined, the pigs form a most profitable part of the farm business.

For feeding, almost complete reliance is placed on skim-milk. In addition to the necessary small quantites of meal purchased for feeding to the in-pig sows and for creep-feeding the litter before weaning, some farmers make good use of reasonable quantities of meal to finish off the pigs, especially when skim-milk supplies are inadequate.

By breeding the sows early, to farrow from late May onwards, an endeavour is made to raise two litters a year from each sow. As many pigs as possible are carried to baconer weight, while all sale pigs are disposed of when the skim-milk supplies decline in the late autumn.

Experiments to investigate the value of maize for the winter feeding of store pigs were carried out last year in North Auckland. The results showed that pigs wintered on maize or maize plus meat-meal not only resulted in a payable return for the maize, but also almost doubled the value of the skim-milk that would have been obtained by buying similar store pigs.

Only the breeding-stock and possibly suckers from the early litters are wintered on the farm.

Good Housing Essential.

Unless suitable housing is provided, ample care and attention in feeding and management given, pigs from the early litters born in late May and June do not thrive. Fixed farrowing-houses with a fair-sized yard in concrete where pigs can be confined out of the mud during wet weather are found necessary. With such early litters, the paddock system with movable farrowing-houses fails on account of the muddy conditions prevalent during the winter months on the heavy soils of North Auckland.

Critical periods occur in pig-feeding when reliance is placed on skim-milk with little or no purchased meals. The supply of skim-milk varies with the seasonal production of the herd, and results in inadequate quantities to do the pigs sufficiently well throughout the year.

In the spring, if pastures are late in coming away, resulting in the skim-milk supplies being less than expected, purchases of meals must be made to keep the young pigs growing. Upsets in the breeding programme, causing sows to farrow later than desired, or excessive deaths among the early litters, often mean a smaller number of pigs available

than are sufficient to cope with the increasing skim-milk supply of a normal season.

Purchase of Stores.

The purchase of store pigs is then considered, but, as many other farmers are seeking to purchase stores at that time, the price is high and the number bought is less than considered necessary. The young weaners are then fed to excess, with consequent digestive troubles, and later the carcasses are graded down through being overfat when sold. The death of even one or two high-priced bought-in stores may easily turn the deal into a loss, instead of enabling a profit to be made. Often disease, which later takes toll of the farm-reared pigs, is introduced through the buying-in of store pigs.

When the yield drops during the dry weather in the summer months, skim-milk supplies become inadequate. The reduced amount available for pig-feeding means that excellent pigs of baconer type are disposed of at porker weight instead of being carried through to baconers as is desirable.

Maintenance of Supplies.

Improvement in the feeding of the milking-cows, by providing ensilage or turnips, combined with the careful management of pastures, particularly frequent topping with the mower, will result in maintaining the skim-milk supplies and enable more pigs to be sent off as baconers.

If home-grown maize remaining from the previous season is on hand, the feeding of maize together with reduced skim-milk to the lighter-weight pigs will leave sufficient skim-milk to enable the larger pigs to be fed to baconer weight.

It is not always practicable to have the right number of pigs on hand to balance the farm skim-milk supplies at all times of the year. In the late autumn, when the seasonal decline in the milk occurs, numbers of unfinished porkers or baconers are still on the farms. Meals may be purchased, but if more than a certain amount is bought the cost exceeds the return obtained. Further, with delays in breeding, weaners which at that time of the year have little sale value present a problem to the farmer. The unfinished pigs are quitted at unremunerative prices, while the weaners, if no sale can be effected, are left to take their chance over the winter.

Unless ample feed provision is made to over-winter stores and autumn weaners in a healthy growing condition, many fail to survive until the spring, or receive so great a set-back that they cannot be economically finished off in the spring.

Most Profitable Baconers.

Normally the most profitable baconers are those that have been cheaply carried over the winter in a thriving condition. Skim-milk supplies are then at a premium. The prices received for pigs as baconers or porkers definitely limits the expenditure on meals—it is not long before the costs exceed the returns. On most dairy-farms some crop such as swedes, mangels, pumpkins, carrots, or maize can be grown. It is by the production of some such cheaply grown crop which suits the farm that full advantage can be taken of skim-milk to obtain the highest possible profits from pig-keeping.

In the Bay of Plenty, autumn litters are carried over the winter on farm-produced maize with access to grass, and in the spring when supplies become plentiful the pigs are finished off on skim-milk for bacon. As part of the winter feed, maize is an excellent crop to grow, and, further, it can be stored indefinitely.

Maize, however, is low in proteins, which are also unbalanced, and is deficient in lime. The usual supplements fed with maize are skim-milk or meat-meal. Suitable pasture, mainly short grasses and clovers, are also of value to balance up the deficiencies of a purely maize diet.

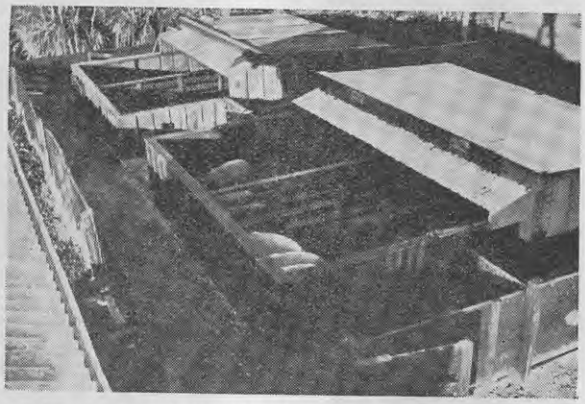

Fig. 2.—The fattening-pens in which the trial pigs were confined when soil conditions were too wet for the pigs to graze.

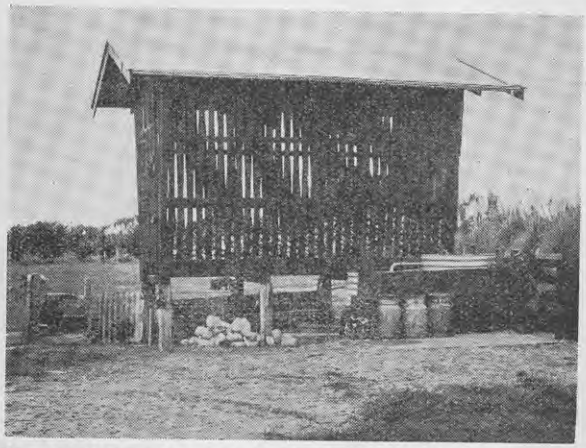

Fig. 3.—The maize crib adjacent to the fattening-pens.

Maize and Meat-meal Bridge the Gap.

EXCELLENT crops of maize can be grown in many areas in North Auckland, especially on the rich river-flats of the Northern Wairoa district, and during the winter months of 1938 the committee of Northern Wairoa Experimental and Demonstration Farm, Dargaville, arranged feeding trials to investigate the value of maize for the winter feeding of store pigs.

The conclusions reached may be summarized as follow :—

(1) It is not practicable to balance pig numbers on the farm so that skim-milk will adequately supply pig feed throughout the year.

(2) This results in the purchase of excessive quantities of meal, or the sale of well-bred, good baconer-type pigs as porkers, stores, or even as underweight pigs, or in some cases pigs are kept on a starvation diet throughout the winter.

(3) Maize, a crop which can be stored indefinitely, can safely be grown on many North Auckland dairy-farms.

(4) Cob-maize (*a*) will help out the gap between the weaning of early litters and a late spring milk-supply ; (*b*) will assist, with skim-milk, to take pigs to baconer weight during the dry summer months ; (*c*) will, alone or with meat-meal, carry stores through the winter in a thriving condition ; and (*d*) will avoid the buying-in of costly stores in the spring with the introduction of disease.

Trial Conditions.

Two lots of ten pigs each were fed under trial conditions from the 16th May, 1938, to 15th August, 1938.

The feed rations were as follow :—

Group 1.

(Maize only.)

Average Live-weight. lb.	Maize per Pig. Pounds per Day.
50	.. 2
60	.. 2¼
70	.. 2½
80	.. 2¾
90–100	.. 3

Group 2.

(Maize plus meat-meal.)

Average Live-weight. lb.	Maize. Pounds per Pig per Day.	Meatmeal. Pounds per Pig per Day.
50	1½	½
60	1¾	½
70	2	½
80	2¼	½
90–100	2½	½

The pigs were housed in the fattening-pens and had access to rye-grass pastures at will except on eleven days during the period. On these days they were confined to the pens because of excessively wet soil conditions.

The amount of food consumed was :—

Group 1 (maize) : 238 lb. maize per pig.

Group 2 (maize plus meat-meal) :— 193 lb. maize per pig, 45 lb. meat-meal per pig.

Weighings were made at two-weekly intervals, and the summarized results were :—

Group.	Weight per Pig, 16/5/38.	Live-weight, 15/8/38.	Increase.	
			Per Pig.	Per Pig per Day.
	lb.	lb.	lb.	lb.
Maize only	53·8	104·6	50·8	0·56
Maize plus meat-meal ..	54·2	115·7	61·5	0·68

Satisfactory Gains.

The gains made are highly satisfactory. An increase of more than half a pound live-weight per day means that the pigs wintered well. These pigs of approximately 50 lb. live-weight in early May, with access to grass paddocks and the provision of suitable housing, were carried through the winter in a thriving condition. Those on maize produced 50 lb. of live-weight—that is, 36 lb. of carcass worth 18s.—for four bushels of maize. Those on maize and meat-meal similarly produced 22s. worth of carcass for 3¼ bushels of maize plus 5s. 6d. worth of meat-meal. The pigs receiving the meat-meal were also livelier and possessed considerable bloom which the "maize-only" pigs lacked throughout the trial.

Here the use of 45 lb. of meat-meal that replaces an equal amount of maize produces approximately 11 lb. more of live-weight—that is, 8 lb. of carcass worth (at 6d. per pound) 4s. The extra cost of meat-meal is less than 2s. per pig.

Following the three months store period these twenty pigs were carried through to baconer weight on skim-milk. They were confined to the fattening-pens, but were allowed out on to grass paddocks on two days each week. During this finishing period the ten pigs which wintered on maize only consumed 416 gallons of skim-milk, while those previously on maize and meat-meal consumed 385 gallons. Weighings were continued,

and after disposal the following data were available, the figures being the averages of the pigs in each group :—

	Maize Group.	Maize plus Meat-meal Group.
Weight at beginning of skim-milk period (lb.) ..	104·6	116·7
Live-weight when killed (lb.) ..	187·1	190·2
Increase during skim-milk period (lb.)	82·5	74·6
Increase in live-weight per day during skim-milk period (lb.)	0·78	0·76
Days to reach baconer weight ..	105	98

Unless the results can be adapted to farm practice with economical benefits feed-trial work is not complete. In suitable maize-growing districts it is considered that a return of £9 a ton for maize grown is a payable proposition. The maize crop has also an advantage in that it can be grown with pumpkins, giving two valuable crops on the one area.

Large acreages of maize are not necessary. One acre yielding 60 bushels will provide enough maize for fifteen to twenty pigs, and will show both a direct and an indirect return. The direct returns are better wintered pigs in good store condition which can be fattened on skim-milk during the following spring.

Fig. 4.—Trial pigs grazing grass paddocks towards the end of the period of maize feeding.

Financial Returns.

The financial returns from the trial reveal that the pigs wintered on " maize only " gave a return of 5s. 6d. per bushel for maize and 1·2d. per gallon of skim-milk, while those wintered on maize and meat-meal returned 5s. 11d. and 1·3d. respectively. Similar pigs to those under trial would have cost £2 (" maize-only " pigs) or £2 5s. (maize plus meat-meal pigs) to purchase as stores during the middle of August, 1938. The returns from feeding purchased pigs would then have worked out at 0·71d. and 0·52d. per gallon of skim-milk.

Although exactly similar results would not be obtained on every farm, these figures are sufficient to show that pigs wintered on the farm on maize meat-meal not only resulted in a payable return for the maize, but also almost doubled the value of the skim-milk that would have been obtained by buying similar store pigs.

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Seed-wheat Certification.

List of Growers.

J. H. CLARIDGE, Seed Certification Officer, Wellington.

FOLLOWING is a list of growers whose wheat crops have passed both the field and grain inspections required under the Government scheme for the certification of seed-wheat. The seed from these crops is not recognized as finally certified until it has been satisfactorily machine-dressed and the sacks suitably tagged and sealed. Further lists will be published later.

Variety.	Grower.	Acreage.
Cross 7	Abbot, C. G., Cheviot	27
	Baldick, J., Wairau Road, Spring Creek	15
	Beavan, F. R., Rotherham	21
	Calder, Geo., Halkett	27
	Croy, E. J., Seafield R.D., Ashburton	30
	Davies Bros., Waiau (Line A)	21
	Davies Bros., Waiau (Line B)	30
	Dorn, F., Kairanga	10
	Jameson, R. L., Rotherham	46
	Johns, D. S., Culverden	33
	Marshall, D., Springston	32
	Neal, F. C., Dillon's Point, Blenheim (Line A)	13
	Neal, F. C., Dillon's Point, Blenheim (Line B)	21
	Neal, F. C., Dillon's Point, Blenheim (Line C)	11
	Neal, F. C., Dillon's Point, Blenheim, (Line D)	6
	Neave, H., Meadowbank	10
	Parsons, F. J. D., Waiau	39
	Ross, R. G., Ruapuna R.D., Ashburton	50
	Snowden, K. R., Dillon's Point Road, Blenheim	7
	Symonds, B. L., Waipara	17
Solid Straw Tuscan	Davies Bros., Waiau	35
	White, G. T., Waiau	13
Hunters II	Earl, D. M., Culverden	25
	Hoban, W. J., Culverden	25
Jumbuck	Calder, Geo., Halkett	10
	Marfell, H. R., Seddon	30
	Snowden, K. R., Dillon's Point Road, Blenheim	9

The accompanying list is of growers whose wheat has been inspected in the paddock and has passed the grain inspection as required under the Government certification scheme for seed-wheat. Farmers should realize, however, that these lines are only provisionally certified, and that before becoming finally certified they must be machine-dressed to a certain standard and the scheme completed by the placing of insert slips inside the sacks and tags outside and the final sealing of the sacks.

Under this scheme there are certain advantages; some farmers will keep in mind the factor of a slight agreed increase in price for their certified wheat over that of the price of milling-wheat. However, the aim of the Department does not lie along these lines. The main object is to make available to the farmer a line of wheat which, by virtue of its comparative purity and freedom from loose smut, will prove superior to the ordinary commercial lines available.

In most cases where a line of certified wheat is carefully handled it should retain its standard for from two to three years. In the case of Cross 7 grown in certain localities, however, growers may be well advised to purchase a fresh certified line each year. Farmers should realize that no warranty as to control of stinking smut is given under the certification scheme, and intending growers of certified seed-wheat should insist that their purchased wheat should be dry dusted with either Agrosan or Ceresan.

Any further information relative to the growing of certified seed-wheat or, in fact, any crop, grass, &c., under the certification scheme may be obtained from the local Instructor in Agriculture in your particular district.

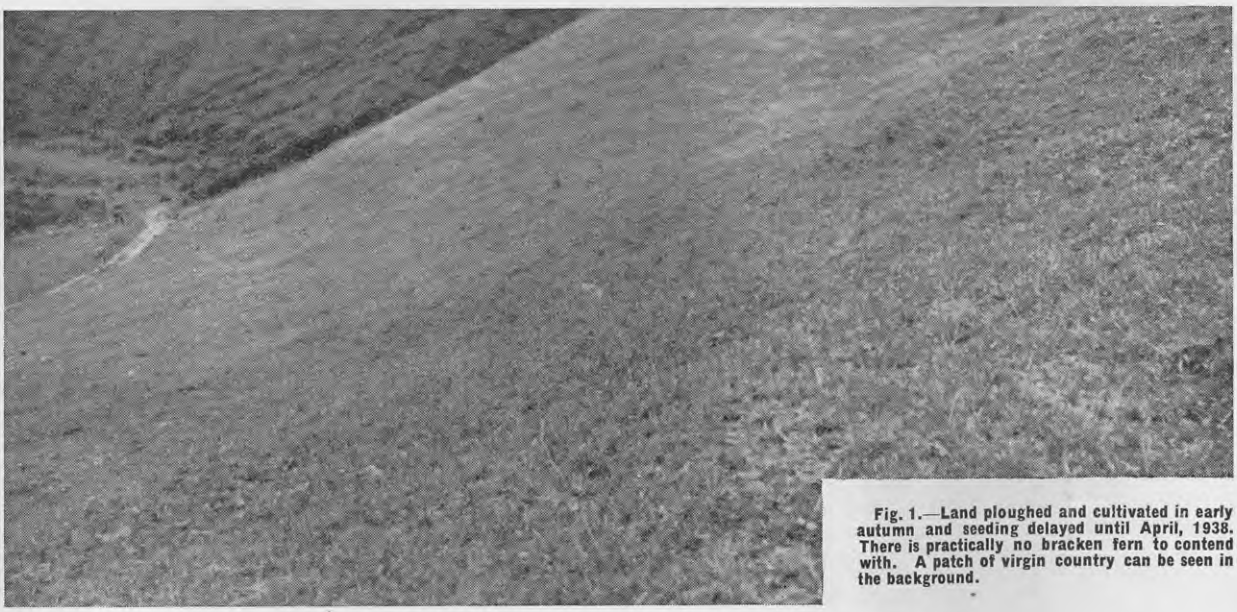

Fig. 1.—Land ploughed and cultivated in early autumn and seeding delayed until April, 1938. There is practically no bracken fern to contend with. A patch of virgin country can be seen in the background.

Grassing of Bracken-fern Country.

Method of Assisting Control of Second Growth.

C. R. TAYLOR, Fields Instructor, Whakatane.

TO the average farmer engaged in the task of developing country dominantly of the bracken-fern type it is doubtful whether there is a problem more difficult to handle than the successful control of second growth during the years immediately following the grassing-down of the sown area. To those farmers fortunate enough to be in the position to command sufficient stock just when required to crush second growth the problem is not nearly so formidable, and in such instances rarely is the situation regarded as calling for more than an average amount of skill in the handling of stock in its relationship to pasture management.

Unfortunately, however, by far the greater number of farmers bent on obtaining a home and livelihood from this type of country are not so favourably placed, with the result that very soon a situation arises that is almost incapable of adequate immediate solution unless the land concerned is comparatively flat, and thus lends itself to mowing. Where the topography of the country is such as to render mowing impracticable, the only other alternative available to the farmer whose property has, or is running to second growth is the carrying of a sufficient number of stock with which to deal with the menace.

Based primarily on the two main growing periods of bracken fern in each year, a method of grassing fern country which materially lessens the usual problems incidental to the control of second growth is described by the author. Most gratifying results have been obtained with this method in breaking in large areas of bracken fern - manuka hill country in the Whakatane County.

Herein lies the difficulty, as stock are usually much too costly for many to be purchased when second growth is troublesome, and later in the season when pasture and other vegetative growth is almost dormant it is invariably necessary to reduce the stock carried by selling the surplus on what is generally a very weak market.

Thus it is possible to incur such heavy financial losses that few farmers find themselves in a position to withstand the almost certain drain on their resources that this method of control involves, and the consequence is reflected in the large areas of fern-infested pastures one observes in practically every locality broken in from the type of country in question.

Practical Method.

Fortunately, there is a method of grassing fern country situated in localities enjoying a moderately mild climate—such as is experienced over most of the Auckland Province, with the possible exception of a few inland areas—that very materially lessens the usual problems incidental to the control of second growth. The method referred to is based primarily on the well-known habit of bracken fern that provides for two main growing periods in each year—the first

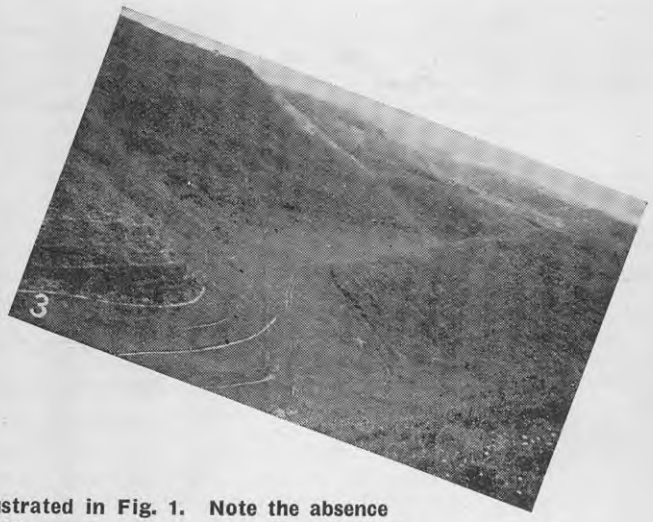

Fig. 2.—Another view of the area illustrated in Fig. 1. Note the absence of fern.

Fig. 3.—The pasture on the right of the fence was sown in April, 1938, and that to the left twelve months before.

Fig. 4.—Part of the same block of country as illustrated in Figs. 1, 2, and 3, but sown in March, 1938, instead of April. In spite of crushing with stock there was ample evidence of a persistent growth of fern when the photograph was taken.

Fig. 5.—Another glimpse of fern-infested pasture following a March sowing. Stock had damaged the fern considerably.

being in the spring during the months of late October and November, and the second during February and part of March.

For very excellent reasons, few farmers nowadays select the spring months for sowing down country of the bracken fern type to pasture, but as grassing down has to be accomplished at some period in the year the autumn season has, by common experience, become the recognized time for doing this work. If, however, the sowing of the seed is undertaken during March, which is, of course, the generally accepted month for this operation, it almost invariably happens that, long before the grass has made sufficient growth to graze, bracken fern has carpeted the area with a dense mass of brown fronds.

These are not only difficult to deal with later, but the dense shade thus created has a most harmful influence on the young establishing seedlings, the result generally being a patchy pasture devoid of a large percentage of the more valued grass and clover species sown. Such a position not infrequently takes many years to rectify, if possible at all, and consequently represents a serious economic loss to the farmer concerned.

On the other hand, by delaying sowing a month or, until such reasonable time as it is apparent that the second burst of fern growth is past, it will be found, provided all other conditions are suitable, that the pasture develops normally without serious competition from extraneous vegetation. Further, by the following

spring, when it would be quite usual to expect considerable trouble from the spring growth of fern, the sward has so thickened up that very little fern will appear, and what small amount does appear can easily be handled by the relatively large number of stock the pasture is capable of *profitably* carrying without having to use them for crushing purposes.

Success of Method.

The method just described has been most successfully employed in the breaking-in of large areas of bracken fern-manuka hill country in the Whakatane County, and the results obtained are most gratifying. Where the scrub is merely burnt and the seed sown on the ash, the burning requires to be done later than usual, and this will adequately account for the autumn growth of fern.

Should the land have been ploughed and worked down or disked and harrowed only in preparation for the seed, all the cultivation possible should be given while the fern is growing. When this has stopped, or the main of it, say, in April, it will be quite safe to proceed with the grassing of the area.

Figures 1, 2, and 3 illustrate the effect of grassing fern-covered hill country in April, 1938. It will be noted that very little fern is evident in the pastures in spite of the fact that the photos were taken during the following spring when the fern was in full growth elsewhere. Figures 4, 5, and 6 depict the results of a March sowing on country adjoining, the seed-mixture, top-dressing, and method of cultivation being the same in each case. Stock were depastured on both areas when the photographs were taken.

Montgomery Red Clover.

R. E. R. (RAETIHI) :—

Is Montgomery red clover suitable for light hill sheep country in this district? I have a lot of ring fern. Would it be suitable to sow on this when burnt off?

Fields Division :—

Montgomery red clover is not considered suitable for light hill country in your district. Subterranean clover and *Lotus major* are much better adapted to the conditions mentioned. Both these plants can be established on ring-fern burns by sowing up to 4 lb. per acre of subterranean clover and 1 lb. of *Lotus major* with 4 lb. of brown-top, 3 lb. of danthonia, 4 lb. of crested dogstail, and up to 8 lb. of good type perennial ryegrass in late February or early March.

To get a good clean burn of ring fern during spring spraying with a solution of arsenic pentoxide is recommended during January. A solution of 1 lb. of arsenic pentoxide to 32 gallons of water is strong enough to brown off all foliage for a good fire. The edges of the clumps should be thoroughly sprayed, and after the grass is up in the autumn odd pieces of ring fern round the edges of clumps should be sprayed again.

Lotus major, which is a very useful plant in your country, can be introduced by surface sowing about November on places where the surface is broken and crumbly, while subterranean clover can be introduced by surface sowing 2 lb. to 4 lb. per acre on the pastures in late February or early March. It is best to have some roughage on the area as a protection for the young plants from birds.

Importance of Strain in Pasture Plants.

Trials in North Canterbury.

A. V. ALLO, Instructor in Agriculture, Fields Division.

A GRASS and clover strain trial is a demonstration trial laid down by the Fields Division on a farmer's property to illustrate the value of a particular strain of pasture plant, either sown by itself or in conjunction with other pasture plants. It is also a useful medium for testing new strains of plants under field conditions of grazing and management. There have been many of these trials laid down in the North Canterbury District, and the information that has been derived from them has proved to be of great value both to the farmer and the Department.

The value of "strain" in agriculture cannot be overestimated. By "strain" is meant the valuation of pedigree or the sum total of all the genetical characters that go to make up the plant or animal. The stock-breeder appreciates to the full the value of strain in his animals, and knows that certain of his stock will produce far more than others, although all are managed exactly alike. Similar conditions are to be found in the plant world, although not so obvious to the casual glance.

Certain strains of a particular pasture plant—*e.g.*, perennial rye-grass—are capable of vastly increased production and longer life than are other strains grown in exactly similar environment. This fact is the underlying principle of our certification-of-seeds scheme, whereby the higher-producing strains of pasture plants have been selected and identified, and are sold to the farmer properly labelled and sealed so that he knows he is purchasing the best possible line of seed available at the price.

Sowing of Trial.

In a grass and clover strain trial the five main species of plant under trial are Italian and perennial rye-grass, cocksfoot, white and red clover, while in certain circumstances such types as crested dogstail, timothy, alsike, subterranean clover, &c., may be included in special plots.

The main strains of each species of pasture plant are sown in adjacent plots. We then have pedigree, mother seed, permanent pasture, commercially certified, false perennial, and imported strains of perennial rye-grass sown in a series of plots. Alongside these we have the various strains of red and white clover and of cocksfoot. Then the good and poor strains of plants are made up into pasture mixtures and additional plots are laid down to demonstrate the effect of good and poor strains of white clover when sown with a certified strain of rye-grass. The relative values of Italian and perennial rye-grass sown with cocksfoot and white and red clovers are also sown to demonstrate the effect rye-grass has on the establishment of the other three species.

An even piece of land is selected, typical of the district in which the trial is to be conducted. All plots are sown in the one day, and all have similar quantities of fertilizers applied. The trial is grazed at the same time as the rest of the field, and is subjected to no preferential treatment. At frequent intervals visits are made to the trial and careful reports are made on the behaviour of the various plots. One is then in a position to state how a particular strain of plant, or combination of plants, will do on a particular soil type under certain conditions of management.

Italian Rye-grass.

There are usually four strains of Italian rye-grass under trial—certified mother seed, imported, poor commercial, and Western Wolths. In all cases the mother seed has been the best plot, giving greatest bulk of feed, best recovery after grazing, and lasting the longest. Western Wolths and poor commercial usually shoot to seed at once and then practically vanish, giving little or no feed, while the imported strain is intermediate between these two extremes.

Perennial Rye-grass.

The main strains of rye-grass included have been mentioned earlier in this article. In most cases the poorer strains show most rapid establishment and give most feed during the first six months of the

trial. Stock seem to prefer these quick-growing strains, so that the poorer plots are usually more closely grazed. After the first year, however, the position is reversed and the poorer strains begin to die out, become weedy and tufted, unpalatable, and worthless. Stock show an increasing preference for the certified strains, which are kept well grazed. At the end of two to three years the plots sown with poor strains are a mass of weeds and rubbish, while the certified plots have a dense, well-grazed sward that it is a pleasure to see.

White Clover.

Strains included in these plots are similar to those in the perennial-rye-grass series—*i.e.*, poor imported and poor commercial strains, certified strains, and ordinary commercial lines. Right from the start the certified lines showed marked superiority, and this superiority increases during the progress of the trial. The poorer strains never produce much feed and very quickly die out, to be replaced quite often by volunteer self-sown white clover.

Red Clover.

The main strains are certified Montgomeryshire red clover, broad red clover, and imported strains. In most cases the broad red produces most feed during the first two seasons, but after this begins to die out. The certified strains produce slightly less feed during the first two seasons, but then show an increasing superiority over the broad red type. The imported types seldom produce much feed at any stage of their growth. In a strain trial on light land at Culverden the only strain of red clover present after five years was Montgomeryshire red, which was giving excellent cover and growth.

Cocksfoot.

The main comparison is between certified strains and the imported Danish type. In all cases the certified type show themselves as being vastly superior to the imported type, both in production, type, and length of life.

When the various strains of grasses and clovers are incorporated into pasture mixtures the same general effect is seen, the plots containing certified strains being vastly superior to the plots sown with poor strains. Deterioration of the latter-mentioned plots is rapid and goes on in spite of annual top-dressings of lime and super. The certified plots will remain in a state of high production almost indefinitely, and there are trials on the lighter plains land that are several years old and in which the plots sown with certified strains of grasses and clovers are holding out well and giving a closely grazed sward, in striking contrast to adjacent plots, weedy and bare, and sown with poorer strains.

Secret of Success.

Departmental experience has shown that much of the lighter land in Canterbury is capable of carrying a much better class of sward than at present. The secret of successful pasture establishment and maintenance on such land is the sowing of certified seeds and regular top-dressing with lime and phosphates.

It is very encouraging to see the increasing number of farmers who are using and recommending certified seeds. The continued use of the better strains of grasses and clovers must eventually mean a raising of the standard of our pastoral farming in Canterbury, and lead to an increase in sheep numbers consequent upon an increased carrying-capacity. The recognition of the fact that there are high-producing strains of various pasture plants, and the building-up of these strains and distribution to the farmer, has probably been the most momentous step in grasslands farming for the past decade.

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Pig Census Returns.

Number of Pigs Born per Sow.

M. J. SCOTT, Superintendent of the Pig Industry, Department of Agriculture.

THE census returns from 182 farms have been discussed in the last four issues of the *Journal* under the headings "Pig-meat Produced per 100 lb. of Butterfat," "Amounts of Meal used," "Production of Pig-meat per Sow," and "Amounts of Other Feed Used."

They are now analysed from the point of view of number of pigs born per sow. They are grouped into: A, ninety-two farms on which less than fourteen pigs per sow are born yearly; and B, ninety farms on which more than fourteen pigs per sow are born yearly.

The results are set out in the following table:—

Group.	(*a*)	(*b*)
Number of farms	92	90
Averages of—		
Number of pigs born per sow	10·4	17·4
Number of cows per farm ..	50	59
Number of sows per farm ..	5·2	4·1
Number of cows per sow ..	9·6	14·4
Production per sow: Number of pigs—		
Born	10·4	17·4
Bought	1·6	1·9
Sold	9·5	13·2
Died	2·5	3·5
Feed to produce 100 lb. of pig-meat—		
Total (lb.)	727	707
As milk (gallons) ..	602	580
As meal (lb.)	45	37
As other feed (lb.) ..	80	83
Weight of pigs sold (lb.) ..	84	86
Pig-meat per 100 lb. of butterfat (lb.)	42	39
Pig-meat per sow (lb.) ..	795	1,137
Earning-value of 1 gallon of skim*	0·85d.	0·90d.

* Pork at 6d. per pound; meal at £14 per ton; other feed at £2 10s. per ton. No deduction for labour or other charges.

In Group (*a*) the sows appear to average about one litter per year, the average number born per litter of recorded sows being approximately ten pigs, whereas in Group (*b*) three-quarters of the sows produce two litters per year and one-quarter have only one litter.

It will be seen from the last line of the table that skim-milk is slightly more valuable where sows produce more than fourteen pigs than it is where sows produce less than fourteen pigs. From the instructional point of view the increase in the earning-value of skim-milk due to more pigs born per sow is somewhat disappointing, as it has long been a generally accepted fact that the efficient use of sows is of fundamental importance in the obtaining of good returns.

Under the section "Production per sow" it will be noted that for Group (*a*) the total of pigs born and bought equals that of pigs sold and died—*i.e.*, no change is taking place in the pig numbers on the farms in this group. In Group (*b*) the total of born and bought exceeds sold and died by 2·6 pigs per sow—*i.e.*, pig numbers are increasing.

From the method of computation employed, by which pigs retained for breeding were not considered in production totals, the (*b*) group may not have been credited with the whole of their production, thus accounting for their earning-value of skim-milk being slightly less than one would expect.

Fig. 1.—A close view of subterranean clover on shingle country.

Subterranean Clover on Shingle Plains.

Experience in the Wairarapa District.

N. LAMONT, Instructor in Agriculture, Masterton.

THERE can be few soil types on which subterranean clover is more valuable than the shingly flats of the main Wairarapa Valley. The climate and soil type combine to suppress all pasture-growth for a period in normal summers, and production is confined to the autumn, winter, and spring. Furthermore, the severe baking that the soil receives brings about depletion of soil nitrogen and humus reserves and, as a result, a winter-growing legume such as subterranean clover is absolutely invaluable.

The illustrations are recent photographs of an area near Featherston which, although lightly stocked, had received only moderate dressings of lime and superphosphate. The tremendous bulk of growth is obvious, while little imagination is required to understand the fertility-building effect of this vigorous clover.

Indeed, innumerable examples are available of this effect particularly in regard to the increase in rye-grass that takes place in a sward in which vigorous subterranean clover has been present for two or three years. In fact, on similar shingly country, but nearer the ranges, where summer showers are more frequent subterranean clover has proved an important factor in preparing the ground for white clover.

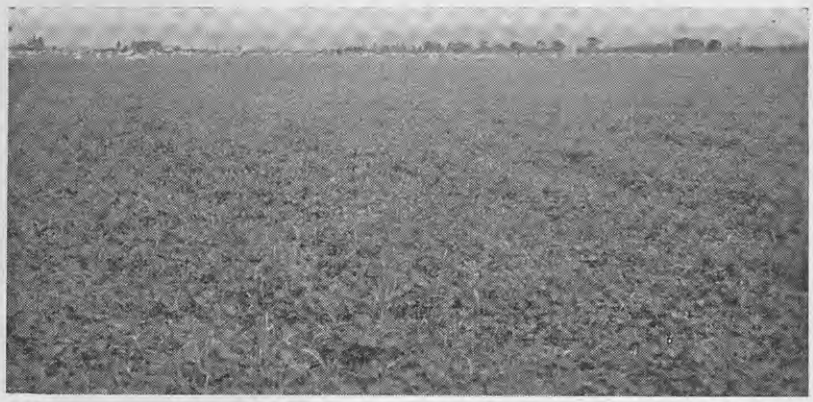


Fig. 2.—A general view of a good stand of Mount Barker subterranean clover on shingle country.

Care of New Stands.

Methods of establishment have already been fully dealt with in this *Journal*, and little need be said except to emphasize the importance of keeping all stock off a newly-sown area until the young plants are past the seedling stage. Late-spring spelling is also advisable in the first year or two to enable plants to produce long runners and thicken up the stand, but once this has been achieved no harm can be done by ordinary stocking in the spring.

There are two points of general management which are important, but which have not been greatly stressed in the past. The first concerns the obtaining of maximum winter and early spring growth from subterranean clover. There is no need to stress the value of production at this time of the year.

The general poor growth of plants in the winter is due partly to low temperatures and partly to absence of sunlight. The former is, of course, beyond our control, but we can aid a plant to overcome the latter to some extent by allowing it to develop as much leaf area as possible.

In practice this means spelling until the end of June, followed by intermittent grazing during July and August. This practice definitely results in unusually high carrying-capacities during the lean period and can be recommended as an excellent means of providing extra feed at this time.

Fig. 3.—A 4-gallon tin standing in subterranean clover on shingle country.

Source of Summer Feed.

The other point concerns the feeding value of the dry stalks, leaves, and burrs during the summer, and any who have read Australian articles on subterranean clover will be aware that in that country very considerable importance is attached to it. Similar experience is now being reported in this district, and it is being found that the dry mass of material that results from the growth illustrated here can be regarded as a useful summer supplement for dry stock with adequate water-supply.

In short, although little summer production can be expected from this type of country, such as there is will be increased by the use of subterranean clover, while over the rest of the year many times the present production can be definitely expected.

Prevention of Frost Damage in Orchards.

Use of Thermometers in Determining Danger Periods.

W. R. LLOYD WILLIAMS, Orchard Instructor, Alexandra.

A practical guide for the determination of temperatures which might cause frost damage to orchards is described in this article. Methods are also described for erecting reliable thermometer shelters.

FROST-PREVENTION by means of heating with oil-burning firepots has now become general orchard practice in many orchards in Central Otago. There are also growers in the Teviot district of Otago, in Canterbury, and in Hawke's Bay who have adopted this method of preventing frost damage to their fruit crops.

Before discussing injurious temperatures it is very necessary to draw attention to the method of taking them. In the first place, only tested thermometers should be used, and they should be placed 4 ft. 6 in. from the ground. Protection is necessary at least above the thermometers to prevent radiation; otherwise the true temperature will not be registered.

These thermometer shelters are made in various ways. A standard shelter for orchard work is in the form of a box, louvred on the ends and back, with a double roof and wire-netting bottom and front. The front part is hinged on the bottom to open downwards. It can be cheaply constructed by the grower, usually with material at hand in the orchard, and is placed on a light but firm stand.

Some growers erect a stout post and attach to it at the proper height an ordinary apple-box with the end (facing the ground) and front removed. The thermometer is placed high up near the top. Another shelter, which is most commonly used in Central Otago, is made by erecting a stout post and nailing to it a cross-board about 8 in. deep. It should be wide enough to allow for a few inches each end beyond the length of the thermometer. A board about 5 in. or 6 in. wide is nailed to the top, with a slight slope to act as a roof. The thermometer is placed reasonably close to the top near the roof. All thermometer shelters should be placed so that the thermometer faces to the south.

Care in Reading.

As thermometers are very sensitive, every care must be taken not to breathe on the liquid, and only an electric torch should be used when readings are being taken. The thermometers should be placed inside the area to be fired so that they are at the farthest point between the firepots; should there be a tree missing or one that is quite small, these are convenient places to erect the shelters. At least one thermometer should always be outside the block to be fired, and should be placed so that it is not influenced by any drifting heat from the fires.

It cannot be over-emphasized that unless the thermometers are placed at the correct height and under similar conditions a comparison of temperatures cannot be made between one part of the orchard and another, or between different orchards, or between one district and another.

The following remarks refer specifically to Central Otago, but it is considered that they should also be taken as a basis in other districts until further data which might disprove their suitability is collected.

The temperatures at which damage is caused to buds, flowers, and fruit raise the all-important questions of when it is necessary to light the firepots and when to extinguish them. The following extract from United States Department of Agriculture Bulletin No. 1588 will give some idea of the many influences which govern frost damage, each and every one of which we have found to be applicable to Central Otago conditions:—

Governing Factors.

"So many factors must be taken into consideration in determining whether a given temperature will cause damage to fruits, buds, or blossoms that the matter is one of considerable complexity. The length of time the low temperature persists, the vigour of the tree, and the weather preceding the frost, all have considerable influence on the amount of damage that will be done.

"Other conditions being the same, the fruit or blossoms on a weak, unnourished tree will show more injury than those on a vigorous tree after both have been subjected to the same low temperature.

" When soil and atmospheric conditions are favourable for growth, as during warm, sunshiny weather, the sap is likely to be watery and its freezing-point relatively high. For this reason a frost which follows a period of weather favourable for rapid growth will cause more damage than the same temperature following a period of cold, cloudy weather and consequent slow growth. Under certain conditions the blossoms and fruit may endure low temperatures without damage, which under other conditions would destroy the greater portion of the crop.

" In the following paragraphs data are given regarding temperatures which have caused damage to various deciduous fruits in different stages of development. These data are based on field observations made by Weather Bureau officials over a long period of years, and are considered safe as a basis of recommendations for successful orchard-heating operations. Some fuel will be wasted in maintaining temperatures according to these recommendations, but the grower who has orchard-heating equipment cannot afford to take chances. All temperatures mentioned are sheltered-thermometer readings . . . . More damage will result from a given temperature when the humidity is low than when it is relatively high . . . "

Chart of Temperatures.

The above quotation should be taken into consideration when the tolerance of fruits to frost damage in one district is compared with that in another district. For instance, the more rapid spring growth in the warmer parts of New Zealand might mean a considerably higher temperature at which fruit, buds, &c., are damaged. Again, the difference in humidity between one district and another may have a considerable influence.

As mentioned in the report on my visit to America, we have found the chart of damaging temperatures in the above-quoted bulletin sufficiently reliable for the Central Otago district. This bulletin was published in 1929, but I was assured that the experience of the intervening years had proved it to be reliable. The following is the chart :—

Fruit.	Stage of Development.		
	Buds closed but showing Colour.	Full Bloom.	Small Green Fruits.
	°F.	°F.	°F.
Apples	25	28	29
Peaches	25	27	30
Cherries	28	28	30
Pears	25	28	30
Plums	25	28	30
Apricots	25	28	31
Prunes, Italian ..	23	27	30
Almonds	26	27	30
Grapes	30	31	31
Walnuts, English ..	30	30	30

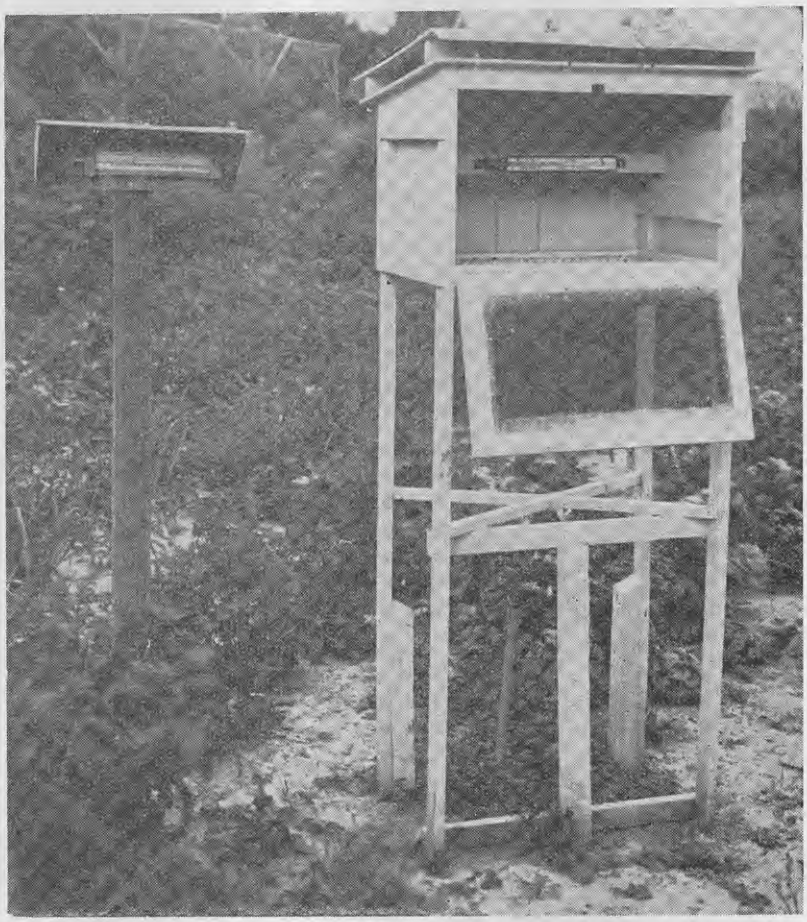
These are the temperatures that will be *endured for thirty minutes or less, provided the temperature has not been below 32° F. for more than two hours.* As an example the bulletin states :—

" Apples and pears at this stage of development (fruit-set) usually are not seriously injured by a temperature of 28·5° F. for thirty minutes or less, provided the duration of temperature below 32° F. does not exceed two hours. If the temperature drops to 29° F. at sunrise, and has not been below 32° F. more than two hours, heating is unnecessary. However, if it appears that the lowest temperature during the night will be below 29° F., or if the temperature falls below 32° F. more than two hours before sunrise, heaters should be lighted and the temperature maintained as near 31° F. as possible throughout the remainder of the night."

Our experience in Central Otago has proved this to be very sound practical advice.

Time for Lighting.

From just before the flowering-stage we consider it necessary to light up for apricots when the thermometer registers 28° F. to 29° F. The latter temperature is safer should the temperature have been at freezing-point or below for any appreciable time. As the flower advances, so must the temperature be raised, until at the greatest liability to damage (when the dried calcyces have fallen and the young fruit is bare) lighting should be started at 31° F. to 32° F., the latter again being the safer if the temperature has remained low for any length of time, or if it reaches 32° F. early in the night with the prospects of a long night's frost. It is easier to hold the temperature than it is to raise it.



Two types of home-made orchard thermometer shelters. On the right is a standard type which is, perhaps, more carefully made than usual. On the left is the one commonly used in Central Otago; both back and top boards might with advantage have been a little larger.

It is customary to light alternate pots for a start, gradually increasing the number of fires if the temperature is not being held, and, as a final resort only—should all fires be burning and the temperature still receding—take off the spiders. This will give an increased burning rate (and consequently increased heat) of at least 60 per cent. to 70 per cent. The removal of the spiders would probably be required only for the last half-hour or so before it is time to extinguish the fires, and it has been found necessary only on very rare occasions with an exceptionally severe frost.

Some take sunrise as the signal to extinguish the fires, but this is a very poor guide, and it is seldom safe then. The thermometer outside the heated area is the only safe guide, and should be followed no matter how high the sun is up. When the sun rises the rays are very " flat " or horizontal, and strike the tree only on one side of the limbs. Again, the coldest time is usually between dawn and sunrise, and the sun therefore takes some time to warm up the air above the danger point. Moreover, it is often found that the smoke from the fires will accumulate in clouds towards the east and prevent the full effect of the sun's heat reaching the trees. Much damage has been done in this district after a successful night's firing by extinguishing them too soon.

Danger Period.

In the chart the first column shows the damaging temperature for cherries as 28° F., whereas for other fruits it is mostly given as 25° F. in the " buds closed but showing colour " stage. This is definitely characteristic of cherries, for at this stage they appear to be at least as susceptible to frost damage as when in blossom. This is American and Central Otago experience. One night last spring when there was a minimum temperature of 26° F. there was considerable damage to some varieties, notably, St. Margaret, Florence, Bedford Prolific, and Napoleon, while in the bud stage. This damage has also been noticed in previous years.

It is difficult to state when the danger period for the season is over, as it depends so much upon circumstances. However, it is quite definite that with stone-fruits the most dangerous period is from just after the " shucks " have fallen and the young green fruits are fully exposed until the stone has hardened and there is a considerable thickness of flesh to protect it.

Too much emphasis cannot be laid on the fact that temperatures registered on reliable thermometers are the only safe guide; appearances are unreliable. If the chart is closely followed there may at times be more burning of fuel than is necessary. At other times, however, it will be less, but the crowning result will be an assured crop.

Haystack Covers.

R. H. G. (NEW PLYMOUTH) :—

How long is it necessary to immerse a haystack cover in a bluestone solution?

Fields Division :—

The aim is to get the material of the stack cover thoroughly impregnated with the solution. The time necessary to do this will vary considerably according to the type of material. In the case of sack covers, for which the bluestone solution is specially recommended, immersion for a few hours should be sufficient. An examination of the cover will show if the solution has gone through the material.

Certificate-of-Record Testing.

Contributed by the DAIRY DIVISION.

IN both number and quality the cows receiving certificates-of-record in January were a particularly strong lot, as the accompanying list indicates, and although no class-leaderships were seriously challenged it will be noted that many of the animals are in the highest class of butterfat-producers.

The list contains 203 names, and, of these, ninety-two cows were granted certificates on a production of over 500 lb. fat, thirty-five over 600 lb., twelve over 700 lb., and four over 800 lb.

YEARLY DIVISION.

Jerseys.

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Fat.
Junior Two-year-old.		Yrs. dys	lb.		lb.	lb.
Bokaboa Linda ..	Mrs. J. Larsen, Cheltenham	1 318	275·5	365	10,967·5	778·64
Pinecrest Choice Rose	E. J. Clough, Inglewood	2 80	283·5	365	9,747·6	600·70
Te Ara Jewel ..	W. E. Thomas, Aorangi R.D.	2 25	278·0	365	9,712·9	588·48
Erinview Cuddle ..	J. Murray, Woodville	2 8	276·3	365	10,342·1	585·34
Bokaboa Birdie ..	Mrs. J. Larsen, Cheltenham	1 283	275·5	323	8,418·0	566·37
Erinview Miss Owl ..	J. Murray, Woodville	2 15	277·0	365	10,710·3	553·77
Marasdale Trixie ..	L. Maras, Maungaturoto Railway	2 37	279·2	365	9,251·2	550·21
Green Meadows Queen Bee	T. W. Wardlaw, Waimana	1 362	275·5	365	9,838·7	545·33
Dellside Dahlia ..	Griffin Bros., Richmond	1 336	275·5	359	10,158·5	538·53
Pakowhai Patty ..	H. J. Fourneau	1 352	275·5	365	8,706·7	506·50
Waipiko Content ..	W. C. Brears, Southbridge	1 322	275·5	365	9,008·1	501·56
Beaulieu Salome ..	Dr. G. Walker, Whangarei	2 64	281·9	365	8,577·8	501·21
Greencroft Little Miss	J. Bones, Kaipaki	1 335	275·5	363	8,632·3	495·55
Tyrone Sybil's Maiden	R. J. Johnson, Runciman	1 272	275·5	365	8,223·6	475·36
Windermere Neat Sadie	V. McD. Hitchings, Otorohanga	1 344	275·5	365	8,395·3	461·03
Ashvale Nanette ..	H. J. Fourneau, Pakawhai, Hawke's Bay	2 33	278·8	348	10,087·2	457·48
Ypres Queen Bess ..	J. G. Horn, Ohau	2 2	275·7	365	8,101·9	453·05
Erinview Golden Wings	J. Murray, Woodville	1 356	275·5	305	9,568·5	451·19
Greencroft Primrose	J. Bones, Kaipaki	1 346	275·5	365	7,871·1	449·14
Dellside Miss Heather	Griffin Bros., Richmond	2 52	280·7	310	7,306·9	445·67
Greencroft Marguerite	J. Bones, Kaipaki	2 11	276·6	365	6,709·7	444·57
Dellside Belle ..	Griffin Bros., Richmond	1 344	275·5	365	7,581·3	441·11
Montrose Buttercup	Yelchich Bros., Waiuku	1 361	275·5	365	7,132·7	430·28
Jersey Glen Mona ..	F. V. Bryant, Mangatainoka	2 12	276·7	365	6,446·6	429·66
Dellside Dora ..	Griffin Bros., Richmond	2 67	282·2	326	8,803·8	424·95
Highfield Shirley ..	A. R. Bayly, Omata	2 13	276·8	365	7,765·9	420·63
Lancewood Diana ..	B. R. Robinson, Manakau	2 30	278·5	365	7,059·9	417·49
Jersey Glen Nancy ..	F. V. Bryant, Mangatainoka	1 339	275·5	365	8,679·4	413·62
Beuvelande Pam ..	G. S. Clarke, Te Awamutu	1 347	275·5	365	7,335·6	395·87
Jersey Glen Bright Eyes	F. V. Bryant, Mangatainoka	1 288	275·5	365	7,751·8	395·01
Tyrone Sybil's Laura	R. J. Johnson, Runciman	1 265	275·5	365	6,947·2	385·98
Beuvelande Baby ..	G. S. Clarke, Te Awamutu	2 17	277·2	360	7,214·9	377·24
Pinewoods Standard Valma	F. J James, Carterton	1 283	275·5	305	7,270·1	372·32
Jersey Glen Royal Gem	F. V. Bryant, Mangatainoka	1 317	275·5	355	7,536·5	372·01
Velebit Quietly ..	G. E. Yelchich, Waiuku	1 273	275·5	365	6,850·9	366·66
Tararua Rose Leaf ..	J. J. Hughey, Rangiora	2 31	278·6	365	7,814·6	362·42
Glorious Designer ..	F. Phillips, Otorohanga	1 346	275·5	304	6,229·9	360·47
H.O. Forward Heath	G. S. Clarke, Te Awamutu	1 361	275·5	365	6,955·0	359·37
Jersey Glen Thelma ..	F. V. Bryant, Mangatainoka	1 354	275·5	357	8,993·9	354·75
H.O. Forward Rosebud	G. S. Clarke, Te Awamutu	1 348	275·5	365	6,634·3	348·75
Jersey Glen Fancy ..	F. V. Bryant, Mangatainoka	2 21	277·6	362	5,624·4	348·20
Heatherlea Alison ..	H. J. Lancaster, Levin	2 14	276·9	365	6,796·4	341·35
Heatherlea Peeress ..	Ditto ..	2 11	276·6	365	6,176·7	336·97
Heatherlea Sweet Lady	" ..	2 0	275·5	365	5,827·2	333·07
Beuvelande Nan ..	G. S. Clarke, Te Awamutu	2 9	276·4	365	7,470·4	334·14
Wendouree Golden Flower	H. R. Hack, Kaiapoi	2 63	281·8	365	6,345 6	321·10
Caerleon Aster ..	Edgar Hofman, Katikati	1 339	275·5	365	6,048·6	321·01
Ivry Petal Wisp ..	H. W. Le Bailly, Buckland	1 317	275·5	365	5,816·0	310·72
Beaulieu Lively ..	Dr. G. Walker, Whangarei	2 1	275·6	365	5,070·5	298·66
Senior Two-year-old.						
Agley Eve ..	W. S. Carter, Palmerston North	2 343	309·8	365	12,958·9	702·53
Erinview Whitesox ..	J. Murray, Woodville	2 333	308·8	365	9,664·1	639·40
Erinview Fifi ..	Ditto ..	2 276	303·1	365	10,628·3	634·75
Oak Farm Princess Suen	G. B. Knowles, Tariki	2 337	309·2	365	8,268·1	534·92
Tyntesfield Duchess ..	Mrs. E. W. Garland, Okauia	2 357	311·2	365	9,043·6	483·63
Taioma Suzanne ..	J. A. Meharry, Tauranga	2 288	304·3	365	8,385·8	477·19
Merton Perfect ..	C. Rowlandson, Tauranga	2 343	309·8	267	7,360·1	403·06
Tyrone Molly ..	R. J. Johnston, Runciman	2 261	301·6	364	6,844·1	401·81
Heatherlea Bright Eyes	H. J. Lancaster, Levin	2 183	293·8	365	6,649·4	401·29
Tyntesfield Bar None	Mrs. E. W. Garland, Okauia	2 360	311·5	287	7,814·2	398·77
Velebit Perfect Lady	G. E. Yelchich, Waiuku	2 300	305·5	365	6,672·1	395·46
Velebit Flower Maid	Ditto ..	2 326	308·1	359	7,269·0	390·11
Bokaboa Dainty ..	Mrs. J. Larsen, Cheltenham	2 316	307·1	200	5,724·0	378·97
Napoleon's Princess ..	H. Wilson, Hastings	2 344	309·9	285	7,410·8	371·67
Beaulieu Marina ..	Dr. G. Walker, Whangarei	2 324	307·9	365	5,705·8	343·10
Three-year-old.						
Erinview Adeline ..	J. Murray, Woodville	3 364	348·4	365	14,566·9	864·27
Windermere Bowlina's Pat	V. McD. Hitchings, Otorohanga	3 360	348·0	365	10,869·9	632·41
Jersey Meadows Prig	T. W. Wardlaw, Waimana	3 332	345·2	333	10,674·0	599·05
Green Meadows Queenie	Ditto ..	3 77	319·7	365	10,673·4	557·76
Tyntesfield Secret ..	Mrs. E. W. Garland, Okauia	3 14	313·4	365	9,741·9	557·63
Windermere Chum ..	V. McD. Hitchings, Otorohanga	3 157	327·7	365	9,347·6	529·69

YEARLY DIVISION—*continued.*

Jerseys—*continued.*

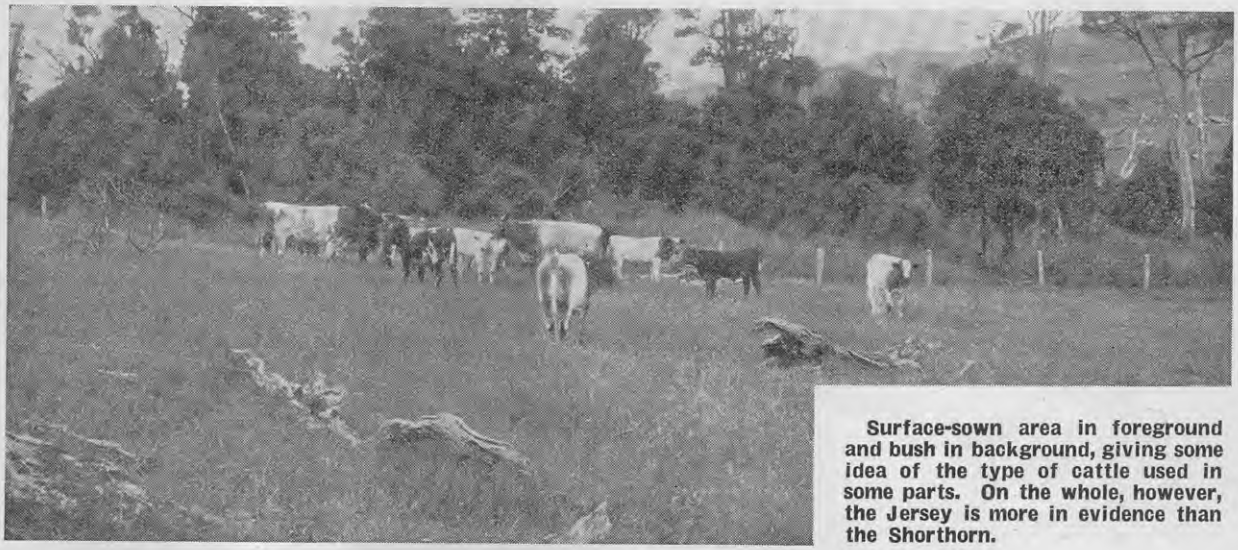
Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Fat.
Three-year-old—contd.		Yrs. dys	lb.		lb.	lb.
Tyntesfield Realistic	Mrs. E. W. Garland, Okauia	3 23	314·3	365	8,872·2	518·07
Tyrone Ena ..	R. J. Johnston, Runciman	3 97	321·7	365	9,066·3	509·49
Fern Oak Star Baby	T. Smith, P.B., Otorohanga	3 345	346·5	326	9,939·7	505·14
Oak Farm St. Margaret	G. B. Knowles, Tariki	3 7	312·7	365	7,472·8	486·64
Beaulieu Comely Maid	Dr. G. Walker, Maunu, Whangarei	3 175	329·5	365	7,294·6	437·98
Tyntesfield Damsel ..	Mrs. E. W. Garland, Okauia	3 0	312·0	278	7,027·0	416·81
Caerleon Colleen ..	E. Hofman, Katikati	3 344	346·4	365	7,356·0	392·80
Beaulieu Glory ..	Dr. G. Walker, Maunu, Whangarei	3 62	319·1	365	6,329·6	388·51
Standard Lady Daisy	Yelchich Bros., Waiuku	3 32	315·2	357	5,776·5	387·48
Velebit Joan ..	G. E. Yelchich, Waiuku	3 311	343·1	365	7,076·6	379·14
Beaulieu Mayflower	Dr. G. Walker, Maunu, Whangarei	3 57	317·7	365	5,851·3	377·96
Tyntesfield Lucky Choice	Mrs. E. W. Garland, Okauia	3 349	346·9	235	7,930·3	365·97
Caerleon Oxford Lucy	E. Hofman, Katikati	3 223	334·3	364	6,428·2	360·89
Caerleon Laura ..	Ditto ..	3 22	314·2	359	5,683·4	330·22
Four-year-old.						
Green Meadows Queen Bess	T. W. Wardlaw, Waimana	4 329	381·4	365	13,646·2	766·69
Highfield Millie ..	Ditto ..	4 344	382·9	365	12,946·4	706·75
Waipiko Coserette ..	W. S. Carter, Palmerston North	4 21	350·6	365	10,090·7	617·72
Kupata Violette ..	Tizard Bros., Kopu, Thames	4 63	354·8	365	8,974·7	559·58
Velebit Felicia ..	G. E. Yelchich, Waiuku	4 283	376·8	365	8,356·1	550·13
Kelvin Golden Flower	Geo. Buchanan, Paeroa	4 297	378·2	347	7,893·5	481·84
St. Ouen's Brooklet..	J. Johnson, Sefton	4 45	353·0	365	8,833·0	475·48
Beuvelande Jewel ..	G. S. Clarke, Te Awamutu	4 333	381·8	365	8,180·4	465·12
St Ouen's Princess ..	J. Johnson, Sefton	4 16	350·1	308	8,919·6	451·74
Greencroft Pansy ..	J. Bones, Kaipaki	4 347	383·2	329	6,403·0	447·25
Beaulieu Charmeuse	Dr. G. Walker, Maunu, Whangarei	4 1	348·6	365	7,474·6	443·31
Te Awa Wait and See	A. C. Smith, Tauranga	4 246	373·1	365	8,675·6	433·57
Beaulieu Lady Viola	Dr. G. Walker, Maunu, Whangarei	4 13	349·8	365	6,912·8	404·13
Costly	H. Wilson, Hastings	4 330	381·5	320	8,335·5	399·81
Mature.						
Oxford Lily Grey ..	W. J. Freeth, Waitara	10 327	385·0	365	14,185·0	851·65
Te Ketiroa Melia ..	A. H. Burwell, Kaimata	7 344	385·0	365	15,245·0	831·96
Meadowland Selection	F. Phillips, Otorohanga	5 28	385·0	365	13,542·1	714·68
Greencroft Hope ..	J. Bones, Kaipaki, Ohaupo	9 23	385·0	365	12,751·1	652·67
Oddicombe Harebell	T. W. Wardlaw, Waimana	5 362	385·0	365	12,854·8	649·52
Wellfield Lady Gay	Ditto ..	7 333	385·0	365	12,429·6	647·45
Jersey Farm Marigold	H. R. Benbow, Ormondville	8 4	385·0	346	10,444·3	600·53
Tyrone Joyce ..	R. J. Johnston, Runciman	6 66	385·0	365	11,695·0	597·23
Merton Gladys ..	A. C. Smith, Hamilton	5 69	385·0	343	10,555·9	581·85
Te Keteroa Coy Girl	A. H. Burwell, Kaimata	6 347	385·0	341	8,571·9	558·10
Glenmore Gem ..	W. S. McEwen, Pukeroro	7 26	385·0	365	8,497·5	557·60
Windermere Cheeky	V. McD. Hitchings, Otorohanga	5 25	385·0	356	10,026·4	554·76
Basra Charmian ..	E. J. Munro, Tauranga	9 290	385·0	365	9,460·9	540·47
Velebit, V. C. ..	G. E. Yelchich, Waiuku	11 89	385·0	365	9,424·8	521·16
Crestdale Snowdrift	J. Buchanan, Waitoa	6 336	385·0	300	9,215·5	512·67
Fernside Maisie ..	A. D. Walker, Taranaki	9 37	385·0	340	9,143·0	510·74
Mature—continued.						
Vailoa Model ..	Yelchich Bros., Waiuku	8 353	385·0	365	9,903·9	504·90
Fern Oak Flower Queen	F. Phillips, Otorohanga	5 341	385·0	351	9,552·5	504·28
Santa Rosa Noble Queen	H. A. Lurman, Otorohanga	5 331	385·0	330	8,305·4	503·09
Oxford Dale Nancy	A. C. Smith, Tauranga	5 1	385·0	365	9,421·2	500·26
Fernside Dairymaid..	A. D. Walker, Taranaki	5 65	385·0	365	9,472·9	491·84
Fern Dell Glory ..	W. S. Carter, Palmerston North	7 295	385·0	288	8,149·2	491·03
Tararua Silver Maple	T. H. Gooch, Stratford	6 12	385·0	264	9,525·4	460·71
Tararua Graceful ..	W. S. Carter, Palmerston North	6 1	385·0	323	8,484·8	459·36
Oak Farm Fairy Princess	G. B. Knowles, Tariki	9 17	385·0	341	8,341·8	422·01
Greencroft Astrinome	J. Bones, Kaipaki, Ohaupo	5 22	385·0	346	6,814·0	403·14

Friesian.

Junior Two-year-old.							
Rosevale Regina Josephine Posch	A. W. Montgomerie, Mangere	2 9	276·4	352	16,088·4	590·36
Moneville Nettie Z. Woodcrest	M. S. Rennie, Mangere	2 13	276·8	365	15,755·1	581·37
Rosevale Posch Echo Inka	C. Humm and Sons, Wainui	2 19	277·4	365	14,964·8	512·24
Peveril Juno ..	A. and J. Rainey, Flaxton, Canterbury	2 17	277·2	365	15,368·3	506·19
Rosevale Lady Abberkerk Echo	C. Humm and Sons, Wainui	2 33	278·8	365	13,219·7	500·68
Totara Veeman Lulu 3rd	Piri Land Co., Box 548, Auckland	2 27	278·2	365	12,961·2	485·89
Totara V.S. Buttergirl	Ditto ..	2 51	280·6	365	13,263·6	481·71
Willowgreen Champion Buttergirl	C. J. Neville, Temuka	2 42	279·7	365	13,514·5	455·27
Willowgreen Milkmaid Echo	Ditto ..	1 308	275·5	219	9,446·3	299·51
Senior Two-year-old.						
Rosevale Beets Posch	H. North and Sons, Omimi P.B., Dunedin	2 265	302·0	363	15,783·9	580·15
Peveril Jewel ..	A. and J. Rainey, Flaxton, Canterbury	2 290	304·5	365	15,673·2	446·10
Junior Three-year-old.						
Moneville Acme Sylvia Posch	M. S. Rennie, Mangere	3 69	318·9	361	17,855·7	684·92
Rosevale Flora Posch Triumph	H. North and Sons, Omimi P.B., Dunedin	3 29	314·9	365	9,548·8	607·84
Junior Four-year-old.						
Rosevale Colantha Posch Regina	R. Hudson, Teddington	4 81	356·6	365	19,279·4	620·38
Totara Veeman Colantha	Piri Land Co., Box 548, Auckland	4 86	357·1	363	15,002·6	566·81
Senior Four-year-old.						
Rosevale Toitilla Johanna Posch	H. North and Sons, Omimi P.B., Dunedin	4 339	382·4	365	19,453·5	642·49
Balruddery Model Sylvia	J. J. Stott, Oamaru	4 257	374·2	365	14,697·5	528·53
Mature.						
Rosevale Sylvia Beets Echo	H. North and Sons, Omimi P.B., Dunedin	8 233	385·0	364	23,773·9	790·45
Longbeach Transvaal Star 11th	J. H. Grigg, Longbeach, Ashburton	8 333	385·0	356	18,822·3	765·16
Totara K.P. Gloria 2nd	Piri Land Co., Box 548, Auckland	5 14	385·0	365	14,066·8	684·90
Totara Marathon Canty	Ditto ..	5 70	385·0	365	16,336·9	671·66
Totara Netherland Buttercup	„ ..	6 330	385·0	365	19,226·5	669·47
Totara Forest Lass ..	„ ..	6 334	385·0	365	16,507·1	618·32
Longbeach Transvaal Star 14th	J. H. Grigg, Longbeach, Ashburton	8 155	385·0	365	13,947·3	575·99
Totara C.R. Monica..	Piri Land Co., Box 548, Auckland	6 360	385·0	365	13,983·2	556·98

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Fat.
YEARLY DIVISION—*continued.*						
Milking Shorthorn.						
		Yrs. dys	lb.		lb.	lb.
Senior Two-year-old.						
Allandale Guinevra ..	R. S. Allan and Son, Hatuma, Hawke's Bay	2 314	306·9	365	8,782·5	335·05
Senior Four-year-old.						
Mereside Sweet Pea 8th	Estate W. Bowis, Doyleston	4 353	383·8	326	9,946·8	400·49
Mature.						
Haeremai Lorna ..	G. H. B. Lill, Ashburton	13 0	385·0	338	17,639·7	647·49
Allandale Roslyn ..	R. S. Allan and Son, Hatuma, Hawke's Bay	6 18	385·0	338	9,411·3	387·65
SECOND CLASS						
Jersey.						
Junior Two-year-old.						
Bonny Buttercup ..	Mrs. J. Larsen, Cheltenham	1 324	275·5	365	7,509·5	512·05
Northfield Sunflower	Ditto ..	2 67	262·2	365	7,782·7	490·45
Oak Farm Chloe ..	G. B. Knowles, Tariki	1 364	275·5	365	7,098·7	462·66
Meadowland Sybil's Maid	F. Phillips, Otorohanga	1 360	275·5	321	7,199 8	412·41
Meadowland Sweet Delight	Ditto ..	1 345	275·5	339	8,262·8	405·62
Mentone la Justice ..	D. O'Sullivan, Inglewood	1 357	275·5	365	7,191·4	404·60
Velebit Sion ..	G. E. Yelchich, Waiuku	1 293	275·5	365	7,399·7	388·46
Meadowland Tiarette	F. Phillips, Otorohanga	1 280	275·5	314	6,886·8	342·16
Heatherlea Gay Lady	W. S. Carter, Palmerston North	2 23	277·8	312	5,735·7	318·96
Senior Two-year-old.						
Velebit Lively ..	G. E. Yelchich, Waiuku	2 316	307·1	365	6,025·4	316·26
Four-year-old.						
Ypres Naomi ..	J. G. Horn, Ohau	4 59	354·4	365	10,146·3	660·02
Lilly Oak Lady ..	A. C. Smith, Tauranga	4 12	349·7	365	9,229·7	568·62
Fern Oak Beauty's Maid	T. Smith, Otorohanga	4 34	351·9	365	10,623·1	565·28
Little Bush Tulip ..	J. J. Springgay, Gisborne	4 212	369·7	365	8,225·5	513·97
Daisy Belle of Craigknoll	R. J. Johnston, Runciman	4 332	381·7	365	7,267·5	466·57
Raeburn Heatherbell	T. W. Wardlaw, Bay of Plenty	4 14	349·9	261	7,868·4	420·10
Mature.						
Bridge View Wonder	W. J. Freeth, Waitara	8 361	385·0	365	11,288·2	629·10
Pinecrest Handsome	E. J. Clough, Inglewood	6 347	385·0	365	10,439·6	596·67
Carhduff Spec ..	J. O'Donnell, Bunnythorpe	5 342	385·0	365	9,446·3	549·88
The Palms Vivo ..	Jas. A. Meharry, Tauranga	8 61	385·0	365	9,929·9	509·50
Waipiko Celia ..	C. F. Vile, Inglewood	5 254	385·0	365	8,854·1	505·08
Tyntesfield Real Girl	Mrs. E. W. Garland, Matamata	5 11	385·0	365	7,893·0	497·95
Lancewood Lassie ..	B. R. Robinson, Manakau	5 364	385·0	364	10,470·4	483·09
Tyntesfield Nazimova	Mrs. E. W. Garland, Matamata	5 3	385·0	365	8,021·2	378·55
Velebit Fancy's Glen	G. E. Yelchich, Waiuku	8 343	385·0	365	7,850·5	419·13
Friesian.						
Junior Two-year-old.						
Totara Veeman Clifden	Piri Land Co., Box 548, Auckland	2 81	283·6	365	14,550·3	519·22

Name of Cow and Class.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season.		
				Days.	Milk.	Fat.
YEARLY DIVISION—*continued.*						
SECOND CLASS—*continued.*						
Friesian—*continued.*						
		Yrs. dys	lb.		lb.	lb.
Junior Two-year-old—continued.						
Totara C. R. Nickie ..	Piri Land Co., Box 548, Auckland	1 346	275·5	365	12,545·7	486·27
Totara V. S. Alcartra	Ditto ..	1 353	275·5	365	11,164·7	380·52
Mature.						
Totara K. P. Buttercup	Piri Land Co., Box 548, Auckland	6 320	385·0	365	22,063·4	807·77
Rosevale Echo Posch Jewel	C. Humm and Sons, Wainui	6 234	385·0	365	19,450·8	696·72
Totara K. P. Gloria..	Piri Land Co., Box 548, Auckland	6 24	385·0	365	16,643·7	676·47
305-DAY DIVISION.						
Jersey.						
Junior Two-year-old.						
Te Ara Nancy ..	W. E. Thomas, Aorangi R.D.	1 328	250·5	305	9,692·3	530·36
Erinview Angel ..	J. Murray, Woodville	1 353	250·5	305	9,009·2	523·49
Kupata Gipsy Maid ..	Tizard Bros., Kopu, Thames	2 45	255·0	305	8,607·6	503·77
Te Ara Linda ..	W. E. Thomas, Aorangi R.D.	2 85	259·0	305	8·752·1	461·15
Highfield Marion ..	A. R. Bayly, Omata	1 344	250·5	305	7,704·8	441·38
Green Meadows Dainty	T. W. Wardlaw, Waimana	1 346	250·5	305	7·963·8	426·50
Erinview Shy ..	J. Murray, Woodville	1 338	250·5	305	7,157·3	414·10
Te Ara Dainty ..	W. E. Thomas, Aorangi R.D.	2 63	256·8	268	5,157·9	277·80
Senior Two-year-old.						
Highfield Foremost Sonia	A. R. Bayly, Omata	2 360	286·5	305	8,943·4	440·27
Three-year-old.						
Holly Oak Darkie ..	A. R. Bayly, Omata	3 361	323·1	305	9,672·5	513·55
Beaulieu Lady Cora..	Dr. G. Walker, Whangarei	3 66	293·6	305	8,695·0	501·36
Wairoa Pretty's Flirt	L. D. Adams, Sheffield	3 16	288·6	305	8,997·0	458·07
Mature.						
Te Kiteroa Melia ..	A. H. Burwell, Kaimata	7 344	360·0	305	13,398·9	716·61
Friesian.						
Senior Three-year-old.						
Totara P. L. Eileen ..	Piri Land Co., Box 548, Auckland	3 340	321·0	305	11,968·2	419·43
Mature.						
Willowgreen Pearl Echo	C. J. Neville, Clandeboye	6 27	360·0	294	11,735·5	459·79
Sealands Alcartra Ideal	H. G. A. Cameron, Weraroa	8 62	360·0	305	11,789·8	446·66
SECOND CLASS.						
Jersey.						
Junior Two-year-old.						
Santa Rosa Joan ..	G. Farrier, Dalefield	2 80	258·5	305	6·896·6	399·57
Friesian.						
Junior Two-year-old.						
Sealands Dutch Girl Ormsby	H.G.A.Cameron, Weraroa	2 10	251·5	305	7,287·6	326·34
Senior Four-year-old.						
Totara V. S. Buttercup	Piri Land Co., Box 548, Auckland	4 305	354·0	305	15,983·5	646·41



Surface-sown area in foreground and bush in background, giving some idea of the type of cattle used in some parts. On the whole, however, the Jersey is more in evidence than the Shorthorn.

Farming in the Catlins District.

Conversion of Bush Land into Farms.

A. F. GREENALL, Instructor in Agriculture, Balclutha.

(Continued from February issue.)

Crops and stock are dealt with in this, the concluding article of a series on the conversion of the Catlins district of Otago into farm lands. The writer considers that, with a policy of sound farming based mainly on correct pasture-management and stock-manipulation, the Catlins district has a bright future.

WHERE club-root and dry rot is causing concern attempts have been made to grow chou moellier. Success has attended most of these efforts, and the crop is definitely becoming popular in the district. It is usually grown in ridges, 1½ lb. of seed per acre being sown with little manure. The crop is either fed standing first with sheep and then with cattle or cut and fed to dairy cows. Crops are in most cases bulky and of good feeding-value. Feeding-value is higher than swedes, and it provides rather an alternative to swede-growing than a supplement to swedes.

However, it must be remembered that red water in cattle is often associated with feeding excessive amounts of lush chou moellier to cattle in winter, and care must be exercised. Any animals showing signs of this trouble should be put on to good pasture and fed with a ration of hay and, in serious cases, dosed with a laxative and common salt.

Soft, yellow, and swede turnips provide good crops, and provide the basis of winter feeding. These crops, however, are subject to diseases such as club-root and dry-rot, and constant cropping on the same fields should be avoided. Their limitations are the result not so much of poor yields, as of their comparative low feed-value for wintering when used alone.

Slipping of ewes and cows, paralysis, and bearing trouble occurs in stock wintered solely on swedes or soft turnips. These troubles could be decreased, if not completely eliminated, by the use of good hay and the removal of sheep and cattle from roots some time before parturition.

Saleable Crops.

Practically the only saleable crop grown in the district is the potato crop, and there are very few large areas in the Catlins. Poor seed is used in the majority of cases, much of the seed planted being affected with virus disease and full of impurities. In most cases seed is used again and again without much selection, and the fact that virus is not severe leads one to assume that the district offers an opportunity for the production of virus-free seed potatoes from certified mother-seed stock. Could such an undertaking be introduced it would undoubtedly be a boon to many farmers, providing a profitable and saleable crop. This would give an added incentive to stump and cultivate much country that is at present in stumps and logs, and which is being brought in slowly through lack of finance.

One farmer, who has been following rather enlightened practices as far as potato-growing is concerned, has made a name for himself and invariably wins prizes at the Dunedin Winter Show with produce that would be a credit to the leading Southland potato-growers. His method is to select his seed as he digs, rejecting all these seeds from roots which have less than about six table-size tubers, and consequently he has been discarding virus-infected setts. All seed-tubers are pickled in formalin and greened in trays prior to planting. A good seed-bed is prepared, and the seed hand-planted after a moulding plough.

High-class seed potatoes being produced in good isolation on ground just stumped.

Two lines of seed grown by this farmer were entered in the potato-qualification trial, and the crop compared quite favourably with certified seed. Yields are not heavy, but quality is good. I am strongly of the opinion that work with certified seed-potatoes would be a most profitable undertaking in the Catlins district.

Stock Carried on the Farm.

The most outstanding and noticeable feature of the cattle in the district is the fact that they are predominantly pure-bred or grade Jerseys. It is difficult to account for the prevalence of this breed, but it is suggested that the early efforts of the late Sir Truby King have had a direct bearing on the position. One of the reasons is probably due to the fact that the majority of the milk is separated and sent to Owaka Butter-factory, very little of it being utilized for cheesemaking. There appears to be a definite opinion in the district that the Jersey not only yields more butterfat per cow, but more of this type of stock can be carried on each farm than any other breed.

Taking a long view of the position, it is suggested that breeds such as the Shorthorn or Red Poll would be more suitable. The heifer calves from such breeds (or from crossbreds) could be kept and bred from, the best progeny going into the herds. The male offspring could also be kept, and such young stock would be good workers on country inclined to go back to scrub. This would be in marked contrast to the present Jersey type of animal which is not a good worker or a very saleable animal.

The common practice as regards breeding is to use a good Jersey bull on all cows and keep the heifer calves that look the best. Cows are occasionally bought in, but the herds are maintained largely by breeding with little introduction of high-producing cows or butterfat-backed bulls from outside. The management is relatively simple—calving about August or September, the cows run out on pasture or scrub land. Supplementary feeding does not start until May or June, when hay and roots or hay and chou moellier are fed out on the rough country of the farm where the cows are put almost as soon as they have dried off.

As regards production records, herds producing from 200 lb. to 250 lb. of butterfat exist in the district, but these are a long way above the average. I should say that the average per cow for the district is well under 200 lb. of butterfat, with the gross return per cow being in the vicinity of £8 or so. The highest figure returned for butterfat per cow was £13. The death-rate per herd is probably higher than in most other dairying districts. This can be attributed to the roughness of the country and to the incidence of ragwort. On the average the ratio of sheep to cows is 7 to 1, and the ratio of sheep to total cattle beasts about 10 to 1.

Sheep Types.

As in most other districts of South Otago, the type of ewe preferred is the Romney crossbred. This sheep is strong, big, and hardy and appears to stand up to the climatic conditions of the district. However, on account of the open nature of the fine wool fleece, a good deal of loss is occasioned by wool being caught by the logs, scrub, &c. This reduces the yield and affects the quality also. Ewes are usually bought in each year or, in some cases, the flock built up now and again by the purchase of full and sound mouth ewes from the surrounding districts. Often in-lamb ewes are purchased in April–May and sold out all counted in October or November as the cows are coming into full milk. Sound-mouth ewes last two to three years, but mortality-rates are high.

In several cases attempts are made to maintain flocks of sheep by breeding. Where this is practised Romney rams are used on a number of the best flock ewes and the ewe lambs from the mating culled, a suitable number being kept for flock purposes. Where the fleece tends to be getting a little coarse by this method a Corriedale or half-bred ram may be used

A chou-moellier crop in the foreground, with fairly dense ragwort immediately behind.

to fine and tighten up the fleece. Romney, Border Leicester, English Leicester, Southdown, and very occasionally Shropshire rams are used for fat-lamb production. Farther south, Romneys and Leicesters are more popular, but, due either to parentage or environment, only about 20 per cent. or so of lambs are fattened off their mothers. Farther north, Southdowns, Shropshires, and Leicesters are used, and again, due either to parentage or environment, an average of 60 per cent. go away fattened off their mothers with, in some cases, as high as 80 per cent. being fattened without supplementary fattening crops.

Some farmers consider the Southdown is not suitable for steep country, but where they can be used they seem to give the results.

Lambing Period.

Lambing usually occurs about September, this date being aimed at as one likely to provide suitable lambing-weather, while by September the spring growth should have started. Lambing percentages appear to be in the vicinity of from 90 per cent. to 100 per cent. Figures below 90 per cent. and as high as 135 per cent. have been recorded, but must be regarded as exceptions rather than the rule. Deaths in lambs and young sheep appear to be little higher than in open country, but in older sheep deaths would average from 10 per cent. to 15 per cent. These are due mainly to old age, casting, getting tied up in lawyers, &c.

There is not a great deal of crop for lamb-fattening grown, the lambs not going off as fats being sold as stores.

The wool-clip, as mentioned previously, is unusually low in weight and quality. Probably a clip of 5 lb. to 6 lb. per ewe would be a good average, although weights as high as 8 lb. have been recorded. The wool is often blackened from the burn, contains vegetable matter, and is torn and patchy so that prices are not high as a rule. Shearing should occur before the bidi-bidi begins to stick, the time being not later than Christmas and often as early as the first week in December.

The presence of bidi-bidi greatly reduces the value of the wool. There is a possibility that the use of a denser-fleeced sheep such as a fine Corriedale may decrease the damage by tearing and spoiling, but the foot-rot factor with this breed in districts of high rainfall would tell against its use.

Pigs.

The pigs kept in the district are of no distinctive breed. In several cases they are managed and fed on correct lines with skimmed milk, meat-meal, roots, and other roughage, and are decently housed. In other cases they are fenced in and run more or less wild in areas of scrub and fern. There would appear to be little reason why pigs should not be made a very profitable side-line on the farms in this district. There is usually an ample supply of skimmed milk and roots, while natural shelter is abundant. If the right breeds were taken in hand and the animals were decently looked after they should return quite good revenue.

The general conclusions drawn as a result of a survey of the main area of the Catlins district are that the same facts (more or less) also hold for the area from the Catlins River to the north fringe of the bush district. The conclusions reached are :—

(1) Farms have been established long enough to have passed the initial breaking-in stage. There is also a larger area of ploughed and ploughable ground and larger total area per farm. As a result the carrying-capacity of the individual farms is such that the flocks and herds are large enough to yield more than a subsistence living.

(2) A gradual change from mainly dairy-farms to mixed dairy and sheep farming has taken place, as the result of an increase in the severity of ragwort several years ago.

(3) Weeds and second growth (and, in particular, ragwort) are not now as aggressive as is the case farther south.

Scope for Development.

The problems are the same here as in the area previously discussed, but in the majority of cases of farms in the Owaka Valley, in and around Owaka and at Glenomaru, farming is on a sufficiently large scale and sound footing to allow a policy of farm improvement to be adopted without necessitating an unduly low standard of living. However, behind this more open country and lying between Owaka and the sea, and on the fringe of the Owaka and Glenomaru Valleys, many farms have been occupied for a shorter period of time and consequently are relatively undeveloped. In these areas there appears to be room for treatment along the lines decided for the area previously discussed.

Around Glenomaru is encountered a belt of country intermediate between the heavy bush and the open plains country where such scrub as manuka, fern, boxwood, tutsan, flax, and moss banks appear, with a limited amount of stunted forest. Whether this change is due to an inherent change in the physical or chemical constituents of the soil, or due to a decreasing rainfall is difficult to decide and one can only hazard a guess that it is the decreased rainfall that has produced this change.

The presence of many successful farms in this area, with better transport facilities and communication, indicate that it will not be long before a comparatively wide area of this country will be successfully farmed.

Tribute to Pioneers.

In concluding this article on farming in the Catlins district one must pay a tribute to those early settlers who in the face of much adversity settled in this country. Their farming knowledge at the outset was not great, but their hearts were. Several of the original settlers are still farming in the district, while many of the present settlers are descendants of the original toilers who after years of hard work, with its joys and disappointments, have passed on. This country owes a debt to its pioneers, and we must see to it that their lives were not spent in vain.

The Catlins district has drawbacks greater than those of the northern bush districts, but these disadvantages are not insurmountable, and it would be a thousand pities to stand idly by and watch it revert to a state of non-productive scrub. With a policy of sound farming based mainly on correct pasture-management and stock-manipulation on the farm, and backed by honest work, the Catlins district has quite a bright future.

Acknowledgments.

The writer wishes to acknowledge the assistance and advice rendered by the Catlins settlers visited : Mr. J. M. Smith, Fields Superintendent, Dunedin ; Mr. S. H. Saxby, Instructor in Agriculture, Dunedin ; Mr. E. Bruce Levy, Director of the Grasslands Division, Plant Research Bureau ; and officials of the Farmers' Union.

Pedigree-sow Records.

Contributed by the LIVE-STOCK DIVISION.

OF the 125 sows recorded during the quarter ended 28th February, 1939, eighty had litters sufficiently good to be included in one of the grades set out below :—

Grade.	Litter-weight.	
	At Three Weeks.	At Eight Weeks.
	lb.	lb.
1	120	360
2	100	300
3	90	270
4	80	240
5	70	210

In the following list the owner's name and address are given, followed by the herd-book number of the sow and the grade of litter produced :—

Berkshire.

Barnaby, F. J. P., Rongotea, 11579/4, 12737/4 ; Barnett, A. L., Leeston, 11455/5 ; Burmeister, O. P., Kairanga R.D., Palmerston North, 12147/2, 11671/3 ; Canterbury Agricultural College, Lincoln, 10823/3 ; Davison, W. A., P.O. Box 2, Rongotea, 12899/1, 13774/5, 13775/2 ; Hicks Bay Pig Club (L. T. Hughes), Hicks Bay, 12622/1 ; Jones, E. J., Eureka, Hamilton, 11900/1 ; McGill and Son, Ngahape R.D., Te Kawa, 12550/5, 11875/5, 13315/4 ; MacIndoe, C. G., Te Matai Road, Te Puke, 13518/4, 12198/2, 12366/5 ; Mangaheia Pig Club (L. Donald), Tolaga Bay, 12815/4 ; Manutuke Pig Club (R. K. Hepburn), Manutuke, 12188/4 ; Maramarua Pig Club (S. J. Holloway), Maramarua, 13048/4 ; Ngakura Young Farmers' Pig Club, Ngakura R.D., Rotorua, 13569/3 ; Omokoroa Beach Pig Club (E. Adams), Omokoroa, Tauranga, 12836/5 ; Rockville Pig Club (F. W. Tyree), Rockville, via Nelson, 12805/3 ; Rongotea Pig Club (J. P. Gloyn), Rongotea, 13208/2 ; Strugnell, R. W., Omokoroa, Tauranga, 11426/2, 12713/2 ; Unwin, S., Stonycroft, Winchester, 11645/5.

Large Black.

Boland, Mrs. R. A. A., Longford, Nelson, 1342/1 ; Conway, E., Foxton Line, Longburn, 1881/3 ; McCutchan, C. R., River Road, Rangiriri, 1656/5 ; McGill and Son, Ngahape R.D., Te Kawa, 1763/5 ; Pedersen, N. P., Kauwhata, P.O., Palmerston North, 1509/2 ; Rose, N. C., Section No. 3, Otara R.D., Invercargill, 1234/4 ; Tahuna Pig Club, care of F. B. Whitechurch, P.B., Morrinsville, 1721/4 ; Whitelock, G. M., Newbury R.D., Palmerston North, 1705/3.

Large White.

Kereone Pig Club (E. Topham), Kereone, Morrinsville, 4855/2; Levin Pig Club (C. F. Roe), Levin, 5010/4; Norsewood Pig Club (Mrs. M. E. Jenkins), R.D., Norsewood, 4860/1; Rowlands, T. E., Ruthin, R.M.D., Kaiapoi, 4814/4; Te Puke Pig Club (Ken Bowen), R.D., Te Puke, 4954/5; Whitelock, G. M., Newbury R.D., Palmerston North, 4546/1; Williams, A. E., P.O. Box 19, Kaiapoi, 4163/2.

Tamworth.

Boyle, A. D., Orari, South Canterbury, 10561/2; Christie, W. R., "Blair Athol," Balclutha, 8955/2; Clevedon Pig Club (J. L. Dunn), P.O. Box 23, Clevedon, 10388/4; Donald, L., Tolaga Bay, 9326/1; Fieldhouse, H. E., Rongotea, 10045/3; Gulliver, J. A. V., R.D., Te Puke, 10124/3; Haigh, Wm., Sefton R.M., 4995/4; Hickmott, E. J., North Road, Belfast, Christchurch, 8295/5, 7729/1; Hunt, C. S., Glen Oroua, 10145/4, 10141/2, 5511/5; James, H. W., Cameron Street, Whangarei, 8540/2; Kaikoura Pig Club (H. E. Mackle), Kaikoura, 10289/4; Kaipara Flats Pig Club (B. Andrews), Kaipara Flats, 9723/4; Mangatarata Pig Club (C. E. Raynes), R.D., Waitakaruru, 10389/3; Maramarua Pig Club (S. J. Holloway), Maramarua, 10054/4; Motua Pig Club (P. A. Osborne), Shannon, 10140/5; Motukarara Pig Club (T. M. Wheeler), Motukarara, 9854/1; Moutere Pig Club (Godfrey Deck), R.M.D., Upper Moutere, 8987/5; Martinborough Pig Club (F. B. Wright), Tawaha, Martinborough, 9748/2; Mauriceville Pig Club (N. Myers), Mauriceville, 8923/2; Netherton Pig Club (H. A. Mills), R.D., Paeroa, 9366/2; Paengaroa Pig Club (H. Jones), R.M.D., Te Puke, 10179/1; Pahiatua Pig Club (A. J. Gleeson), Pahiatua, 7859/3; Pohangina Pig Club (T. J. Spelman), Raumai 10142/5; Puhoi Pig Club (C. A. Straka), Waiwera, 9892/3; Pukekawa Pig Club (J. L. Lindberg), Pukekawa, 10055/2; Rangitukia Pig Club (J. E. Omundsen), Tiki Tiki, East Coast, 8911/3; Scott, W. C., R.D., Glen Oroua, 5274/3; Stewart and Kerr, Onewhero, 10250/4; Suter, E., Waiau Pa, 9797/1; Tokomaru Pig Club, Tokomaru, 9744/1; Waerenga Pig Club (F. D. Holt), Waerenga, 10052/5; Waitaha Pig Club (L. J. Linklater), Waitaha, South Westland, 9835/2; Whakawhitira Pig Club (H. Fox), Ruatoria, 8971/4; Whatatutu Pig Club (D. W. Anderson), Whatatutu, 9037/2; Whitianga Pig Club (J. W. Lauder), Whitianga, 10056/3.

The following table sets out the performance of each breed, and the average of all sows recorded during the quarter:—

Breed.	Number of Sows.	Averages.					
		Number of Pigs.		Litter-weight.		Weight per Piglet.	
		Born.	Weaned.	Three Weeks.	Eight Weeks.	Three Weeks.	Eight Weeks.
Berkshire ..	41	9·2	6·9	79·2	249·9	11·6	36·5
Large Black ..	11	8·7	7·0	81·5	265·5	11·6	37·9
Large White ..	12	10·3	7·7	86·0	277·3	11·2	36·2
Tamworth ..	61	8·7	7·2	85·8	280·2	11·8	38·6

Growth of Subterranean Clover.

A CORRESPONDENT, R. J. S. (Johnsonville) writes: Last year, towards the end of August, I collected some macrocarpa cones in a bag and kept them in a warm place until the seeds had come out. I prepared a good bed, and at the end of November I planted several lots at various depths. I planted various lots until Christmas time. Half of all the seeds planted had been soaked in hot water prior to planting. As the first lot showed no signs of germinating I tried various experiments, but none succeeded. No trees have appeared yet. What was wrong with my method? I have been very successful in growing pines by the same method in Hawke's Bay.

For what period should a paddock in this district, surface-sown with subterranean clover last December, be spelled to enable the clover to seed? There is a considerable amount of rye-grass appearing owing to top-dressing. Last year we spelled the paddock until the rye-seed was mature. Is this correct, and should it be repeated? I have a patch of subterranean clover on the lawn which I study closely. Can I tell from the state of the seed in that patch how the paddock should be treated? I know when the seed is formed and when it is mature, &c.

The Fields Division replies:—

The failure of the macrocarpa seed to germinate may have been due to any one of the following: (*a*) The seed was collected from young trees; this is the most likely cause of failure. (*b*) The seed was sweated in a warm place; this is not good practice. (*c*) The seed was planted too deep. (*d*) The dry spell last year may have delayed germination.

The practice of the Forestry Department is to collect seed only from old trees. The cones are spread on sacking or fine netting with canvas underneath to catch the seed. When sowing, the ground is pressed out with a planting board or roller and the seed placed on the surface and lightly dusted over with light sandy soil. Shading of the seed-bed after planting with a light frame covered with netting and then with 10 oz. hessian is recommended, although shading with manuka brush or other material can also be used successfully.

The spelling of a paddock surface sown with subterranean clover to obtain a denser sward of this clover is often practised in the first year or so after sowing. Subterranean clover will re-establish from seeds, even when closely grazed by sheep, up to the time of dying off in the early summer, but where the plants are scattered and the close grazing prevents the plants from sending out the usual long runners bearing flowers and seed-pods, the reseeding is naturally confined to the site of the original plants, so that little or no thickening of the sward of subterranean clover takes place.

Thickening up the sward is best done by closing the area for a month or six weeks during the main growth and flowering period, which usually occurs from about mid-October onwards. When the plants are sufficiently dense to give a good cover of subterranean clover during the spring and early summer under normal grazing with sheep or cattle, then no further spelling should be necessary, unless for some reason or other the strike in the autumn is much less dense than is desired.

Slaughterings of Stock.

THE following return of slaughterings of stock at meat-export slaughterhouses and abattoirs for the nine months, May, 1938, to January, 1939, inclusive, has been compiled by the Live-stock Division:—

District.	Cattle.	Calves.	Sheep.	Sheep, of which Ewes.	Lambs.	Pigs.
North Island.						
Meat-export slaughterhouses—						
Auckland	96,416	546,684	139,660	69,307	604,669	233,468
Poverty Bay - Hawke's Bay	30,733	38,811	331,801	108,622	906,831	26,521
Taranaki-Manawatu	53,264	235,752	129,306	57,133	867,287	130,887
Wellington-Wairarapa	24,018	25,854	195,698	50,438	652,313	32,289
Totals	204,431	847,101	796,465	285,500	3,031,100	423,165
Abattoirs	88,529	28,834	281,383	163,240	46,296	77,976
North Island totals	292,960	875,935	1,077,848	448,740	3,077,396	501,141
South Island.						
Meat-export slaughterhouses—						
Nelson-Marlborough	238	10,549	12,380	1,763	97,022	8,352
Canterbury	9,068	38,616	240,545	175,133	1,258,146	29,529
Otago-Southland	5,170	44,376	96,056	74,705	984,309	3,887
Totals	14,476	93,541	348,981	251,601	2,339,477	41,768
Abattoirs	44,110	11,034	198,555	97,395	29,206	20,200
South Island totals	58,586	104,575	547,536	348,996	2,368,683	61,968
Dominion.						
Meat-export slaughterhouses	218,907	940,642	1,145,446	537,101	5,370,577	464,933
Abattoirs	132,639	39,868	479,938	260,635	75,502	98,176
Grand totals	351,546	980,510	1,625,384	797,736	5,446,079	563,109
Same period, 1937–38— Meat-export slaughterhouses and abattoirs	355,355	1,031,590	1,426,802	719,425	5,696,904	637,788
Same period, 1936–37— Meat-export slaughterhouses and abattoirs	275,384	1,014,166	1,069,961	578,552	5,125,415	586,189

Regular Harrowing of Pastures.

A farmer at Mohikiwi has had clearly demonstrated to him the preference shown by stock for properly managed pastures. A paddock was well harrowed and top-dressed with super in the spring, a small area of about a chain square being left untreated. Through the whole of the summer never a cow was to be seen on this patch according to the farmer, and it consequently took on the rough, harsh appearance typical of neglected grassland. In spite of similar demonstrations in various parts of the district, the regular harrowing of pastures is a practice too often neglected on the West Coast of the South Island.

Veterinary Notes for the Farmer.

Discussions on First-aid Measures.

Contributed by the Live-stock Division.

Foul-in-the-foot of Dairy Cows.

THIS is one of the most serious types of lameness affecting dairy cows. It is due to the infection of small wounds in the vicinity of the foot by a common germ, the bacillus necrophorus.

Features of this organism are—

(1) It grows best in the absence of air (oxygen); hence is most active in closed protected situations.

(2) It forms a powerful toxin, leading to the death of surrounding tissues; thus, there is always a core or area of dead, decaying tissue present.

Symptoms.

The symptoms are obvious — first marked lameness and pain, then swelling of the parts just round top of the hoof, and later breaking of the skin between the toes. If relief is not promptly obtained there is general disturbance, reduction of milk, failure of appetite, and marked loss of condition; sometimes after the skin breaks a core of dead tissue separates, pus escapes, and relief is obtained, lameness becomes less and general symptoms subside, sometimes the swelling persists. Infection may enter one of the small joints of the toe or a tendon sheath, and the case drags on for months.

Treatment.

In the first place, every cow showing lameness should at once have the foot of affected limb thoroughly cleaned out and washed or soaked in a suitable antiseptic unless there is another obvious cause of lameness. Frequently this may prevent further developments. Should swelling appear round coronet and no relief occur in twenty-four hours, a strong antiseptic applied to skin between toes may hasten opening of tissues and separation of the dead core.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

One may apply a small pad soaked in pure Jeyes' fluid, bandaged in place between the toes for twenty-four hours, or rub in a little 1 in 8 biniodide of mercury ointment. Once the dead core comes away a tar bandage can be applied, and the case usually goes on quite well. In more persistent cases prolonged soaking in warm solution of Condy's crystals, teaspoonful to three pints, or chloride of lime at the same strength, can be tried.

Between treatments the foot should be kept clean and *dry*, and poulticing is not desirable. The cow should be kept where much travelling or entrance to dirty yards can be avoided and feed and water are available without exertion.

Should the disease process localize in one of the small toe joints and veterinary assistance be available, the toe may be amputated which cuts the case much shorter and prevents further loss of condition.

Causes.

The conditions under which this trouble is most often met are where approaches to shed are filthy, thus both harbouring the germ and keeping the feet soft, and where, in addition, cows have to travel over material likely to cause minor foot injuries, such as sharp metal chips, coarse rough stones, broken concrete, manuka facines, stumps, &c.

While it is mainly a disease of the spring and of muddy conditions it may appear during dry weather, but, if so, factors leading to foot injuries must be operating, and it must be admitted that the organism may remain alive for weeks in moderately dry soil or even in dust.

Preventive Measures.

In view of the loss which may occur, prevention is important. Should cases occur, clean up dirty approaches and gateways and lime such areas heavily. To avoid dirty gateways or alleyways it may be necessary to make a new temporary approach to the shed.

Do away with possible causes of foot injury already named.

In some sheds where infection has continued to recur a footbath containing bluestone, through which cows walk when entering the shed, has been found beneficial.

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Diseases and Injuries of the Horses Foot.

Corns.

THIS is an injury to that part of the sole which lies in the angle between the wall of the hoof and the bars, and is brought about by bruising or some undue pressure.

Common causes which may lead to injury of this part are badly fitting short shoes, rasping of the wall, and paring away the bars. Corns occur most frequently on the inside heel, and are recognized by the reddened appearance of the sole.

The treatment consists in finding the cause of the bruising or pressure and removing it. Some alteration to the shoe may be necessary to remove pressure from the seat of the corn, but before this is undertaken a veterinary surgeon should be consulted.

In maintaining a foot free from corns the importance of sound shoeing—*i.e.*, well-fitting shoes—and the proper care and treatment of wall, sole, and bars of the foot cannot be over-emphasized. The practice of rasping the wall and cutting away the bars is wrong.

Thrush.

The presence of this condition is readily detected by the rather characteristic and unpleasant smell of the discharge issuing from the cleft of the frog.

The factors which lead to the occurrence of the condition may be summed up in the word "NEGLECT." Lack of care and attention in keeping the feet clean, allowing dirt and moisture to remain in contact with the frog, particularly in the cleft, will lead to thrush. The common but altogether wrong practice of paring the frog predisposes to the condition, as does any other cause which prevents the frog from carrying on its natural function.

As regards treatment, attention must therefore be directed to cleanliness, dryness, and the restoration of the natural function of the frog—that is, in a word, "pressure."

The frog, particularly the cleft, must be cleaned thoroughly; any antiseptic solution may be used for this initial cleansing. Once the part has been thoroughly cleaned it must be kept dry by means of a powder antiseptic dressing and the cleft of the frog packed tightly with tow or gauze, which can be kept in position by means of a leather sole or metal strip. The more exercise given to the animal at this stage the better the results obtained.

Sandcrack.

This is a term used to describe a crack or fissure in the horny wall of the hoof starting from the bottom and extending upwards. The crack may extend in depth to the sensitive structures underlying the wall and upwards to the coronet, in which cases lameness is usually severe.

This condition occurs most frequently in "brittle" feet, flat feet, and overgrown neglected feet. Some constitutional upset may alter the normal secretion of horn to such an extent that a weak, brittle horn is grown which readily predisposes to sandcrack.

In carrying out treatment it must be remembered that this horn tissue will not reunite; therefore treatment must primarily be directed to the growth of new healthy horn from the coronet. This can be promoted by blistering the coronet with a mercury blister. If the crack has not reached the coronet it is advisable to make a transverse nick by means of a rasp or knife just above the upper extremity of the crack. This will tend to prevent the fissure extending up farther.

At the lower extremity of the crack—*i.e.*, at the ground surface of the wall—a notch must be cut out extending about ½ in. on either side of the crack and upwards for about 1 in. This is necessary in order to relieve as much pressure as possible from the split part of the wall.

Sandcracks are sometimes extremely troublesome to deal with, and often recur. Where possible, it is always advisable to seek professional advice.

Answers to Inquiries.

Contagious Abortion.

M. G. (WAIKATO) :—

Please accept my appreciation of your fine veterinary notes for the farmer. Last June I purchased an eighteen-month half-Friesian - Jersey - cross heifer in calf and in good condition. About December it began to grow an udder, but did not spring until two days before calving on 26th January, 1939.

While the udder was growing it also developed two lumps about the size of hen's eggs just under the skin, one on each side close in to the leg at the junction of the udder to the body.

On 26th January it threw a calf about eight months still in the skin. There was also a lot of yellow-brown discharge with the calf, and it continued for a few days, although I used a disinfectant twice. The roses on the calf lining was also covered with this yellow-brown discharge.

Is this contagious abortion, and what is the best course to take? What are the lumps, which are unchanged, and have they any connection with the calving? The heifer is otherwise in good condition and is a heavy milker.

Live-stock Division :—

It appears that your bought-in heifer was infected with contagious abortion, hence the premature calving and the extra amount of the yellow-coloured discharge, which is a distinct feature of abortion disease. In such a case it is advisable to burn or bury the calf, if dead, and also to burn all discharges. The animal should be douched out regularly with a weak antiseptic solution until all discharge has ceased, attention being paid to washing down the tail and hindquarters.

The animal should be isolated from the rest of the herd while any discharge is present, if this is possible. However, infection may be present on the farm; in fact, the heifer may have become infected after arrival at the farm.

It is advisable not to breed this animal again until a month or six weeks after all discharge has ceased. This may mean a careful watch as the heifer may appear in heat at an earlier date.

As infected animals acquire an immunity with age there is no reason to dispose of the animal because of this infection. Heifers are more susceptible to abortion than older animals because of the age factor and the development of immunity.

The development of the udder at an early date and the short springing period are typical symptoms of an impending abortion in a heifer. Heifers usually show signs of springing over a period of several weeks before calving.

The lumps described by you are the normal lymphatic glands situated at the upper and outside each back quarter of the udder. These normal glands show up particularly well in a thin-skinned animal. In a fleshy udder it is difficult to see the glands, although they are always present: These lymphatic glands are usually larger and more prominent in high-producing animals.

The glands rapidly become enlarged and very painful in cases of mammitis, and one of their functions is to act as filters to invading organisms.

Vitamin Requirements of Live-stock.

A. D. D. (WAIHOU) asks for information on the vitamin requirements of live-stock and the ability by percentage of the various manures to replace a complete soil to maintain one cow per acre.

Live-stock Division :—

The subject of the vitamin requirements of live-stock, including the dairy cow, has been dealt with in many scientific journals within recent years. All authorities are agreed that where stock have access to green feed and are exposed to sunlight on a reasonably well-mixed diet there should be no necessity to supply vitamins in any supplementary manner.

Poultry and pigs, housed and kept on an intensive indoor system of production, would not comply with the above requirements, and the diet of these animals may prove to be deficient in the fat soluble vitamins A and D. Such a diet may be corrected by the addition of digestible green feed or a supplement such as cod-liver oil, which is rich in these vitamins.

Greasy Heel on a Horse.

E. P. (NGATEA) :—

Will you please give me a cure for greasy heel on a horse?

Live-stock Division :—

This condition of the heel of a horse is best treated by clipping the hair from the affected part. The part is then thoroughly washed with soap and water to which a little washing-soda has been added. This is necessary to remove all the greasy or sebaceous discharge which adheres to the edges of the cracks in the hollow of the heel. The part should then be well rubbed and thoroughly dried.

If the horse is not seriously affected an astringent lotion or ointment, such as white lotion or zinc ointment should be applied to the affected area twice daily to assist in arresting the discharge and enable healing to take place.

In advanced cases the discharge is copious and foul-smelling and wartlike growths appear on the limb. These advanced cases require more drastic treatment, such as cauterizing and the use of strong lotions of copper sulphate, alum, and zinc sulphate. In mild cases the healing of the cracks is assisted by the repeated use of an ointment or the application of olive oil to the affected part. This applies more particularly to cases where the horse is required to work every day, the work tending to prevent healing of the cracks.

Prevention of the condition lies in the direction of keeping the horse away from muddy ponds and preventing the continual wetting of the fetlocks. The use of concrete troughs for watering purposes in place of muddy pools has prevented the occurrence of the condition.

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Farm Practice and Management.

Contributed by Officers of the Fields Division.

Top-dressing Practice in Southland.

IT has been truly stated that a good farmer leaves his farm in a better state of fertility at the end of his term compared with the state at which he commenced operations.

While farming in Southland is essentially mixed in character, there is no doubt that the grasslands are playing an ever-increasing part in the production of lamb in particular, and, to a lesser extent wool, mutton, and dairy products—mainly cheese in the last-named case.

The value of top-dressing pastures has long been realized, but there is still room for extension with profitable results.

Liming.

Unlike farmers in other districts, the average Southland farmer need have no hesitation in applying lime, and the consensus of opinion is that lime is more effective when applied during the course of cultivation. Many progressive farmers have adopted the practice of applying 1 ton of carbonate of lime at each ploughing during the cropping rotation. This results in the application of two or three tons of carbonate of lime before sowing out to grass.

When it is considered that on the larger farms these pastures may remain down for from twelve to twenty years, this quantity is not excessive, although in addition to this the fairly general practice of applying small quantities of lime with the annual application of phosphate is not to be condemned. On the dairy-farms where pastures may be broken up after a period of six to twelve years, lighter applications before sowing out may be deemed advisable, and where liming has been consistently practised over a life-time the farmer would be wise to obtain a lime-requirement check test of his arable field. This test is carried out free of charge by the Department of Agriculture on application to the local instructor.

Phosphates.

The next consideration is the phosphate to apply and its time of application. The choice will lie between superphosphate and basic slag, with the price in most cases being the main consideration in the higher rainfall districts. Farmers who are obtaining excellent results from either phosphate are not advised to make any change. If a trial is desired, divide one paddock, and for each half keep grazing and production figures, which, extended over a number of years, should provide interesting and reliable results.

In regard to the time of application the autumn is becoming increasingly popular, and January to March dressings should be the rule in Southland. Dressings after March could more profitably be held over till early spring.

In a wet season, such as has been experienced this year, grass-growth has been excellent, but this in turn means a heavier drain on available fertility. Autumn dressings rectify this drain and, in addition, bring about an appreciable increase in growth before the dormant winter period. Coupled with this important advantage lies the fact that early spring growth is also stimulated, while late spring growth may not provide the same embarrassment to the farmer concerned, as it undoubtedly does with spring top-dressing.

The pastures to be top-dressed in the autumn should be the better-class pastures on the farm, and this will mean, in the majority of cases, the younger pastures.

Potash.

In certain districts of Southland, notably the Edendale Plain, potash salts in addition to phosphate have given very good results. In general, the 30-per-cent. potash salts are used, and these are applied with phosphate in the autumn. In certain instances the palatability of certified perennial rye-grass has been improved by applications of potash, and a number of farmers claim increased fattening capacity from pastures so treated.

Nitrogen.

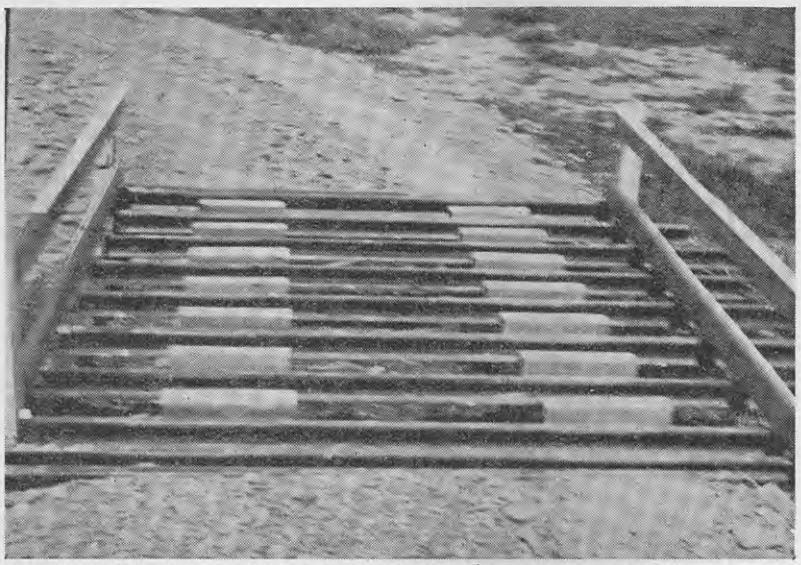
Autumn application of nitrogenous fertilizers has made no headway in Southland, but in backward seasons spring applications of ammoniated super to young pastures dominant in rye-grass and on land adequately limed have given excellent results. Generally speaking, provided a pasture has adequate clovers growing throughout the sward, nitrogenous fertilizers are not necessary, the clover-plant itself supplying sufficient nitrogen to ensure adequate growth of grass.

—A. Stuart, Instructor in Agriculture, Invercargill.

Effective Type of Cattle-stop.

TO one who visits farms every day and all day, a cattle-stop on a long drive in to a farm house is always a welcome sight. Too often one has to struggle with badly sagged hinges on gates or, worse still, the familiar Taranaki gate of barbed wire, which is also known as the " tailor's friend."

Cattle-stops are usually constructed with a foundation of concrete, but the illustration shows a simple type for use where the road had to be built up to cross a railway-line.



Foundations were made of two bridge stringers purchased at a small cost from a dismantled bridge in the vicinity. The stringers are of 14 in. by 16 in. Jarrah, and were cut in two and placed the width of the car wheels apart. Railway irons were placed on the top 5½ in. apart and held by spikes. In between the rails 4 in. by 4 in. hardwood blocks 18 in. long were nailed to make a smooth track for the car. In all, eleven railway irons were used, but the two end ones are close together to prevent metal falling into the pit.

The whole structure is 9 ft. wide by 11 ft. long, and the rails on the sides prevent stock getting past the corners. The wide spacing of the rails makes it a very effective stop for all stock.

—A. S. Nash, Instructor in Agriculture Rangiora.

Manurial Response.

IT has been demonstrated in many parts of the Dominion that soil productivity is almost entirely dependent on artificial fertilizers. An instance of this is illustrated in the accompanying photographs of an experiment in turnip manuring conducted by the Ballance Young Farmers' Club, in which half-drill " no manure " strips were left at intervals across the area.

Fig. 1.—Left, 3 cwt. superphosphate plus 3 cwt. lime; centre, no manure; right, 2 cwt. superphosphate, 1 cwt. sulphate of ammonia, and 1 cwt. sulphate of potash. The crop comprises hardy Green Globes and some Lincoln Reds.

For some time after the manured strips were up the no-manure strip was quite bare of vegetation, but relatively poor turnip plants appeared later, and when the main crop was nearly full grown and about 15 in. high the no-manure turnips were from 2 in. to 4 in. in height, as the photographs clearly illustrate.

One interesting feature of this experiment was the fact that the germination of the no-manure strip was (on plant counts) about 50 per cent. of the germination of the plot receiving 5 cwt. per acre of highly soluble manures. It would appear that instead of " burning " the seed, as so often happens, the manure gave extra vigour to the seedlings, enabling more to survive and establish than was the case where no manure was applied.

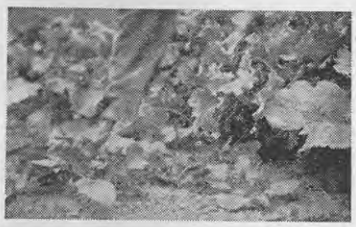


Fig. 2.—A close-up of the area in Fig. 1, showing a comparison between unmanured plants in the foreground and manured plants in the background.

—N. Lamont, Instructor in Agriculture, Masterton.

Serviceable Home-made Farm Gates.

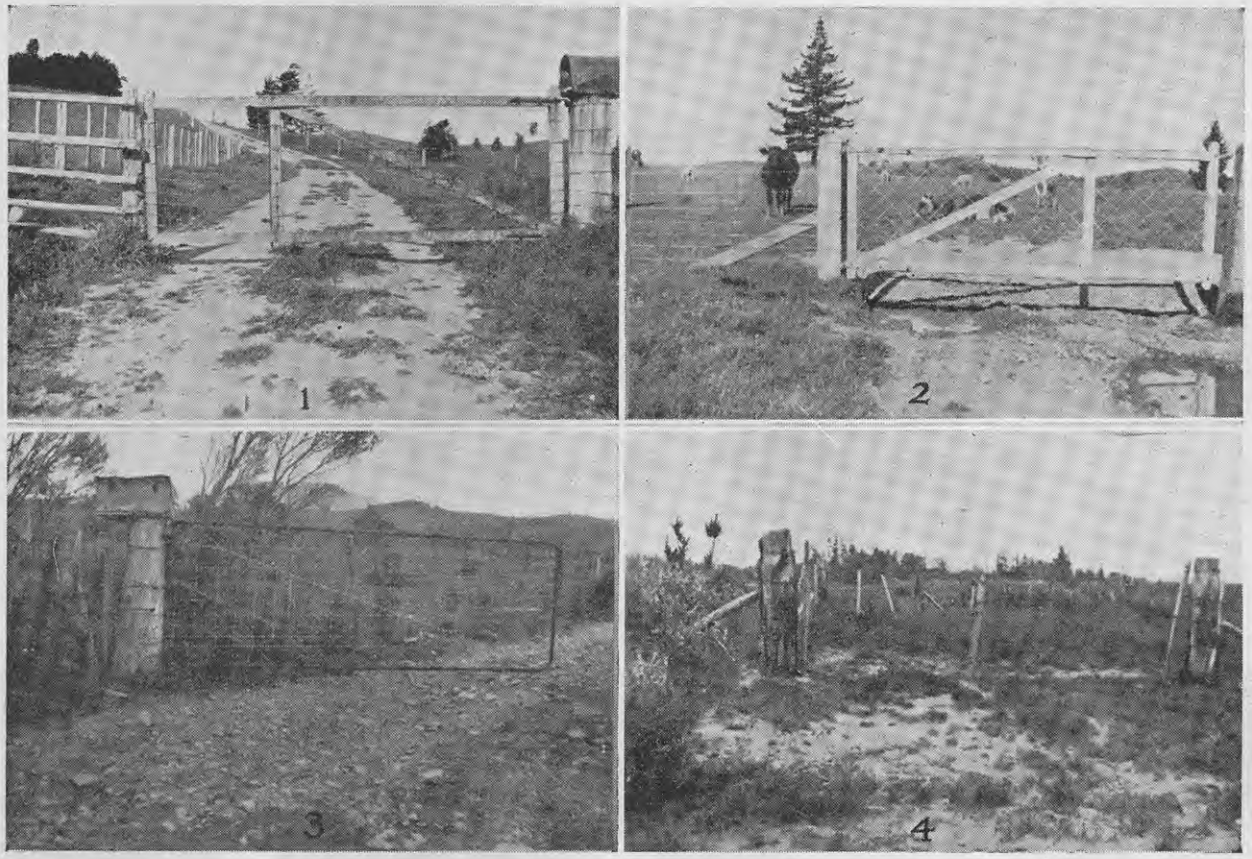


Fig. 1.—This pattern is preferred to that in Fig. 2, as the wire is easier to strain and secure. Fig. 2: A cheap and serviceable home-made gate. Fig. 3: The frame for this gate was made from a section of a discarded milk-vat coil. Note collar in top left-hand corner used to join ends of coil, and eyebolt hinges driven into post. Fig. 4: This gate may hold stock at high cost of time and temper. Such gates are dangerous to stock, and this makeshift is justified only where it is seldom likely to be used.

FARM gates are in more or less constant use. Good, serviceable gates are a necessity rather than a luxury, and, judged by the test of economy alone, will quickly repay their cost by time saved and greater efficiency in holding stock.

In order to be efficient a gate need not necessarily be expensive, and good, useful gates can very quickly and easily be made by any average handy-man.

The gates shown in Figs. 1 and 2 can be made from hardwood or from good heart rimu. For the heads 3 in. by 3 in. timber is used, and, for the remainder, 3 in. by 2 in. timber is best employed. As the pressure exerted on the gate by stock is mainly horizontal, the top and bottom bars should be placed with the 3 in. surface uppermost to provide greater lateral strength.

The strands of the pig netting used in Fig. 1 are simply passed through spaced holes bored in the frame, and are strained tight before being stapled down. This pattern of wire is to be preferred to the diamond mesh shown in Fig. 2, as it is more secure and requires less stapling. Where diamond-meshed wire is employed it must be stapled at each mesh. It is difficult to tighten, and is apt to work loose in service.

The gate shown in Fig. 1 has now been in use for more than ten years. During that period it has required no repairs, and is still in excellent condition.

The gate shown in Fig. 3 has proved remarkably simple, light, and efficient. Judged also from the standpoint of cost, this must prove almost the cheapest efficient farm gate on record. The farmer bought a length of old vat-coil from a dairy factory for 10s. Each coil, cut from the original length with a hacksaw, makes one gate frame, and the length, purchased for 10s., provided frames for twenty gates—a cost of 6d. each for everlasting iron frames!

The two ends of the frame are joined by means of a short collar cut from a piece of 1½ in. water-pipe, and the gate is hinged on two eyebolts, which are slipped on to the frame before the two ends are joined. The netting is simply laced on as shown in the illustration, a piece of twisted No. 8 fencing wire being employed to act as a reinforcement and as a brace for the frame.

—P. S. Syme, Instructor in Agriculture, Warkworth.

Patchiness in Nelson Cereal Crops.

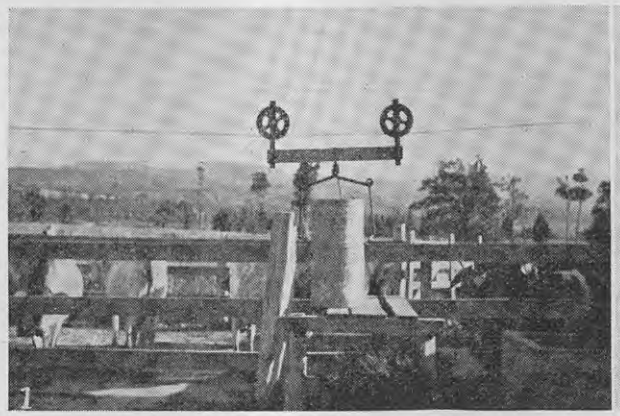
A field of wheat showing distinct patchy growth.

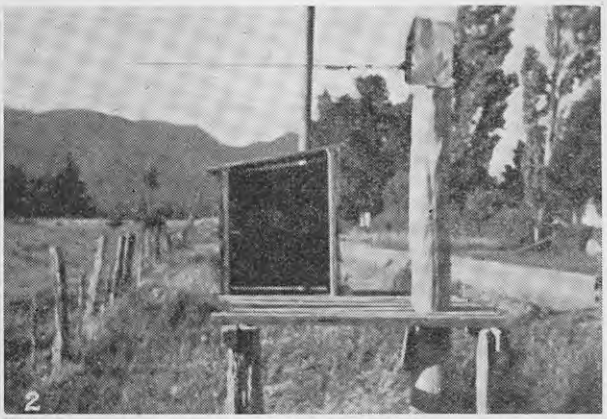
THE uneven growth in oat, barley, and wheat crops has been notably apparent this season in many fields in the Waimea district. The first symptom of unthriftiness has been the yellowish-green of the leaves contrasted with the usual healthy dark green.

In view of the heavy winter rainfall the explanation appears to lie in the general leaching from the soil of nitrogen, especially as good, healthy green foliage appears in patches, evidently where fertility has been increased at some previous time by stock.

Under such conditions as these it would appear that a spring dressing of sulphate of ammonia at the rate of 1 cwt. per acre would be most advantageous.

—D. M. E. Merry, Instructor in Agriculture, Nelson.





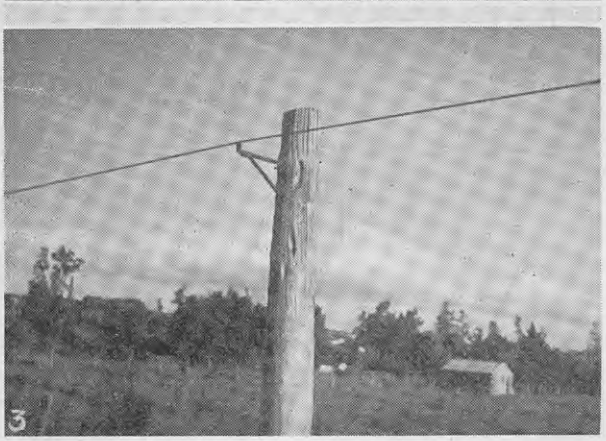


Fig. 1 : Conveyor and attached can. Fig. 2 : Roadside stand. Fig. 3 : Supporting pole and bracket.

Simple Conveyor for Collecting Cream.

DAIRY-FARMERS whose sheds are within several chains from a main collecting highway will find that an overhead conveyor of the type described will greatly minimize the labour of conveying laden cans to the stand, and will eliminate the necessity for either barrowing or sledging.

Level ground or areas with a surface falling toward the highway offer the best positions for the easy operation of the equipment.

As will be noted from the illustrations, an aerial wire of $\frac{3}{8}$ in. stranded steel cable supports the overhead trolly gear to which the cans are hooked. If the wire is taut the load can easily be pulled with a short length of rope right from the separator-room door to the roadside stand.

The steel rope in the equipment illustrated passes over the shed roof and is firmly anchored. Tightening the rope is done by a universal screw. The post at the roadside stand is firmly set and footed. In addition, it has cross bearers beneath the ground level set ahead and behind to prevent movement when the wire is strained.

Bearer posts are spaced between the roadside and the shed at 11 yard intervals, and the overhead cable is borne on iron brackets sufficiently out from the post to allow free movement.

If well constructed, a conveyor of this type will handle the heaviest cans with but small attention to oiling, &c., and will give faithful service over many years.

—D. M. E. Merry, Instructor in Agriculture, Nelson.

Proceedings of Twelfth International Horticultural Congress.

THE organizers of the Twelfth International Horticultural Congress advise that the report and proceedings of the Congress, which will be published in a few weeks, may also be purchased by non-participants if ordered at once. The report and proceedings will comprise two bound and illustrated volumes, which will be sold to purchasers abroad at the exceptional price of 16 RM. (£1 14s. 6d.), including postage. The Congress management emphasizes that it is necessary to order the books immediately, as they may later be sold out.

This note does not concern the members of the Congress, as they will receive the report and proceedings of the Congress free of charge and without further notice.

In ordering the books please apply to Twelfth International Horticultural Congress, Berlin, W. 35, Potsdamerstr. 101. Remittances may be sent to the Postscheck-Konto of the Deutsche Gartenbau-Kredit A.G., Berlin, N.W. 40, Postscheckamt Berlin, Konto-Nr. 25 431.

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Horticultural Instruction.

Contributed by Officers of the Horticulture Division.

Orchard Notes.

Harvesting for Fruit Export.

WORK for the coming month is confined almost wholly to harvesting the remaining mid-season and the late apple and pear varieties. The peak period for export is just ahead, and as perhaps several varieties require to be handled almost immediately it is necessary to consider carefully a programme of work to follow in order that no particular variety will become too mature and be shut out of export.

The most urgent work is to complete the harvesting of the Jonathan crop by the closing date. Towards the end of the Jonathan season growers with quantities of this variety may find maturity becoming advanced. It is advisable for the main picking to take all fruit sufficiently mature and grade it into the respective grades according to colour, and to avoid as far as possible allowing fruit to become too advanced for safe shipping.

It may be necessary in some instances where maturity is rather advanced to delete the larger sizes from export consignments and pack for export only the medium and smaller fruit. Towards the end of the Jonathan export season a certain amount of low-coloured fruit is inevitably left. It is wise to leave all such low-coloured fruit for a period, with the object of allowing it to tree-ripen and take on colour for local marketing.

There is a good demand for this class of fruit which, if handled carefully, should stimulate the consumption of apples locally. In grading Jonathans for colour, Extra Fancy grade must have the full percentage of bright colour; otherwise it must be placed on the lower grade.

Time of Picking.

The same principles must apply in grading all coloured varieties in order that the proper standards may be preserved. Immediately following the main export picking of Jonathans efforts will have to be made to complete the Delicious harvest before starting the Sturmers. Growers are sometimes tempted to make rather an early picking of Sturmers and then make a last-minute rush to complete the Delicious harvest, frequently to the detriment of both varieties.

Sturmers could with advantage gain extra maturity, and Delicious would be in better shipping condition, if not unduly delayed. In handling Sturmers great care is required to avoid the amount of small bruising which so readily occurs in picking and grading. It is an advantage with this variety to delay two or three days between picking and putting over a grading-machine to allow the skin of the fruit to toughen just sufficiently to reduce the bruising tendency.

Dougherty apples should be left until they take on a bright colour, and should not be picked when they appear fully coloured but still remain dull. A correct idea of colour is not always gained in the orchard when examining fruit in bright sunshine. To gain a correct impression it is better to gather a number of specimens and examine them indoors.

Dougherties are often picked a little too soon, to conform with shipping requirements. However, with provision having been made for receiving Dougherties later when shipping arrangements permit, growers should endeavour to secure a higher standard of colour for export lots.

Local Market.

It is important in picking fruit for the local market to carry out the same exacting grading and careful packing as is required for export. Fruit intended for cool storage should be of similar maturity to that for export, and the same care is required in eliminating fruit with skin injuries and other defects which will impair keeping qualities or encourage rot to develop.

Although a slightly inferior grade of case timber is sometimes used in local cases, any timber with defects likely to weaken the case and allow some injury to the fruit should be discarded, and only strong, clean, well-constructed cases used. The standard bushel case should be made the wide way up, as it has been found that loose packing results when it is constructed the narrow way.

Fruit requires proper attention if it is to open up in good condition after being transported to markets at a distance. Pears mark very readily where they come in contact with the bare case timber. Anything short of all-round straw-bound case liners plus the wrapping of fruit is insufficient to give full protection.

Experience gained during market inspection last season fully indicated that fruit well graded and packed and fully protected by all-round liners sold at a sufficient premium over other fruit to more than compensate the grower for the additional cost in preparation.

Packing-shed Hygiene.

Reject fruit should not be allowed to remain in or about the packing-shed, but should be disposed of quickly before rots develop or codling grubs escape

from infected fruit and take cover either in picking-boxes or shelter within the timbers of the packing-shed, to remain as a source of infection for the following year.

It is not uncommon to find the greatest infestation of codling-moth in close proximity to packing-sheds for the very reason that most of the codling-moth infected fruit on an orchard is accumulated in one spot, and, unless destroyed, there remains a concentration of grubs at that one point.

—N. J. Adamson, District Supervisor, Nelson.

Viticulture.

Phylloxera-resistant Stocks.

(Continued from February issue.)

THE stocks available from the Te Kauwhata State Vineyard belong, with few exceptions, to the Americo-American hybrids and to the Americo-Vinefera hybrids. The former were produced from pure American species and their varieties, and the latter have American and European blood in their composition.

Americo-Americans.

The *Riparia* x *Rupestris* combine the characters of the *Riparia* and the *Rupestris*, and are represented in New Zealand by the *Riparia* x *Rupestris* No. 101–14, produced by Millardet and de Grasset, *Riparia* x *Rupestris* 3306 of Couderc, and *Riparia* x *Rupestris* 3309 of Couderc.

The *Riparia* x *Rupestris* 101–14 stock resembles the *Riparia* in root system and foliage rather than the *Rupestris*. It is more tolerant to lime than either. It makes a good growth in most soils, even in the compact clays known as gum lands in North Auckland, and is generally preferred to the *Riparia Gloire* for planting in *Riparia* (alluvial) soils. Its affinity for *Vinefera* is in most cases good. Vines grafted on it produce good crops which ripen early. It is particularly suitable for vines like the Gamays, which are liable to perish through overcropping.

The principal characteristics are: Trunk, thick; habit of growth, semi-erect; bark, thick, and greyish in colour; rods, long, straight, cylindrical, slightly striped, reddish-chestnut when matured; shoots (in a herbaceous state), bright red and smooth; leaves at tip of shoot, pale green; leaves, larger than long, entire, the lateral lobes indicated by larger and more pointed teeth, the terminal lobe is prolonged by a very pointed tooth; petiolar sinus, deep V form, nearly closed; upper side of leaf dark shining green, lower a lighter green, smooth or with a few hairs on the principal nerves; stalk, short, strong, canaliculated, covered with short brushlike hairs.

Unlike the 3306 and 3309, which are male vines, the 101–14 produces small bunches of small dark, violet-black berries. The 101–14 is highly resistant to *phylloxera*.

The *Riparia* x *Rupestris* 3306 (Couderc) stock is becoming one of the most popular in New Zealand for grafting on both outdoor and underglass varieties of vines because of its very good affinity for *Vineferas*, in which it promotes abundant fructification and early ripening. Cuttings of this stock root freely, and grafts take fairly well (30 per cent. to 40 per cent.).

On the stiff clay of Te Kauwhata the 3306 makes a vigorous stock, and with the Berlandieri 420.A—on a little better soil—has proved to be a very suitable stock for grafting on the Albany Surprise (syn. Pierce). It is also proving a very good stock for the Black Hamburg, Gros Colman, and Muscat of Alexandria grown under glass.

The 3306 is generally recommended by European authorities for poorer soils than the 101–14 and as being more suitable for clay soils and soils with wet subsoils than the 3309. In New Zealand it is doing well so far wherever it has been tried. It has the reputation of being one of the most resistant stocks to root-rot (pourridié), and it resists chlorosis in soils containing up to 30 per cent. of lime.

Its principal characteristics are: roots, rather fine, of spreading habit, yellowish in colour; shoots, long and thin, covered with small hairs (which distinguishes the 3306 from the 3309, which has smooth wood). The leaf, which is a little longer than wide, is also pubescent, that of the 3309 being smooth. The leaf of the 3306 is more *Riparia* and less *Rupestris* than the 3309. It is dark green with rosy nerves and sharp narrow teeth. The petiolar is V-shaped, and the sinus is not so open as that of the 3309. The 3306, like the 3309, is a male vine, and in consequence does not bear fruit.

(To be continued.)

—J. C. Woodfin, Vine and Wine Instructor, Te Kauwhata.

Citrus Notes.

Shelter Belts and Manuring Trees.

WITH the approach of the colder months of the year, the keen citrus-grower with the welfare of his trees at heart needs to consider once more the vital question of shelter. Shelter means adequate protection for the citrus orchard from all winds. Unfortunately, it is true that in most localities damaging winds can be experienced from all directions. The south and west are most important, but the north and east also require protection against east and north-east gales. A tall line of timber trees—pines or eucalypts—does not of necessity imply adequate shelter. Too often the cold wind whistles through these belts, and a low hedge close to the orchard is an urgent necessity. Shelter

for an orchard requires care and foresight in planting to vary the proposed shelter if it proves unsuitable for the locality or outgrows its usefulness. In many instances a shelter such as *Abizzia lopantha* has outgrown its usefulness and yet no plans have been made for its replacement, with the result that it has to remain longer than advisable or the orchard become unduly exposed by its removal.

For the intending planter this question of shelter requires every consideration. Visit the groves in your locality and note the effect of shelter. It is generally the determining factor in any grove, and until it is sufficient little can be done to improve a grove by pruning or manuring.

In most localities 2 acres are the most that can be recommended for one block without cross shelters, so that where an orchard is of 6 acres or 8 acres a grower may often be well advised to sacrifice a line of trees for the sake of shelter. It is better to sacrifice one line of trees now than to plant the shelter between two rows of citrus trees and have to sacrifice two rows later or have a tremendous amount of hand cultivation through the lack of space in headlands.

Shelters that have been proved are *Cupressus lawsoniana, Hakea saligna, Pinus radiata, Bambusca nigra,* and *Cupressus macrocarpa.* Although it is too early to plant shelter-trees, preparation for the shelter-belt area must be made now. If the trees are to make adequate growth the shelter-tree area should be ploughed, fallowed, and well disked before shelter-trees are planted this winter.

Manure Cover-crop.

Cultivation will now be reduced to a minimum if the green-manure cover-crop has been sown as suggested last month. During the early part of April is not too late to sow a cover-crop if it has not yet been done, as sufficient growth to be of any value for turning under cannot be expected if the sowing is unduly delayed. At this time of the year is recommended a 3–4–50 Bordeaux spray for prevention of verrucosis, and it is important that growers pay greater attention to the necessity for producing only clean fruit. Where this is done the grower is usually well repaid for the extra work involved and care taken.

Autumn manuring of the trees should be of a slow-acting nature. Blood-and-bone or fish manure are suggested. A forcing nitrogenous manure is likely to force too much tender autumn growth, which is liable to be frosted or damaged by cold winds. This class of manure should, if possible, be worked well down into the soil in order to keep the feeding roots from coming too near to the surface, where they are likely to be destroyed by future cultivation.

The intending planter will be well advised to consult the local Orchard Instructor relative to varieties of citrus suitable for planting in his locality and the stocks upon which it is best to grow the variety. It is advisable for intending planters to communicate with reliable nurserymen as early as possible in order to ascertain trees available of the required standard and on the stock desired. Do not leave this question of citrus-tree requirements too late in the season, as the coming months are suitable for planting, and it is unwise to make careful preparations and then be unable to secure suitable trees.

Green Fruit.

During this month many of the lemons on young, vigorously growing trees will be very green and coarse. These lemons are not suitable for curing, and should either be discarded or allowed to grow oversize for peel purposes alone.

The green fruit of the autumn period also requires very careful handling, and injuries received prior to the picking will often exhibit the "oil spot" resulting from the rupture of the oil cells. This marking is detrimental to the appearance of the fruit.

—L. Paynter, District Supervisor, Auckland.

Tobacco Culture.

Harvesting the Crop.

THE priming, suckering, and topping operations have been completed in the majority of cases throughout the district, and the main crops will now be ready for harvesting.

Due to the unfavourable weather experienced from the beginning of the season the leaf is ripening very unevenly, making it difficult even for growers with large areas to harvest sufficient leaf at one picking to fill a kiln. To pick, half-fill, and cure a barn is uneconomical. Further, the cure from a part barn is never as good as that obtained from a full one.

If a grower postpones his picking in a season such as this until he has enough ripe leaf to fill a kiln it means, as often as not, that a large percentage of that picking will be over-ripe and a dead loss, as over-ripe tobacco in nearly every instance breaks down in the process of curing, becoming dark, blotchy, papery, and worthless.

It would be advisable, therefore, and a great saving, when and where possible, for adjoining neighbours growing the same varieties to harvest their crops on a co-operative basis, picking, filling, and sharing a kiln between them, until such time as the crops begin to ripen more evenly.

The growers with very backward or light crops which are a long way from the suckering and topping stage should top heavily almost as soon as the bud appears, leaving only six to seven leaves on the plant. By the adoption of this method and with the promise of a late summer a reasonably payable crop may be expected.

When kiln-curing, a safe and reliable procedure which minimizes considerably the danger of what is known as "spong-ing" of the leaf is, when raising the temperature preparatory to opening the ventilators to begin fixing colour, to open all top vents quarter-way three to four hours before cracking alternate bottom vents. After the top vents have been open for the prescribed period carry on in the usual way.

—U. A. Yeldham, Tobacco Instructor, Motueka.

Vegetables, Small Fruits, and Flowers.

Contributed by the Horticulture Division.

Preparation of the Land for Cropping.

SPRINGTIME is always a busy season on the farm, and the frequent showery periods experienced often cause serious delay at that season in the preparation of the soil for cropping, especially when it is of a heavy character. In such circumstances it is best to make an early start in the preparation of the land for early crops, such as potatoes, peas, salads, &c., and also for permanent crops that are planted early in the season, such as asparagus and rhubarb. Most of these crops thrive best with a liberal dressing of farm manure, which should be ploughed under as soon as the land is available, together with any of the slow-acting fertilizers which may be required, such as basic slag, blood and bone, or fish-manure. Other plots for later cropping which are free now may be ploughed, harrowed, and sown down in a hardy, green cover-crop, such as oats and horse-beans, for ploughing in later, or simply double-ploughed or trenched in preparation for sowing root crops.

Intensive cropping has a strong tendency to deplete the stores of lime in a soil, and a moderate annual dressing, or a heavier one at longer intervals, is required to keep acidity within reasonable limits or to create such alkaline conditions as many crops prefer, as, for instance, the cabbage family.

Application of Lime.

Lime is usually applied in the form of a finely ground limestone of good quality; fine grinding is important. About 1 lb. to the square yard or 2 tons per acre is a normal dressing at intervals of three or four years. About half that quantity will usually be sufficient when slaked burnt lime is used. For best results the lime is broadcasted after ploughing, and is harrowed in during the autumn. This attention is too often overlooked; it is of special importance on heavy land of a naturally acid character.

To complete the preparation of the land after this treatment for sowing in early spring all that will usually be required is to broadcast or drill a dressing of soluble, quick-acting fertilizers, such as superphosphate, sulphate of potash, and sulphate of ammonia, and cultivate it in a few weeks before sowing.

Breaking in Grassland.

If the land to be used for cropping is in grass it should be skim-ploughed without delay and the turf allowed to rot before it is ploughed under deep. Land with an open subsoil is sometimes overdrained, especially in the drier localities. Heavy land, however, especially when low-lying, will require draining. It is a heavy task, but it will save much labour later and will return better crops if a well-planned scheme of drain-pipes to collect the surplus water in the subsoil and open drains to carry it away is properly carried out.

There are few localities where vegetable crops do not require the shelter of hedges to protect them, at least from the prevailing winds. The preparation of the land and early winter planting of carefully selected trees and shrubs should be carried out and maintained with all the attention one gives to the most important crops. In order to reduce the labour and cost of maintenance it is best to choose plants which give sufficient shelter when their natural height at maturity is reached.

Crops for Planting Now.

CROPS planted at this season are cabbage and cauliflower for spring cutting. A piece of land well drained, clean, and generously manured for the previous crops is best suited for these crops, which should be planted deep and firmly.

In the cooler districts the cauliflower plants are sometimes best pricked out 2 in. apart on beds which can be covered with a frame to protect them from severe weather until the worst of it is past. It is also a suitable time for planting mushroom spawn in beds of well-prepared compost. Under good conditions mushrooms may be expected in one or two months, when the outside crop is finished. The most important condition is the maintenance of a temperature of 50° F. to 60° F. This cannot be done at this season in a draughty shed, especially in a wet shaded place, unless the beds are on the floor and well covered up with straw and canvas covers.

For winter and spring cropping, which are the more important seasons, a warm, well-drained, and sheltered position is most suitable for sheds for mushroom culture. In such a position high summer temperatures will make cropping difficult, but with a varied supply of fruit and vegetables of many kinds at that season this is not so important.

Other plantings of this class which may be done now are some of the perennial herbs such as chives. Planted 6 in. apart, in a good, moist soil, they produce a rush-like grass that is of the greatest use for salads and seasoning by imparting to dishes a mild onion flavour in a most convenient form. Lifted, broken up, and planted in fresh ground every third year, it provides a generous supply with little trouble. It will flourish with little or no attention about a back-country whare or seaside cottage as well as at home, and is a most useful plant.

Asparagus and Celery.

As soon as the mature growth on an asparagus plantation changes colour it should be mown, raked, and burnt, and a slight ridge thrown over the stubble to rot it. As the celery crop approaches full growth it should be blanched by earthing it up; this is best done in two or three stages in fine weather.

Towards the end of April a sowing of broad beans is sometimes made, and, in localities practically frost-free, culinary peas for harvesting in early spring. For this purpose a good main-crop variety, such as a good strain of Stratagem, is used. Lettuce for planting out in early spring is sometimes sown, but it will usually require the protection of a glass frame, which requires considerable attention to be successful. A thin sowing should be made on a raised bed or in boxes, the latter having the advantage of facilitating transport of the plants when setting them out.

The soil should be only moderately rich in humus, and should not have grown lettuce for a season or two. Give a dressing of bonedust when the boxes are half filled, and when the seeds are covered place the glass lights in position and keep the frame close until the seeds are well up. Then harden the plants off and ventilate freely on all suitable occasions—not merely some but all occasions that are suitable. Remove the lights on fine days, but cover at night and when rain threatens. Avoid overhead watering and rain, but ventilate freely at night except during a hard frost.

It is satisfactory to know that research work is being carried out at the Imperial College of Science in the control of rust disease of lettuce (*Marssonia panattoniana*) which is so troublesome in winter crops. Results so far indicate that the trouble is seed-borne, and a suitable seed treatment is being sought.

Flowers that Bloom in the Spring.

IN this section the herbaceous plants and lawns demand most attention at this season. As the summer annuals finish blooming they are cleared away and replaced with wallflowers, stocks, violas, pansies, polyanthus, &c., which have been grown in preparation for the occasion, or tubers of ranunculus and anemones, or bulbs of early-flowering gladiolus, hyacinths, tulips, daffodils, &c. In well-prepared beds these plants soon make a good display of varied colours which continues well into the summer.

Borders of herbaceous perennials are cleaned up, additions and adjustments made, and a dressing of well-prepared organic manure applied and lightly worked in. Lilies, irises, carnations, and lily of the valley are among the many subjects which may be planted now. Carnations thrive best in an open position in a rather dry atmosphere, firmly planted in a soil that is well drained and not too rich in humus.

Most lilies prefer semi-shade, especially in warm, sunny localities. Lily of the valley is definitely a woodland subject, and must have shade to flourish satisfactorily. Among irises, the bearded section like a sunny position that is comparatively dry and an abundance of lime; the Japanese varieties do not like lime, and a cool, moist position suits them best. For this reason they are often chosen for planting on the verge of a pond or on the banks of a stream.

Reconditioning the Herbaceous Border.

In nature, herbaceous plants maintain their condition by "creeping" on to fresh ground by means of suckers, runners, or scattering their seeds. In a well-managed garden border where this is not permissible the matter is arranged by lifting the plants every three or four years, reconditioning the border, and replanting so that as far as possible a fresh position is given to each kind. This may be done now or in early spring. Where the undertaking is of considerable dimensions both periods will probably be required to complete it.

The main points are to conduct the removal to temporary ground in a methodical manner so that labels and plants are not lost, and to clean, cultivate, and manure the soil thoroughly in preparation for replanting. Planting naturally affords an excellent opportunity for exercising one's taste and skill in the arrangements, but for the inexperienced it might be added that large masses of one colour may be overdone and become monotonous. That very fine plant *Gazania* is often treated in this fashion, or the colours are so intermixed as to destroy all effect. It is generally most effective to plant relatively large groups of one variety, the size of the group depending on the proportions of the border and the garden about it.

Another point is that, however fine a subject one may have to plant, the effect it produces is going to be greatly enhanced or discounted by the environment it is given. For busy people it is generally best to confine oneself in this section to plants of a height and strength of stem which require little or no staking and tying at any stage of growth. The labour of maintenance is thus greatly reduced.

Colouring Late Tomatoes.

LATE tomatoes often meet a good market demand. Where the weather is cold, the colouring of the fruit is slow, but, if mature, it may be hastened after picking by placing it in a cabinet heated to a temperature of 65° F. to 75° F.

In preparation for the new season's crop the compost for the seed-boxes should receive attention. Messrs. Lawrence and Newell, of the John Innes Institution, have given a great deal of attention to this matter, and have demonstrated with a number of annual herbaceous plants that it is best to sterilize the ingredients separately in a compost for seedlings and to mix them afterwards.

They obtained very striking results. They found it best always to add phosphates when mixing, preferably in the form of superphosphate of lime (basic phosphate) at the rate of 1½ oz. per bushel of compost. If the sand is clean it need not be sterilized, or, on the other hand, the sand and loam may be sterilized together without detriment.

Manurial Treatment for Small Fruits.

MANURIAL treatment of established plantations of bush fruits will vary according to circumstances. In most cases it will probably take the form of a dressing of well-cured farm manure or other organic material lightly ploughed under now, unless it has been already done this season, and a dressing of artificial fertilizers in the spring.

(Continued on page 272.)

Work for the Month in the Apiary.

Removal of Supers and Autumn Work.

AMONG the autumn work which must not be neglected is the removal of the supers, and this should be undertaken as soon as the extracting-combs are cleaned up by the bees. It is bad management to leave the bees more space than they can occupy. By removing the supers the space in the hive is restricted, and consequently it is much easier to make the bees snug and warm for winter.

Where the strength of the colony will permit this to be done nothing is to be gained by leaving on the supers. However, it may be impossible in the case of strong colonies to confine the bees to the brood-chambers, in which case the supers can be left on the hives until the spring. By that time most of the bees will be in one story, and the supers can then be removed.

A good plan to induce the bees to clean up the combs is to insert a mat, in which a small hole has been cut, between the brood-chamber and the super. The bees, finding the combs partly cut off by the mat, lose little time in removing the surplus honey. At this operation the excluders should be removed from the hives and stored away until such time as they can be cleansed of burr combs. A little care is necessary in dealing with the excluders in order to avoid bending the wires. They can be readily cleansed by plunging into boiling water.

Winter Stores.

The losses attendant upon starvation are no less serious a menance to the beekeeper than disease. While disease is met with from time to time, each autumn brings the problem of wintering the bees. It has to be faced every winter, and, while the professional will prepare his colonies to guard against serious losses, the average beekeeper is apt to overlook the essentials that make for success. There are factors such as shelter, watertight hives, vigorous young queens, &c., which all play a part in the wintering problem, but, above all, a supply of food sufficient to meet the colonies' wants must not be overlooked.

The safe wintering of bees is a test of a beekeeper's capabilities, as he is called upon to gauge the amount of stores required to tide his bees over the period between the autumn flow and the appearance of the early nectar-secreting plants. Locality plays an important part, more especially where autumn flows are unknown and fine autumn weather prevails. In these districts the consumption of stores is greater, and a constant watch must be kept on the hives to determine the amount of food required to guard against loss, as breeding will be carried on until a later period in the season.

Various estimates have been given as to the amount of food required to winter the cluster—varying from 30 lb. to 40 lb. —and experience has proved that provided a colony is left with this amount it will not only winter well, but will build up rapidly in the spring. In any case, it is by far the safest policy to leave an excess of food rather than to run the risk of leaving the colony short and with barely enough to tide it over the dormant period.

Where the amount of stores is less than 30 lb. the shortage can be made up quickly by the insertion of a few combs of honey. Calculating on the basis that a full comb contains 6 lb. of honey, it is easy to estimate the weight of honey in the hive. If, however, combs of honey are not available, feeding should be undertaken. This latter operation should not be delayed until the cold weather, but should be started early in the autumn.

Supplementing the Stores.

For supplementing the stores, sugar syrup fed in the proportion of two of sugar to one of water is the best substitute for honey. Avoid using inferior qualities of sugar; none but the best white sugar should be fed. In feeding to augment the winter food-supply it is often necessary to feed large quantities of syrup, and consequently large feeders must be adopted.

The Miller and the division-board feeders are excellent for the purpose. The former enables about 10 lb. to 25 lb. of stores to be fed at one time. It is designed to be placed inside the super or upper story on top of the brood-frames, and has two compartments for syrup, the passage-way for the bees being in the centre through the bottom directly over the cluster.

The division-board feeder is popular and enables about 5 pints of syrup to be fed. Hanging between the frames, all that is necessary is to turn back the mat so that the opening in the top is exposed. The main advantage of this feeder is that food can be supplied without exposing the cluster and without the aid of smoke.

Shelter.

As in the spring, a vital necessity at this time of the year is shelter for the hives. Brood-rearing must be encouraged if the bees are to go into winter quarters sufficiently strong to give good results the following season. If a shelter hedge or fence has not been provided an excellent temporary breakwind of manuka scrub can be erected.

Shelter without too much shade is the life of an apiary, and on no account should large trees be utilized as a means for protecting the hives. The spaces between the trunks are productive of draughts, and the high branches exclude too much of the sunlight. A line hedge 8 ft. to 10 ft. high is the ideal shelter for an apiary.

Foul-brood.

As advised last month, every effort should be made to winter only clean colonies. The risk of carrying over diseased bees is too great, as the trouble is more likely to be spread in the autumn

and spring by robbing. In cases where weather conditions have prevented successful treatment, or in which disease is detected on making a final examination prior to putting the bees into winter quarters, it is advisable to remove all combs showing the slightest signs of disease.

Where disease is detected in a bad form nothing will be gained by holding the colony over for treatment, and it is by far the safer plan to destroy. In mild cases remove all the diseased combs and substitute clean, drawn-out extracting-combs, and, provided plenty of capped stores are given, this will tide the colonies over until the spring.

Mark all infected colonies as a reminder for early treatment. Avoid disturbing diseased hives in the off-season, and guard against manipulations calculated to disturb the bees and induce robbing.

Bottom-boards.

Among the work requiring attention in the autumn is the cleansing of the bottom-boards. This operation can be undertaken before finally closing down the hives for winter. Usually there is an accumulation of pollen, wax particles, and dead bees, and, if left, this material is likely to become mouldy and offensive to the bees.

All operations should be carried out as quickly as the work will permit. A good plan is to provide a spare bottom-board. Lift the hive on to the spare one, scrape the old board, and replace the hive.

Spare Combs.

It is a frequent statement, and a true one, that next to his bees a beekeeper's most valuable asset is his drawn-out combs. Complete combs of worker cells are absolutely necessary for the proper working of an apiary and merit careful treatment at the hands of their owner during the off-season. They should be stacked in the supers inside a mouse-proof structure, and to guard still further against the attacks of mice each stack of supers should be covered with a queen-excluder. A few moth-balls scattered among them will prevent the attacks of the smaller wax-moth (*Achroea grissella*).

Where accommodation cannot be found for the combs indoors they may be left in the hives over a mat placed between them and the brood-chamber, but in this latter case they must be weighted to prevent the winter gales from dislodging them.

—E. A. Earp, Senior Apiary Instructor, Wellington.

In a trial on the Taieri Resistance oats versus Algerians the latter variety withstood the winter frosts better than Resistance. On paper one of the special features of the Resistance oat is its supposed resistance to frost injury. When stock were turned in they grazed the Algerians to the line before going on to the Resistance.

VEGETABLES, SMALL FRUITS, AND FLOWERS.

(Continued from page 270.)

Great care must be taken with the cultivation not to exceed what is customary as regards depth, as the roots of these plants are fibrous and often very close to the surface. The profitable life of these crops under average conditions does not exceed ten years, and as that term approaches it is best to make a new plantation on fresh land so that it will come into bearing when the older plantation is grubbed out.

The preparation of the land for planting most kinds of bush fruits should now be completed so that it may settle and receive light cultivation to destroy seedling weeds before planting towards the end of May. For a domestic supply on the farm a small sheltered area is best reserved for these and other perennial crops, as they then crop better than if they are planted about the vegetable garden and are subject to disturbance in the course of general cropping.

Small fruits which are planted in the spring and early summer include loganberries, tree tomatoes, passion-fruit, and Cape gooseberries. Most other kinds are best planted in early winter, although early spring is also a suitable time.

Harvesting Edible Nuts.

WHERE edible nuts are grown the grass under the trees should be mown and the surface smoothed out in the most suitable manner to facilitate harvesting. Then, as soon as the nuts begin to ripen, the trees should be well shaken at intervals with long forked poles and the nuts gathered. Leaving them on the ground exposed to dews and rain even for a short period is injurious to their appearance and very often their quality also.

Even when gathered promptly they should be well cured by drying them off well before storage. This is done in a well-ventilated shed or in the open, the nuts being placed in trays 6 in. or so deep with slatted bottoms, and well stirred from time to time. If the curing is done outside, the trays should be stacked at night and covered to keep them dry. In this way a sweet, bright sample is obtained. When cured, the nuts should be put over a riddle to eliminate waste and under-sized specimens before marketing.

Nuts required for planting should not be dried but should be stratified in damp sand or sandy soil until sown in the spring. In different parts of the country very good sweet almonds, walnuts, chestnuts, and hazelnuts are grown, and there are few places where one or the other of these useful supplies may not be produced with comparatively little trouble.

Lawns New and Old.

AFTER the grass on new lawns is well through the ground it should be rolled when the surface is dry with a light roller weighing about 2 cwt. Later the grass should be cut with a machine that is properly adjusted and lubricated, with the cutting knife set to cut high so that the grass is left comparatively long. When the grass is well established closer cutting may be done gradually in the springtime.

On established lawns and greens the repairs and attention referred to last month should now be carried out as soon as possible, so that the full effect of the treatments may be obtained without delay. On light land especially, feeding should mostly be done with organic manures, but to some extent it must be supplemented with artificial fertilizers to obtain the best results. In the absence of data to the contrary the mixture found by the Green-keeping Research Committee to be so beneficial at this season may be tried—viz., 3 parts superphosphate, 4 parts sulphate of ammonia, and 1 part finely ground sulphate of iron, applied at the rate of 1½ oz. per square yard and mixed with fine top-dressing soil to facilitate an even application.

For the control of earthworms and grass grub 1 oz. of arsenate of lead powder per square yard of turf—mixed with the top-dressing and well rubbed in—will generally be found a satisfactory remedy. For earthworms alone, bluestone solution 1 lb. to 100 gallons of water applied at the rate of 1 gallon per square yard is effective if applied in dull, moist weather when the worms are near the surface. For the subterranean caterpillar, which lives underground and feeds on the grass at night, a suspension of arsenate of lead 3 lb. to 100 gallons of water applied during calm weather, sufficient to wet the grass thoroughly, may be applied.

—Wm. C. Hyde, Horticulturist.

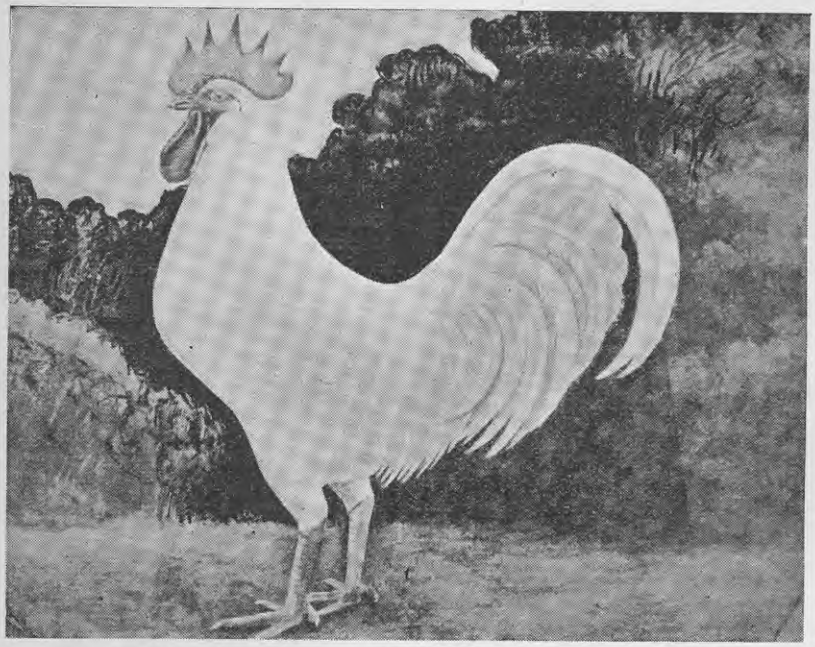
Poultry-keeping Section.

Selecting Breeding Males.

ON many poultry farms the general quality of the breeding hens is better than that of the males. This has been the case for some years, but since the introduction of sexing day-old chicks this aspect of poultry-culture has become more noticeable. These facts would seem to indicate that many poultry-keepers either fail to appreciate fully the real importance of the breeding male, or do not give the necessary attention to the production of pedigree-tested males to head their breeding-pens.

The economic importance of using only really good-quality males for breeding cannot be overestimated. It is well to remember when selecting the breeding male that he is more than half the breeding-pen. If mated to a number of hens he has an influence on the quality, constitution, and producing-capacity of every chicken hatched.

The influence of a good male may easily make a great difference in the number of chickens hatched and reared because of the fact that so much depends upon the vigour and constitution that is inherited from a good male. If the male bird is bred from a hen that has produced a large number of eggs of good size, shape, colour, and texture of shell, these characters are likely to be transmitted to his pullets. If each of these pullets produces extra eggs during her first laying year it is not difficult to estimate the great value of the good male.



A good type of utility White Leghorn breeding male.

Care of Growing Cockerels.

Unfortunately, growing cockerels are not always given the best chance to develop the desired vigour and constitution, as they are often reared in overcrowded, small, and poorly ventilated quarters.

It is more or less a waste of time to single-pen or trap-nest hens for the breeding of cockerels if the cockerels are not given proper care and attention while growing. It is well to bear in mind that a weakening of the parents' constitution will affect the vigour of their descendants. There is no doubt that by careful and wise selection the poultry-keeper can produce great results, but it is necessary to remember that the male is the hardest worked member of the breeding-flock, and if the best results are to be obtained he must be given every care and attention during his growing period.

Old male birds, and even young cockerels, are likely to become infested with vermin if not given regular attention and facilities for dusting and cleaning themselves. Both young and old birds should be examined regularly for insects and given treatment if required.

Know Your Breed.

As mentioned in last month's notes, if the beginner is to make a success of breeding and selecting he must first of all know the requirements of the standard and have a definite model as a guide. The full test of the Leghorn standard was published with last month's notes.

The Leghorn cockerel shown in this issue is a good type of utility breeding-bird, and is a useful guide or model at which to aim. If this picture and those of the good breeding hen and pullet shown in last month's issue were placed where they would be often seen the beginner would soon get set in his mind the correct type and carriage to select or aim for.

Once he knows the requirement by a study of the text and the careful handling of his birds he should, with practice, be fairly capable of selecting the best birds in his flock. The great art of selecting is to be able to place the true value on the various visible characters, and to select those individuals with the minimum of faults or, in other words, to select the best-balanced birds.

Progeny Testing.

The only way to prove the true breeding-value of the individual bird is to test out its progeny. The poultry-keeper who single-pens or trap-nests at least a few of his best type of pullets each year and breeds his cockerels from those producing the best quality and number of eggs is more likely to be successful in breeding a high-quality class of stock.

It is true that many poultry-keepers are not in a position to test birds individually, and it is not suggested that it is necessary to test all pullets, but a few single pens are a very valuable asset on any plant. Those who are anxious to build up a reputation and are not in a position to test a few birds are recommended to enter a team of their best type of pullets in a local egg-laying test, where the birds and their eggs are judged three times during each test. If the best of these birds are used to breed cockerels to head future pens it will be found that the entering of a team in an egg-laying test is a good investment.

Vigour and Constitution.

Purity of blood must, of course, be maintained if a reputation for high-quality stock is to be made, and next to this it is essential to select for vigour and constitution. These characteristics are best detected by physical activity and an alert, commanding disposition.

Such birds usually have great courage. They crow loud and often and, in fact, some of the best birds will crow when handled. This shows confidence, which is a valuable characteristic. The nervous, highly strung, effeminate bird that squawks when handled is seldom of much use, and such birds should be culled.

Type and Body Size.

The standard allows thirty points for type and carriage, and this should indicate to the beginner the great importance that experienced breeders place on this characteristic. It is true that freak types sometimes put up great records, but the beginner should stick to the standard as a guide and not be carried away by egg records alone.

Other points being equal, by all means breed from the bird with the highest record or best pedigree, but if he shows any lack of vigour or weakness or is too small he should be rejected, no matter how good his other characteristics may be.

The Precocious Cockerel.

The inexperienced person is often inclined to select the early maturing precocious bird. This is a mistake, for it is not always the bird that is most pleasing in appearance at a very early age that makes the best breeder. Such birds usually develop their comb and internal organs before their frame has time to grow, and they often remain small. It is safer to retain those cockerels that are rather big or perhaps a little ungainly in the early stages, but vigorous. The best breeders are usually among those that develop their frames first and internal organs after.

The continual selection for a specific characteristic without due regard to other essentials is often opposed to constitutional vigour and at times tends to the production of other undesirable characteristics. For instance, the continual use of early maturing males will have a tendency to reduce the size of the offspring and will eventually affect the size of the eggs.

While the very early maturing birds should be avoided, it is well to remember that slow growth and bad feathering are indications of weakness. Those birds with long legs, thin necks and badly proportioned bodies should be culled, as also should those with very coarse, badly shaped combs. The best males show real character and courage, and the very outstanding bird seems to have a personality that attracts.

These good birds have good-sized, well-proportioned bodies, well-framed, strong masculine heads, not too coarse, yet not too refined. The eye is a very important point. It should be of the correct colour, large, full, prominent, and with a keen yet friendly expression. It is always wise to keep a few extra cockerels in case of accident, for some birds are likely to go off colour, and losses are often experienced from fighting.

If the home male birds are not up to standard it would be wise to purchase a good standard-bred bird and mate him with a few of the pick of the home hens for breeding cockerels for future use. Poultry-keepers intending to invest in some fresh cockerels would be well advised to order early so that a good selection may be made. The purchaser would also be wise to buy cockerels that have been reared on a good, free range.

—C. J. C. Cussen, Chief Poultry Instructor, Wellington.

Lucerne Hay Chaff for Poultry.

" ECONOMY " (METHVEN) :—

To-day wheat, pollard, and bran are expensive foods for poultry. I have some particularly good lucerne hay baled. Will you please advise me to what extent it might be used chaffed to mix with the morning mash for hens and for ducks.

Chief Poultry Instructor :—

I have used up to 20 per cent. of good lucerne chaff with morning mash for hens and ducks. Some poultry-keepers soak the chaff in water overnight, while others place the chaff in buckets and pour hot water over it and allow it to soak for half an hour before mixing with the mash. I prefer the latter method.

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N.Z. Federation of Young Farmers' Clubs.

Edited by S. Freeman, Dominion Organizing Secretary.

Two Further Lincoln College Scholarships Awarded to Y.F.C. Members.

ATTENTION was drawn in last month's issue to the selection from twenty applicants of G. O. Fallow, of the Thornbury Y.F.C., as the 1939 holder of the scholarship offered by the Lincoln College Old Students' Association.

The Selection Committee — Messrs. Alan Grant (Dominion President and Chairman of the Canterbury Council),

F. J. Dolamore.

A. C. Cameron (Chairman of the Otago-Southland Council), R. McGillivray (Fields Superintendent, Department of Agriculture, Christchurch), and J. M. Smith (Fields Superintendent, Department of Agriculture, Dunedin)—was so impressed with the applications received from Southland that it recommended that a special effort be made to secure further scholarships for Southland.

Following a deputation to the Southland Frozen Meat Co., Ltd., the company offered two further half-scholarships tenable at Lincoln College during 1939. A special Southland Selection Committee, set up by the Otago and Southland Council and consisting of Messrs. W. R. Harris (Chairman), Henry Smith, S. D. Blomfield, J. Carnegie - Gardner, W. Faithful, and A. Stuart, has selected Messrs. F. J. Dolamore, of the Woodlands Club, and J. F. Winter, of the Wyndham Club, as the holders of these two scholarships.

F. J. Dolamore is twenty-one years of age, and received his secondary education at the Southland Boys' High School, where he took an active interest in everything pertaining to the school life. The rector, Dr. Uttley, speaks very highly of his excellent record at the school and of his high moral character and reliability. Since leaving school he has worked on various farms at Elfin Bay (Lake Wakatipu), Owaka Valley, and Otara, Southland. During this time he has taken a correspondence course in book-keeping, and has interested himself in the activities of the district in which he has been working.

He was a moving spirit in the establishment of the Owaka Valley Club, and was for a year its secretary. He also represented the Clutha District Committee on the South Island Council. He was largely instrumental in forming the Woodlands Club, and was its first secretary. Splendid testimonials have been received from Mr. Dolamore's various employers testifying to his character and reliability.

James F. Winter is twenty-three years of age, and is secretary of the Wyndham Young Farmers' Club. Since leaving the Wyndham District High School he has had eight years' practical experience on his father's farm, which is one of the best of its kind in the Wyndham district. Although the Wyndham Club has not long been formed, Winter has shown himself to be one of its keenest members.

J. F. Winter.

He has taken a very active interest in various organizations in the Wyndham district, and is secretary of the Youth Workers' Organization, secretary of the Presbyterian Bible Class, and a member of the Miniature Rifle Club, the Anglers' Club, and the Agricultural and Pastoral Society. Various people of standing in the district testify to his character and industry.

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Interchange of Visits to Districts.

C. H. HAMBLYN, Fields Superintendent, Department of Agriculture, Palmerston North.

WHILE it must be admitted that an organized tour by parties of young farmers gives the members of such parties a very pleasant and instructive holiday it will also be admitted, I think, that the tour arranged to cover as much territory as possible in a relatively short time gives little opportunity to gain more than a passing knowledge of the farming and farm problems of the districts visited, and, further, gives no time for the making of other than brief contact with members of other clubs, and little chance for the making of permanent friends.

There is an alternative to the tour which, it is suggested, has many advantages, including less organization and a lower cost to club members, and which is capable of catering for a much greater proportion of club members each year and is likely to give more lasting and useful results to those taking part.

Personal Visits.

What I have in mind is the possibility of arranging for parties of club members from one district to visit for a week or so the club members of another district as their personal guests—in other words, an interchange of visits where the club members from one district are invited to visit and stay with members of the clubs in another district and, wherever possible, for such visits to be reciprocated. The visiting club member would naturally get out and about on the particular farm on which he was staying, would see and discuss the current farm-work, and would no doubt lend a hand as occasion required, and the evening's discussion of farms and farming in the quiet of the host's home would be a feature.

During the visit special gatherings of visitors and local club members could readily be arranged, such as field-days on selected farms, demonstrations of live-stock and farm operations, and evening meetings, debates, socials, dances, and smoke concerts.

If it were felt that eight to ten days on one farm or in one locality in a large district was too long for the visitors, arrangements could easily be made for a change-over to some other farm or locality during the stay. The organization of such interchange of visits would be simple and the cost low.

The general principle of dairy-farmers visiting dairy-farmers and sheep-farmers visiting sheep-farmers would probably be accepted as sound. Clubs in sheep-farming districts would thus send invitations to clubs in other districts mainly devoted to sheep-farming, and where the farming is mixed arrangements would be made for the visitors to be guests on the particular type of farm in which they are most interested.

General Procedure.

The procedure would be somewhat on the following lines: A District Committee, say Manawatu, would send an invitation to another District Committee, say Southland, for a stated number (forty to fifty) of Young Farmers' Club members to visit their district as guests for seven to ten days, arriving on a specified date. The Southland Committee would accept the invitation on behalf of the clubs, and would arrange for the selection of the club members wishing to make the visit, probably by inviting the clubs to nominate so many members per club to make up the number required.

The party would travel to Palmerston North, and would there be met by their individual hosts, the Manawatu clubs having been asked to take care of so many guests each, according to the number of clubs in the district and the number invited. The boys would be taken home as visitors and treated as such during their stay. The District Committee would arrange for any special district functions to entertain their visitors during their stay.

It is considered that such an interchange of visits would give opportunities for young farmers in one district to gain a much more thorough and complete knowledge of the conditions, methods, and problems of farming in other districts visited. The making of good and lasting friendships with the members of the families visited and other people in the district would also be possible.

Cost to Members.

The cost to members would be the fare to and from the district visited and pocket-money. The cost to the clubs and districts would be confined to special entertainment functions, which would be made to pay for themselves. The organization would be much easier than that for a tour.

It is certain that the people most concerned with such arrangements, the mothers and fathers of the members acting as hosts, would welcome the young farmer visitors as friends of their sons, thus paving the way for lasting friendships among the younger farmers throughout New Zealand.

There is, of course, no reason to confine the interchange of such visits as between districts, as clubs and groups of clubs in neighbouring districts could readily arrange for members to interchange visits.

The interchange of visits on the lines suggested is put forward here for consideration by club members and for criticism. It is felt that it requires only one or two districts to make a start with this method of broadening the knowledge and interests of club members for the scheme to be taken on and extended to all the clubs in the Dominion.

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"Parents' and Friends' Evening."

WHAT is believed to be the first "Parents' and Friends' Evening" was held in the Manawatu district recently. Describing the social, Mr. H. J. Lancaster, Advisory President of the Rongotea Y.F.C., and Chairman of the Manawatu District Committee, writes:—

"Some months ago I suggested to the Rongotea Club that we hold a 'Parents' and Friends' Evening' in July, but because of my illness they postponed it until Monday, 7th November.

"A debate was held on which was the better dairy cow for New Zealand, Friesian or Jersey. Mr. Elliott adjudicated.

"My objective was to bring the parents into the movement on that occasion so that they could see what the movement accomplishes. After the debate I explained the objective of the 'Parents' Evening,' and asked them whether they considered it should be an annual social. They were very emphatic that it should, indicating that they considered it an excellent way of bringing them more into the movement."

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Taumarunui Club's Field Day.

J. M. HOPKINS, District Secretary, Taumarunui.

THE Taumarunui Club held its first field-day on Saturday, 21st January, when members visited and were shown over the Native land-development scheme at Taumarunui. The administrative centre for this project is at Ngapuke, in the Pungapunga Valley, through which runs the new Taumarunui–Tokaanu Road.

Because of the wet weather experienced during the previous weeks some members were unable to attend, being busy with hay crops. However, those who did considered the trip was worth while, and an interesting and instructive day was spent.

Members travelled in their own cars to Ngapuke, where Mr. A. G. Ferris, the Supervisor, and the Overseer were met. Before setting out on a tour of the scheme Mr. Ferris explained what had been accomplished in the development so far, and outlined future developments and the method of bringing each particular type of country into production.

Very little flat land exists on the whole area, and most of the country is in cut-over bush. Some small areas of manuka scrub do exist, and these are confined to pumice flats and terraces along the Pungapunga Stream and the Wanganui River. The total area of Native land in this particular locality is 21,000 acres, and no doubt all this land will be brought into production in time.

Pastures Improved.

Some of the flats and terraces of manuka scrub have been sown in pasture after felling and burning the scrub, or they have been sown in swede crops after the first ploughing. Along the lower portion of the Pungapunga Stream some of the country was in worn-out pasture, with much blackberry and ragwort infestation. With top-dressing, oversowing, and stocking with sheep and cattle after cutting and burning the blackberry and ragwort, these pastures have been improved considerably and are at present showing quite an appreciable amount of white clover and rye-grass.

The amount of top-dressing done so far is small, but this autumn a fairly extensive programme is planned. All the land at present in pasture on the settlement is stocked with sheep and cattle, and a considerable number of goats are kept to control the blackberry growth. An additional five hundred goats were purchased recently and are doing good work in keeping down this troublesome weed.

During the tour of the settlement stops were made at points of interest and the particular phase of work in the development explained by the Supervisor or the Overseer. Several pastures of both temporary and permanent natures were inspected, and general discussions took place as to the merits of the different grasses and clovers and the methods of establishment and general maintenance.

Field of Swedes.

Finally, a 70 acre field of swedes was inspected on the Wanganui River side of the scheme. This block is to be made into a single unit as a dairy-farm. As the breaks of swedes become fed off the permanent fences will be erected, the eaten-out areas disked and harrowed and worked into a suitable seed-bed, and permanent pasture sown.

While on this block an opportunity was taken to inspect the Kaitieke Dairy Co.'s pig layout in the adjourning field, where an electric fence is used to confine the pigs. At the time of the visit the power for this unit was shut off, but the pigs were making no attempt to go near the fence.

Mr. Ferris and his assistant were thanked for the interesting tour of the settlement and for the efficient manner in which they had explained the different work in progress. It is to be hoped at some future date, when development is more advanced, that a further field-day will be held on the settlement.

Y.F.C. Activities in Kaitaia District.

MEMBERS of the Northern Young Farmers' Clubs and Pig Clubs visited the freezing-works on 11th November, when the staff showed approximately fifty visitors through the works. Some of the members had sent a number of their pigs through and were able to see them killed and graded.

Mr. H. Kneebone, the Government Grader, explained the method of grading and showed how grading was done by chart; the back had to be a certain thickness at the shoulder and the loin, according to the weight and length of the pig.

The Government Inspector showed examples of diseases in pigs, and explained how they are caused.

An interesting field-day was held by the Kaitaia Young Farmers' Club and friends at Mr. Sutton's farm on 26th November. Mr. J. Donnelly demonstrated and explained in detail the erection and the working of an electric fence. Plain or barbed wire could be used, barbed wire being the most effective, he said. An animal could rub lightly against a plain wire and get little or no shock if its hair were dry. In the case of barbed wire, the barbs penetrated the hair and the shock was more intense.

The current passed through the wire intermittently, and there was no discharge of the battery until something came in contact with the wire. The strength of the current varied according to soil conditions and the size of the animal, the shock being greater when the grass and the ground were wet. A large animal, such as the horse, was more sensitive to a shock than a smaller animal. The horse, being a heavy animal, made a better earth contact than other lighter animals.

Mr. Donnelly also explained why animals are subjected to a greater shock than human beings. An animal had four earthing points, he said, and usually touched the wire with its nose, which was generally wet.

The pigs on the farm showed their respect for the fence; they could not be coaxed with food or driven under the wires.

Stock-judging Competitions at Feilding Show.

G. S. ROBINSON, District Secretary, Manawatu.

THE first stock-judging competition held by the Manawatu Young Farmers' Clubs District Committee since the national competition took place in November, 1937, was staged at the Feilding Agricultural and Pastoral Association's Show on 1st February. Classes were provided for judging in sheep, dairy cattle, and pigs, and the following were the results :—

Romney Ram Judging.

(Judge, Mr. A. L. Wheeler, Marton.)

(*a*) *Individual Competition.*—J. D. Colquhoun, Feilding Y.F.C., 1 ; G. Mitchell, Kairanga Y.F.C., 2 ; P. Thevenard, Kimbolton Y.F.C., 3 ; J. Gibbons, Rongotea Y.F.C., 4 ; A. Cowan, Apiti Y.F.C., 5.

(*b*) *Teams Competition.* — Apiti Y.F.C., 1 ; Kimbolton Y.F.C., 2 ; Levin Y.F.C., 3.

Baconer Pig Judging.

(Judge, Mr. E. P. Neilsen, Palmerston North.)

(*a*) *Individual Competition.* — L. E. Hansen, Feilding Y.F.C., 1 ; M. Lind, Rongotea Y.F.C., 2 ; A. Cowan, Apiti Y.F.C., 3 ; A. Petersen, Feilding Y.F.C., 4.

(*b*) *Teams Competition.* — Feilding Y.F.C., 1 ; Rongotea Y.F.C., 2 ; Colyton Y.F.C., 3.

Dairy Cattle Judging.

(Judge, Mr. J. Mitchell, Woodville.)

(*a*) *Individual Competition.* — V. C. Lewis, Levin Y.F.C., 1 ; G. Mitchell, Kairanga Y.F.C., 2 ; P. Thevenard, Kimbolton Y.F.C., 3 ; A. Mikkelsen, Kairanga Y.F.C., 4 ; J. D. Colquhoun, Feilding Y.F.C., 5.

(*b*) *Teams Competition.* — Feilding Y.F.C., 1 ; Kairanga Y.F.C., 2 ; Levin Y.F.C., 3.

The competitions drew an entry of more than one hundred, representatives being present from the majority of the twenty-one clubs in the Manawatu district. Following the judging of the competitions, excellent demonstrations were given on the animals by the judges, Messrs. A. L. Wheeler, J. Mitchell, and E. P. Neilsen. Competitors were thus able to see where they had made mistakes and how they could improve their judging in future contests.

The winners of these competitions will be invited to take part in the combined district competitions at Masterton during April, where they will have the opportunity of being selected for a New Zealand championship contest.

The committee responsible for the organizing of the Manawatu Competitions was as follows : Mr. P. Thevenard (chairman), Messrs. H. J. Lancaster, D. Rowland, F. E. Sherwood, J. H. Mason, K. Ferguson, J. B. Chrystall, C. G. Dobson, and G. S. Robinson (secretary).

Results of Y.F.C. Classes at Shows.

A SUCCESSFUL innovation was staged at the Dannevirke Agricultural and Pastoral Association's annual show on 7th and 8th February, three special classes being scheduled for entries exhibited by Y.F.C. members. The prizes were : First, £1 ; second, 15s. ; and third, 10s. The Dannevirke Y.F.C. donated 10s. 6d. special prize in each of the classes, the Co-operative Wholesale Society, Ltd., gave a special trophy valued at £2 2s. for the best pen of three fat lambs suitable for export, and Messrs. Abraham and Williams, Ltd., donated a special prize of £1 1s. in the bacon pig class.

The following were the results :—

Ewe Hoggets.

Pen of two ewes in natural condition, suitable for breeding, under twenty-one months : G. N. Buchanan (Waitahora), 1 ; H. F. Ferguson (Mangahei), 2 ; D. Simmons (Mangatoro), 3 ; J. Harvey (Waitahoro), V.H.C. There were fifteen entries in this class.

Fat Lambs.

Pen of three fat lambs suitable for export, under 42 lb. : D. MacDonald (Dannevirke), 1 ; D. MacDonald (Dannevirke), 2 ; D. Simmons (Mangatoro), 3 ; Rob Grigg (Tiratu), V.H.C. There were thirteen entries in this class.

Bacon Pig.

J. C. Kilgour (Norsewood), 1 ; J. C. Kilgour (Norsewood), 2 ; David V. Kells (Norsewood), 3 ; P. Taylor (Norsewood), V.H.C. There were eight entries in this class.

In the ewe hogget class the judge's remarks on the pen placed first (G. N. Buchanan's) were : " Nice even ewes, showing fine breed characteristics."

The Dannevirke Y.F.C. is to be congratulated on its initiative and enterprise in carrying out this undertaking so successfully. Thanks are also due to the Dannevirke Agricultural and Pastoral Association for its co-operation in scheduling the classes.

Classes at Masterton.

Fat Lamb Judging Competition.

J. West, Masterton Y.F.C., 1 ; A. P. Southey, jun., Masterton Y.F.C., 2 ; H. McKenzie, Carterton Y.F.C., 3.

Romney Sheep Judging Competition.

D. McLachlan, Masterton Y.F.C., 1 ; G. Buick, Masterton Y.F.C., 2 ; J. West, Masterton Y.F.C., 3.

Fleece Competition.

(In conjunction with the Farmers' Union, but separate prizes for Y.F.C. members.)

(*a*) *Fine Crossbred Class.*—D. C. Ross, Carterton Y.F.C., 1 ; G. Blatchford, Masterton Y.F.C., 2 ; H. Bannister, Masterton Y.F.C., 3.

(*b*) *Medium Crossbred Class.* — G. Blatchford, Masterton Y.F.C., 1 ; D. McGregor, Masterton Y.F.C., 2 ; H. Bannister, Masterton Y.F.C., 3.

D. C. Ross also entered the champion fleece, and thereby won the Alfred Matthews Memorial Cup competed for by both Young Farmers' Clubs and Farmers' Union members.

Among the Clubs: Reports on Activities.

IN order to make room for other matters of interest to Y.F.C. members it has been decided to publish the full list of clubs with the names and addresses of secretaries quarterly in future instead of monthly.

Because of seasonal activities throughout the Dominion, more particularly in the South Island, a number of clubs have been in recess and in consequence have held no meetings recently, so that only a comparatively small number of reports are to hand. Club secretaries are urged to forward reports through the usual channels as soon as possible after each meeting.

Western Southland.

Wyndham.—Discussion on Physical Fitness Week. Election of new Secretary. Report on Invercargill District Committee meeting. Lecture by Mr. Dunbar entitled "A Few Points in Banking." Farewell to J. F. Winter, late Club Secretary, who has obtained a Y.F.C. scholarship to Lincoln College.

Wairarapa.

Ballance.—Arrangements for judging competitions and fat-lamb entries at Pahiatua Show. Address by Mr. S. T. Tinney, Pahiatua, on "Farm Law." The speaker dealt fully with the procedure in buying, leasing, and selling a property, and also with mortgages, bank overdrafts, &c.

Carterton.—Decided to take part in the parade during the local Physical Fitness Week and to enter a team of eight in the tug-o-war. Nominations were accepted for the provincial stock-judging competitions. Lecture by Mr. E. P. Neilsen, Supervisor, Wellington Pig Council, on "Pigs and Pig Farming."

Eketahuna.—Business meeting. Discussion *re* activities, &c.

Masterton.—Discussion *re* Physical Fitness Week; members to take part in procession, &c. Arrangements for the provincial stock-judging competitions in April. Lantern lecture by Mr. L. J. Dumbleton, Entomologist, Department of Scientific and Industrial Research, Nelson, on "Parasitic Control of Insect Pests."

Manawatu.

Apiti.—Election of stewards for Apiti Y.F.C. Show; decided to conduct a stock-judging competition in conjunction with the show. Address by Mr. G. S. Robinson, District Secretary, on the Physical Fitness Week and the part to be taken by the Y.F.C. in the Pageant of Youth to be held at Palmerston North.

Colyton.—Discussion on National Fitness Campaign; club to hold a sports meeting to select teams to take part in district events. Club "membership drive" to be undertaken. Mr. H. de O. Chamberlain, Department of Agriculture, addressed members on "The Physical Fitness Campaign."

Feilding.—Business meeting. Arrangements for impromptu speeches, and also for club dance.

Fitzherbert.—Discussions on physical fitness campaign. Mr. G. S. Robinson, Department of Agriculture, spoke on the Physical Fitness Week and the local and district activities in connection with it. Three motion pictures were exhibited.

Kairanga.—Arrangements for club social. Mr. G. S. Robinson, Department of Agriculture, outlined the activities being undertaken in connection with the Physical Fitness Week. An address was given by Mr. R. Struthers on "The Farmer and the Law." The address created great interest, and keen discussion followed.

Levin.—Selection of team for stock-judging competition at Shannon. Talkie films dealing with agricultural subjects were exhibited by Mr. H. de O. Chamberlain, Department of Agriculture.

Oroua Downs.—Challenge Cup donated to sports club for Y.F.C. relay race. Arrangements for visit to Foxton wool-pack factory, and a cricket match with Rongotea Club.

Shannon.—Business meeting. Decided to support the Linton sports-day. Four teams selected for stock-judging at Shannon sports, as follows: (*a*) A. J. Smith, C. Watson, G. Third; (*b*) N. Guerin, A. Cooper, D. Campbell; (*c*) M. Lange, W. Jagger, I. Falconer; (*d*) J. Allerby, D. Aitcheson, J. Bowler.

Pohangina Valley.—Address by Mr. H. de O. Chamberlain, Department of Agriculture, on the Physical Fitness Week.

A group taken at the Nuhaka Club's field-day on Mr. T. W. G. Tombleson's property which is described in the club notes. Visiting Wairoa Club members are in the group.

Rongotea.—Talkie films on agricultural subjects exhibited by Mr. G. S. Robinson, Department of Agriculture.

Whakarongo.—Discussion *re* district picnics and other activities connected with Physical Fitness Week. Lecture by Mr. H. de O. Chamberlain, Department of Agriculture, on "Manures." Mr. Chamberlain also addressed the meeting on the Physical Fitness Week.

Woodville.—Report on dance. Discussion *re* Physical Fitness Week. Mr. G. S. Robinson, District Secretary, gave an outline of the district activities connected with the physical fitness campaign. It was decided to enter teams in all sections, and also to send a team to Shannon to take part in the stock-judging competition.

Wanganui.

Marton.—Arrangements finalized for the stock-judging competition at Marton A. and P. Show. Address by Mr. Isaac Andrew, of Marton, on "Judging Sheep." During the month an inter-club debate was held with the Hunterville Club, the subject being "That Farming To-day is more Difficult than it was Fifty Years Ago." The Marton team was awarded the decision by a very small margin.

South Taranaki.

Hawera.—Club debate, the subject being "That Horses are Superior to Tractors for any Class of Haulage." The speakers were as follow—Affirmative: S. Johnston (leader), G. Ogle, D. Gray, I. Dunlop. Negative: J. Johnson, G. Kavanagh, D. Badcock, A. Johnson. Mr. P. O. Veale acted as judge, and gave the decision to the team supporting the negative. Points awarded were: Negative, 321; affirmative, 293. J. Johnson was adjudged the best individual speaker.

Pukengahu.—Cricket match to be held with the Eltham Club. Arrangements for a presentation to a member who was recently married. Address by Mr. C. A. Wilkinson, M.P., on his trip to England at the time of the Coronation, May, 1937. The speaker described his tour from the time he left Auckland on the "Awatea." At Sydney he boarded a Dutch steamer for Singapore, where he inspected the defences, &c. He arrived in England, and saw the actual coronation in Westminster Abbey. After attending several Court functions he left England to tour Holland, Germany, Czechoslovakia, and France. Mr. Wilkinson gave interesting descriptions of all the places he visited, and also touched upon their main industries. Practically every club member attended this meeting, and about forty visitors, being members of the Farmers' Union and Women's Division, were also present at the lecture.

Whakamara.—An illustrated talk on "Liver Fluke in Sheep" and the "Hydated Tape-worm" was given by the club Secretary, I. Buckerell.

North Taranaki.

Inglewood.—Field-day at Inglewood. An attendance of more than two hundred and fifty was recorded, including farmers and others interested. Opening speeches were made by the Mayor, and the President of the Inglewood Jersey Cattle Club. Demonstrations were given by Mr. Sorenson on "Castrating" and "Types of Baconers." Other demonstrations were given on horses and cattle.

Karaeaka.—Final arrangements for a field-day. Teams selected to represent the club in the Y.F.C. stock-judging competitions at the Taranaki A. and P. Show at New Plymouth. Address by Mr. R. B. Wood, M.R.C.V.S., on the "Live-stock Embargo." The speaker also touched briefly on hydatids, stressing the necessity for every care being taken to carry out the recent regulations in connection with the campaign to eradicate hydatid disease.

Mangamahoe.—Report of District Executive meeting at New Plymouth. Lecture by Mr. A. G. Elliott, Department of Agriculture, on "Diseases and Grubs in Crops and Pastures." Mr. Elliott also spoke on "Pasture Management."

Okau-Tongaporutu.—Report on club dance; profit shown of £6 10s. Decided to enter four teams in the Y.F.C. stock-judging competition at the New Plymouth A. and P. Show. Address by the club Secretary, Owen Collins, on "Rotorua and Surrounding Districts."

Urenui.—Discussion on forthcoming district tour. Four teams selected for the cow and pig judging at the New Plymouth A. and P. Show. The District Secretary, Mr. G. A. Blake, Department of Agriculture, outlined the arrangements for the district tour, and also spoke of the various judging contests to be held at the show. Mr. A. G. Elliott, Department of Agriculture, also spoke concerning the tour, giving members some idea of what they would see at various points throughout the trip.

Southern Hawke's Bay.

Norsewood.—Business meeting. Arrangements finalized for entries in the bacon-pig class at the Dannevirke A. and P. Show.

Takapau.—Discussion on the suggestion of the Advisory President that Y.F.C. members should be encouraged to take a greater interest in the Territorials. Lecture by Mr. A. C. Morton, of Massey College on "The Points of a Ram."

Northern Hawke's Bay.

Nuhaka.—Paper read by C. Clayton (club member) on "Treating Dogs for Influenza." Address by Mr. M. R. Shaw on his recent trip to Australia. A field-day was held at Mr. T. W. G. Tombleson's homestead, Tahanui, and took the form of a Romney sheep judging contest for a cup presented by Mr. Tombleson. This was won by R. Powdrell (Wairoa Y.F.C.), W. Brownlie (Wairoa Y.F.C.) being second, and A. Jane (Nuhaka Y.F.C.) third. Three members of the Wairoa Club were present at the gathering.

Wairoa.—Business meeting. Discussion on following: Physical Fitness Week—Mercantile firms to be challenged to a cricket match; Meeanee Y.F.C. sports meeting; debating team for Ruakura; Rugby football match *v.* Manawatu; Hastings Educational Week.

Poverty Bay.

Gisborne.—Address by Mr. S. R. Philips on his recent trip abroad. Visiting members from the Tolaga Bay Y.F.C. gave talks as follows: M. Robinson, "The Management of a Model Pig Farm," and J. O'Connell, "The Preparation for an Adequate Water-supply." At previously unreported meetings Mr. K. Kilby, of the Smithfield meat-market, gave an address on "Smithfield and the New Zealand Meat Trade," and Mr. La Marr, engineer in charge of boring operations at Totangi, gave an interesting talk on "Oil Boring."

Te Karaka.—Short talks by club members as follows: "Dairying in South Africa" (J. Bayley); "Subterranean Clover" (E. Newton); "Drinking-water for Dairy Stock" (J. McKenzie); "Blow-flies" (J. Dymock); "Experiments in Pollinating Corn" (R. Bright); "Ruakura Farm" (E. Tattersfield); "A Model Piggery in England" (A. Bayley); "Fencing" (A. D. N. Manuel); "The Apiary" (A. Maclean).

Taumarunui.

Taumarunui.—Final arrangements for visit to Ohura A.P.H. and T. Association. Mr. C. Walker, Department of Agriculture, exhibited talkie films on subjects of agricultural interest, including "Worm Infestation of Pigs."

Eastern Bay of Plenty.

Edgecumbe.—Business meeting. Selection of a debating team; discussion on radio talks, the projected district tour, and the stock-judging competitions at the Whakatane A. and P. Show.

Opotiki.—Discussion *re* stock-judging competitions, and report of the District Committee meeting. A five-minute talk was given by each club member present on "How to Improve the Club."

Taneatua.—Business meeting. Subjects selected for debating contests. Suggested that members should attain a combined field-day to be held at Waimana, at which teams for stock-judging competitions (dairy cow and baconer pig) would be selected to represent the Eastern Bay of Plenty against teams from Rotorua and Western Bay of Plenty.

Western Bay of Plenty.

Katikati.—Dance to be held on show night. A short talk was given by the club Secretary (R. Walford) on the Y.F.C. rally held in Tauranga on 11th February. Following this, all members present made impromptu speeches, that given by L. Court being voted the best. The Advisory President, Mr. H. Capamagian, gave a realistic account of his experiences in the riot that occurred in Auckland in 1932.

Omokoroa.—Arrangements for cricket practice in order to select a team. Mr. A. Greig, Orchard Instructor, Department of Agriculture, gave a lecture on "The Home Orchard."

Paengaroa.—Decided to make a donation of £2 towards the prize-money in the Y.F.C. dairy cow-judging competitions to be held at the Te Puke A. and P. Show. The following were selected to act as junior judges for the various stock sections at the show: L. Ashe (draught horses); A. Walter (Shorthorn cattle); E. Pinker (Friesian cattle); G. Mortensen (Red Poll cattle); W. Conway (sheep); D. W. Gulliver (pigs). It was decided to hold a picnic sports meeting in March, the committee to bring down a programme for the next meeting. Interesting lecture by Mr. A. E. Spratt (advisory member) on "Fat-lamb Raising."

Waihi.—Arrangements for visit to Te Aroha Dairy Co. A talk on "Debating" was given by Mr. Smith, Headmaster, Waihi District High School, followed by general discussion.

Rotorua.

Horohoro.—Discussion of proposed tour of the land-development scheme at Ruatoki, Te Kaka, Tikitiki, and Mohaka. The following took part in the discussion: C. C. Hingston, W. Corby, J. Gordon, and Mr. C. S. Dalgleish, District Secretary. A field-day was held, taking the form of a lecture and demonstration by Mr. A. M. W. Greig, Orchard Instructor, Department of Agriculture, on the "Treatment of Soil; How to Plant; Suitable Trees to Plant; Pests, Diseases, Sprays, Pruning, and Manuring."

Waikato.

Huntly West.—Business meeting. Discussion *re* finance. Teams selected for forthcoming debate. Decided to purchase a table-tennis set.

Kakepuku.—Arrangements for a visit to Horotiu freezing-works, and for an inter-club cricket match *v.* Otorohanga Y.F.C. Selection of assistant stewards for the various sections at the Te Awamutu A. and P. Show; twelve appointed. The Advisory President, Mr. W. G. Neill, gave an interesting address on "Methods of Controlling Mammitis, using the Brown Thymol and Bacteria Test." The visit to Horotiu took place on 14th February, the party being shown through the freezing-works by the manager, Mr. Souter, who afterwards gave an instructive talk on the prevention and cure of diseases prevalent in pigs. The chief grader exhibited some pig carcasses, explaining the system of grading, and showing the type of carcass desirable for the present market. The New Zealand Dairy Co.'s casein, tin, and box factories at Frankton were then visited. The party numbered twenty-seven.

Te Kowhai.—Business meeting. Minutes of Auckland Council meeting read and discussed. Arrangements for lectures for next meeting, &c.

Auckland.

Mangatawhiri.—Arrangements for a visit to a wool-store at Newmarket. Report by A. E. Webb (delegate) on the Auckland Council meeting held at Ruakura. Mr. C. Walker, Department of Agriculture, exhibited two talkie films on "Farming Methods in Other Countries," and two silent films dealing with "Worm Infestation in Pigs."

Dargaville.

Marohemo.—Mr. E. H. Arnold, District Secretary, outlined a proposed winter tour of Hauraki Plains, Waikato, and Bay of Plenty. Mr. Arnold also gave a lecture, with the aid of diagram, on "The Principles underlying the Breeding of Live-stock and Plants."

Kaitaia.

Kaitaia.—Mr. H. M. Thomson, a delegate from the Mangonui A. and P. Association, gave an outline of the National bacon-pig championship; a class for pigs entering this championship to be reserved at the Mangonui A. and P. Show. A bacon-pig judging competition for Y.F.C. members also scheduled at the show. Several members were appointed as stewards to take charge of various classes in the show. An interesting talk on "Bloat in Cattle" was given by Mr. G. Bell, and Mr. H. M. Thompson enlarged on the subject. Mr. E. Moss, Department of Agriculture, spoke on strain trails of grasses and clovers and the manurial experiments carried out on all different soil types in the district, and was asked numerous questions pertaining to lime and fertilizers, members generally taking part freely in the discussion. Mr. Moss, who is leaving the district, was the recipient of a travelling shaving outfit, which was presented by the Chairman on behalf of the club. The Advisory President, Mr. E. W. Hansen, expressed the regret felt by all members at losing Mr. Moss's valuable services. Mr. Thompson endorsed Mr. Hansen's remarks.

Ororu.—Letter to be forwarded to the District Secretary, Mr. E. Moss, Department of Agriculture, Kaitaia, expressing appreciation for all that he has done for the Ororu Club and for the Y.F.C. movement in the Northland. Club debate, the subject being "The Wholesale Development of Land *v.* Development as Funds Permit." The speakers were G. P. Adamson and W. R. Forsyth (wholesale development); R. Maria and O. F. Packard (development as funds permit). The decision was given in favour of the latter. The previous meeting was devoted entirely to business matters, including a decision that the club should pay the expenses of delegates to district meeting, the rate to be fixed at 3d. per mile.

Umawera.—Discussion on "Seasonal Work for the Month." Vote of thanks passed to Mr. E. Moss, Department of Agriculture, for his work as District Secretary. Address by Mr. McKenzie, of Broadwood, on "The Care of Horses." The speaker dealt with his subject under six headings—handling, care, feeding, watering, covering, and breaking in.

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Health Notes for the Farm.

Contributed by the Department of Health.

Good Posture Leads to Good Health.

Health counts for far more than wealth; disease, or physical weakness, lowers the spirits and undermines the temper. The greatest blessing we can confer upon the community is to save them from the disabilities that bear down the man or woman whose body is a constant source of suffering or discomfort. —NEVILLE CHAMBERLAIN.

In walking no man in the world has the upright poise and even springy step of the Australian Blacks. No white man can compare with him; his graceful movements of body and limb and panther-like step are all his own.—"A Drover's Odyssey," by GEORGE MCIVER.

THROUGHOUT the world to-day the desire to protect and to salvage human life generally has led to a fixing of our attention on the child as never before. This is of supreme importance for the healthy welfare of our race. Just as we recognize that early care is necessary for plant-life, so do we find that for the child no perfect maturity can be reached if nature is not assisted in every possible way. Thus, we learn how important it is to lay the foundation for good posture in the early years of life.

Posture, or the position of the body, is the way the bony framework is held while sitting, standing, or lying. The organs of the body are arranged within this bony framework, so that if the posture is not correct these organs will sag or be squeezed out of their right positions, and will not do their work properly. Young bones are like the young branches of a tree, being more easily bent than older ones. This is because they contain more cartilage or gristle to make them elastic. It is obvious, therefore, that to be perfect the body must be trained while it is young and flexible.

The child who sits or stands wrongly is like a tree that is bent into the wrong position as a sapling; both will grow up crooked for life unless straightened in youth. Carriage is an asset in life, indicating physical energy and well-being. Good posture is of importance to men and women alike from babyhood to old age.

The groundwork for good posture habits should begin in infancy and childhood. The aim should be to prepare the human machine for the stress and strain of modern life. The child with correct postural habits, other things being equal, will have the best and most healthful carriage in adult life and all that goes with it. Good posture should receive as much attention in the home as teaching the child music, art, or other accomplishments. The habit can be most readily formed in children, just as table manners are taught in childhood.

The Infant.

Now let us consider the infant. For his first year he is helpless, like a young animal progressing on all fours. At the end of his first year the instinct to stand erect asserts itself; the creeping child obeys the impulse and makes awkward efforts to acquire a new attitude and a new means of progression. When he finally succeeds in standing erect some adjustment of his bodily framework and of his muscular system has taken place.

It is because of the exaggeration or imperfect development of the three main curves of the spine that characteristic deformities associated with faulty posture become evident. If a baby is made to sit up, stand, or walk before its muscle movements have been gradually learnt there is a danger of producing deformity. As a general principle, no muscle should be constantly exercised far in advance of its natural time of development.

Dr. John Gibbens states in his valuable booklet "Posture and Exercise for Children" that "all muscular movements should be learnt by small beginnings with a gradual increase in their range and power, just as an athlete learns to run slowly before he can sprint. . . . The following exercise is very good for the baby's legs. Lie him on his back and, holding his feet in your two hands, push his legs up and down as you would pedal a bicycle. The baby will enjoy this and kick out vigorously. The earlier a baby is laid on his tummy the quicker he will learn to crawl. Crawling is a fine exercise."

Good Posture.

In good posture the head is carried erect, not backward or forward; the shoulders are square, not round; the chest is up and out, and not flat; the abdomen is drawn in, and does not protrude; the back curve is slight and not exaggerated, and the legs are straight.

Correct posture in the standing position will soon develop correct posture in walking, working, sitting, or lifting, making it possible to do these things with the least amount of effort, certainly without a waste of energy.

Bad Posture.

In bad posture the head is allowed to drop forward; the chin is dropped; the chest is flat and sunken; the upper trunk has swayed backward and the lower trunk has sagged forward; the back curves are exaggerated; with the sinking of the chest the abdomen drops, is relaxed, and protrudes; the knees are sometimes bent forward, sometimes sprung backwards.

There is unquestionably a relationship between good posture and good health, and bad posture and poor health. Poor posture found among our youth results in a complete or partial exhaustion of

important muscles from continual sagging. Many conditions, such as constipation, backache, chest pain, &c., may be due to bad posture. Some conditions often considered vague as to their causation, such as nervousness, insomnia, general disability, and nervous mental irritability, have been relieved by correcting posture.

There are some children who suffer from definite curvature of the spine, and in these cases medical advice should be sought. The discovery of such deformities should not be left to chance. Children's backs should be examined occasionally to see if any suspicious signs are present. An early recognition of spinal curvature and subsequent immediate treatment is most essential to their cure. Moreover, the old proverb that "prevention is better than cure" holds good here if it does so anywhere.

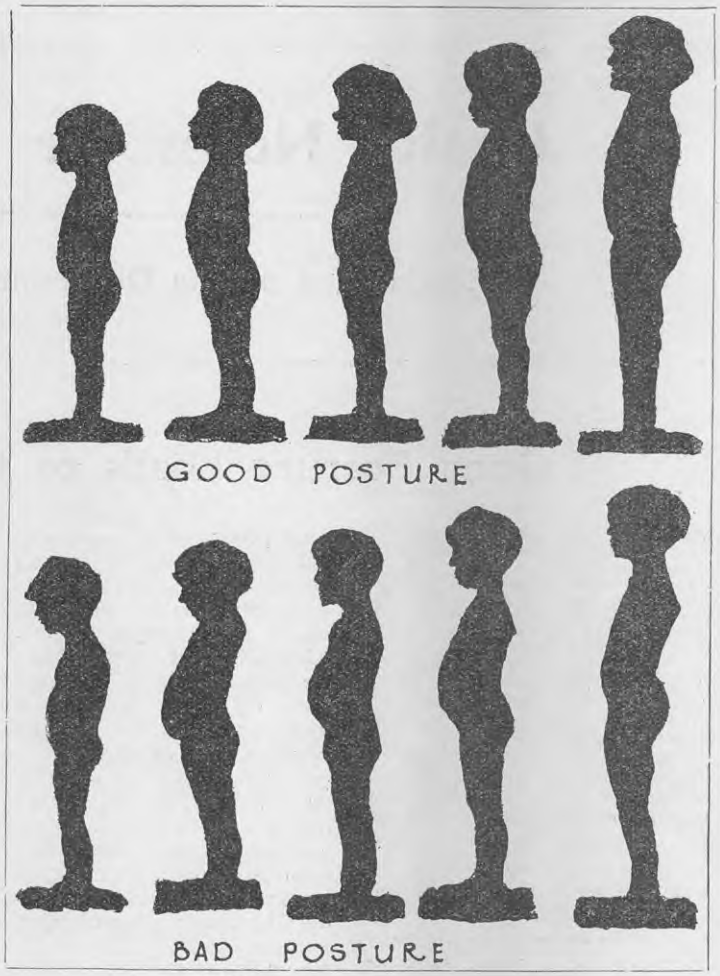
How to Obtain Good Posture.

As indicated, the groundwork for good posture must be laid in infancy and childhood. The working-capacity of the body and its length of life are increased by care and by the elimination of unnecessary strain. People recognize this with their motor-cars; and horse-breeders are most careful not to load a colt's back unduly until its bones are set. We should take similar precautions with our children.

As regards the child, no school life should ever result in the loss of a good carriage. One of the most striking features of modern educational methods is the stress which is laid on necessity for freedom for the growing child, and the curriculum is so designed that an increasing amount of activity is permitted. The aim of physical exercises in school is for a full harmonious development of the various parts and organs of the body according to their natural purposes and powers.

However, in addition to ensuring good posture, none of those things which are fundamentally essential to bodily health should be neglected. The life should be so ordered as to permit of good, simple food, adequate rest, appropriate exercises, sunlight, and fresh air. A contributory factor in poor physical development is the use of incorrect clothing and footwear.

Children's clothing should be so cut that the weight falls on the root of the neck at the back and the inner part of the shoulders. It should be light but sufficiently warm, and there should be no constriction of the body. No man engaged in strenuous exercise, a gymnast for instance, would think of wearing anything to restrict the movement of the chest. Shoes which are too tight or too short, or which have heels so high as to prevent correct bodily balance, are harmful.



Self-training.

An important essential in learning good posture is to seek and sense it in your own body. Standing before a full-length mirror, visualize your body with a straight line passing the ear, the middle of the shoulder, hip, knee, and ankle joint. The position will be natural and an easy one to maintain. It is mainly a matter of self-training. Simple reminders of good posture to keep in mind are to "stand tall and sit tall."

A very simple yet an easy method of developing good postural habit has been recommended. This consists specifically in consciously drawing in the upper abdomen at all times, whether standing, walking, or sitting. By the upper abdomen is meant that portion immediately below the ribs and the "sternum" or breast-bone. It is claimed that everyone who will try this simple method for a few days will at once be cognizant of the fact that breathing is deeper and seemingly more satisfactory.

Start each day with a walk of a few blocks during which the upper abdomen is drawn in and the proper posture maintained. This practice will soon develop into a natural easy habit, and its good effects will, in a short time, manifest themselves. Dr. J. Oldfield in the *British Medical Journal* makes the novel suggestion that the posture of children would be improved if they had a daily half-hour drill in walking freely and easily with a tumbler of water on the head.

Main Essentials.

Good posture is necessary for good health and beauty and for the best physical development. There is a growing appreciation of this fact in the education of children to-day. The nation, it has been said, would benefit greatly if, as in ancient Greece, an ideal in the form

of statues showing perfect physical development could be kept before our youth at all times.

Correct posture may be simply, easily, and quickly learned, particularly by young people. The foundation is laid in infancy by wise care on the part of the mother. The child should be impressed repeatedly by teaching, discipline, and example with the importance of correct posture. There is no doubt that the average man, woman, and child would be all the better for doing some exercises as a daily routine. Physical laziness and inactivity and spending too much time indoors tend to produce bad posture.

The rule for good posture is to set the shoulders back and square them evenly to keep the chest high and well arched forward, the stomach in, the chin in, and the neck perpendicular like a column—simple fundamental measures that most people know and many people disregard. It should not be a position to be held for a while, or occasionally when thought of, but one which is fixed by unconscious and ingrained habit. A normal well-shaped foot is a great help in obtaining good position. Adequate rest for children is essential to prevent fatigue, which may lead to bad posture.

Test of the Body.

"It is quite certain that no artist or medical man," states Sir Arthur Keith, "has ever seen a human body which conforms in every detail to the absolute ideals which have at various times been postulated. The ideal is really a composite and imaginary figure, and the ordinary man and woman need not be disappointed if in the shape and proportion of their bodies they fall short of the classical ideals. After all, the true test of the body is how it stands the wear-and-tear of time and the work of life; the best of health may be sheltered within a rugged ugly body. What one may well enjoy is the easy pose, the well-balanced action which characterize such classical figures which are really beautiful."

Wise nurture, healthy occupations and homes, and ample facilities for attractive recreations and sane physical training increase the sum of human happiness and well-being in town or country.

In the cause of national welfare the motto for the future should be "Health, Happiness, and Efficiency." Let us heed those prophetic and memorable lines of Goldsmith:—

> Ill fares the land, to hastening ills a prey,
> Where wealth accumulates, and men decay.

The Manufacturing Industries.

Contributed by the INDUSTRIES AND COMMERCE DEPARTMENT.

BY far the most valuable trade is the home or domestic trade of one's own country. If we keep this fact steadily before us we may reach a better understanding of the present drive to expand our secondary industries and to increase our production in New Zealand.

An all-round well-balanced nation encourages as great a variety of home industries as is consistent with circumstances and common-sense. That is exactly what we in New Zealand are endeavouring to accomplish to-day. The expansion of our existing industries and the establishment of new industries in the Dominion will supply many avenues for the profitable employment of our people and thus will we lessen the evils which hitherto have followed a recession of the prices secured overseas for our exports.

The value of an all-round increase in industry not only benefits the nation as a whole; the repercussions are also advantageous to the individual. This works out in a multiplicity of ways, and one of the most important, if we leave the standard of living out of it for a moment, lies in the wider field offered to our educationists in the training of the youth of the country.

One section of the community cannot truly advance unless all are progressing. With the right economic proportion of primary and secondary industries New Zealand would not only be the most prosperous country in the world, but the best, taken all round, to live in. Given this very desirable state of affairs—and that, after all, is the policy now being followed—we will have a splendid country and eventually we will be housing a population ten times as great as we are to-day. It is desirable that New Zealand should increase her population, and the rural or primary industries alone cannot accomplish this end. Thus we must build our nation on a balanced basis—the utmost production from our primary industries and the progressive expansion of our secondary industries.

The argument may be adduced that by building up our secondary industries we will be aggravating the already acute problem presented in our cities to-day in that there is admittedly overcrowding. But surely we can learn from the mistakes of older nations and, instead of building our industries in and around the main centres, we can build them over a much wider area. Such a spreading of industry would have the effect of easing the pressure in our main centres and it would make for a steady development of the country with a well-distributed population. The advantages of this from a defensive point of view are incalculable.

A few years ago Professor Ashley said: "All observers of working-class life will agree that a period of low wages and of partial or complete unemployment has a negative effect and is degrading; far greater is the benefit of a positive and elevating period of high wages and overtime." That statement was made in 1920. The full truth of the Professor's assertion regarding high wages has also been proved in the subsequent years. Surely, then, it must be clear that a furtherance of the policy which brings happiness and contentment and the opportunity for work in productive industry merits the fullest support. A steady and continued expansion of our manufacturing industries and the maintaining and increasing of our production will minimize the possibility of a recurrence of the dark years of the depression.

The duty before us is plain. We must individually and collectively do our part in seeing that the wheels of industry are kept whirring busily, and we can best do that by putting the best we have into our own jobs and by giving due heed when purchasing goods to the fact that when we buy a New-Zealand-made article we are ensuring that a fellow New-Zealander is kept in employment. By remembering that fact, and by acting on that knowledge, we will be doing our share in the building of a nation.

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The Farm Home and Kitchen.

Contributed by the Association for Country Education.

A Letter from the A.C.E. to Readers of These Columns.

WE have taken over this section of the *Journal* with the desire to supply you with what you want and can use in the way of reliable, practical, useful information, based on the findings of the world recognized authorities in each subject.

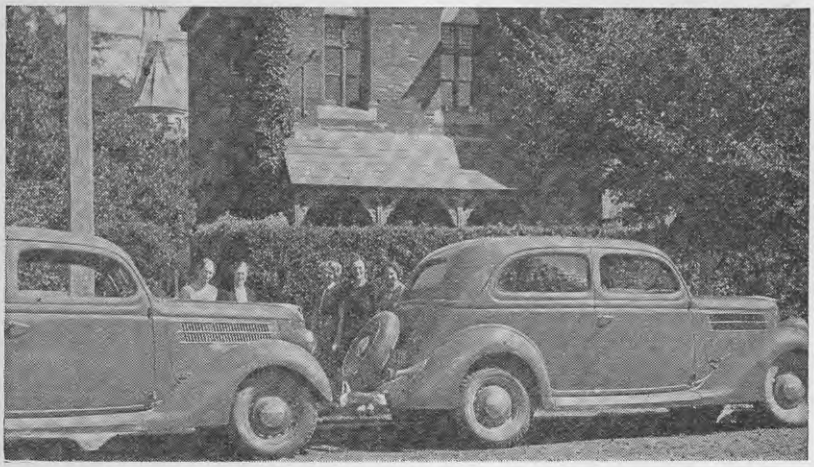
It is truly amazing how much research work which bears on the home in one way or another is going on all the time. The physical needs of man are being more and more understood—and making even greater progress is the study of the needs of his mental nature.

If, in every home, the knowledge which is already available were applied the world would be a wonderful place to live in. It does seem that the world's only salvation lies in people's knowing and applying in their homes and in their daily lives the knowledge that is helpful to humanity.

Marion McDowell, writing in *Forecast* (the American national magazine for home economics), deals with the ideal home and its influence on the world. Because we have not yet attained the ideal she refers to it as "To-morrow's home," and says :—

"In our disrupted world, how can any one speak confidently about to-morrow? With Spain in ruins, with thousands of refugee families huddled miserably around the remnants of their possessions, with streets and parks of great cities destroyed or undermined with trenches, what can one say save that we still may hope for better things?

"We in America are comparatively fortunate. We are told that one-third to one-half of our people have too little for a decent standard of living. We can still believe that *homo sapiens* will yet make use of some of his sapience to utilize the possibilities that are ours, provided that science and sensitivity to the needs of others can be combined in a new set of values.



Home-science Tutors of the A.C.E. outside the new headquarters in Dunedin. Left to right: Misses H. Hayes, R. T. Robins, M. I. Crowe, V. Macmillan (organizer), and M. Fogo. Miss Hayes will undertake tutorial work in the Waimate County, Miss Crowe her monthly J.H.C. circuits, Miss Robins her duties in Mid-Canterbury, and Miss Fogo her duties on Banks Peninsula.

"Certainly they would provide more fully for the physical needs of man. How thrilling to imagine every home sunny, airy, spacious, beautiful in design, in furnishings, in care. How delightful to dream of all remediable defects in both children and adults removed from the debit side of our civilization. How exciting to picture every human being well fed, well clad, well sheltered, and well educated to make use of his body's potentialities. How different family and human behaviour would be under these conditions.

"Very different, but not yet ideal, unless some other equally essential human and spiritual needs were satisfied. This ideal home of to-morrow, also, would provide companionship, affection and love in its finest sense. That quality of sensitivity mentioned above would be necessary in the choice of marriage-partners, in the delicate adjustments essential to fine marital relationships,

and particularly in the treatment of children in the home. For the home of to-morrow would apply the insight which psychology is slowly making available.

"Therefore, the home of to-morrow would not be a contracted, selfish, and unsocial place. It would be in closer touch with the world outside. It would value the less intimate human relationships, welcoming the friends of all its members, playing its part in the life of the community, considering with the children events of international affairs, creating in them the attitude of open-mindedness, tolerance, and good will.

"In this way the home of to-morrow would develop to the fullest capabilities of its members. It would fuse the findings of science for the benefit of all. In such an atmosphere of sufficiency, of beauty, of affection, of understanding, what scarcely sensed possibilities unfold for our race! Would that we might make them realities to take the place of the cruelty, the crudeness, the chaotic conditions, that fill our world to-day."

That, then, seems to be our united task—to fuse the findings of science for the benefits of all. Yours is by far the bigger share of the task, but, as we have said, we of the A.C.E. want through these columns to do what we can to help you.

Because we want this service to be very real in its value we would welcome suggestions for topics which you, as readers of "The Farm Home and Kitchen," would be interested in having us discuss.

Sincerely yours,
THE "A.C.E."

A.C.E. Headquarters,
University of Otago,
Dunedin, N. 1.

Feeding the Schoolboy and Schoolgirl.

"HERE we are, Mother! Is dinner ready?" For more than a month now we've heard that daily cry, and for almost a month "Mother" has been faced with the problem of having the very practical answer to it ready on the table.

We say "problem" first, because getting oneself back into the routine of preparing and serving meals on a schedule after the more elastic time-table of the holidays is a problem, especially when lunches have to be sent along in the school bag; and, secondly, because providing meals for hungry, and sometimes not so hungry, young people is not the easiest of your hundred-and-one tasks.

No, it isn't the easiest by any means, but surely one of the most important!

Recently we have been in the throes of a physical fitness campaign, and, while recognizing the extreme importance of well-directed exercise and recreation, we cannot overlook the fact that, after all, physical fitness does depend to a large extent upon good nutrition. Especially is this true of growing boys and girls.

Nutrition Affects School Work.

Experiments have proved beyond doubt that there is a very definite relationship between not only the physical but also the mental conditions of school-children. In other words, malnutrition can result not only in dental caries, anæmia, constipation, colds, but also in irritability, dullness, listlessness, and mental inertness.

All of which brings us to the question: "What food should these children of ours have?" And for its answer we cannot do better than turn to the rules laid down by the League of Nations Commission on Nutrition. Briefly summarized, the recommendations of the Commission are that the diet of growing boys and girls should contain two main food groups. First, the protective foods, which include milk, eggs, meat, fish, liver, green leafy vegetables, potato and other root vegetables, raw fruit, and cod-liver oil. Second, the supplementary energy foods—namely, fats, cereals, and sugar.

When we look at the list a little more closely it is easily seen just why each of these particular foods has been recommended.

First on the list is—

MILK

for from it is provided the minerals lime and phosphorous so vitally needed for the building of strong bones and teeth. Here, also, we find first-class body-building material and vitamins A and D.

Weekly Food Needs of Adolescent Girls and Boys.

MILK	5–7 quarts.
VEGETABLES—	
Potatoes	2½–6 lb.
Green leaf, as cabbage, spinnach, lettuce	1–1½ lb.
Others, as carrots, string beans, beets	1½–2½ lb.
Dried, as peas, beans, and lentils	2–4 oz.
FRUIT—	
Raw—one orange or apple, or two bananas, or peaches, or apricots, &c. (When cooked fruit is served more is required.)	
BREADS—	
Preferably oatmeal, wholewheat	2½–4½ lb.
CEREALS—	
Preferably oatmeal, wholewheat	1–2½ lb.
EGGS	4–7
CHEESE	2–4 oz.
MEAT AND FISH	1–2 lb.
FATS—	
Butter	6–8 oz.
Other fat	6–8 oz.
SUGAR	½–¾ lb.
TOTAL (calories daily)	Approximately 2,000–3,500

The protective foods—milk and its products, vegetables, fruit, and eggs—should receive special emphasis in the meals of adolescents. They may well be used in larger amounts than these suggested if the food budget permits.

Rich desserts, pastries, and sweets should be used very sparingly, if at all.

—*Adapted from "Nutrition Notes."*

EGGS, MEAT, AND FISH

supply the material necessary for the building of muscle and tissues or, in other words, " body-building material " for growth.

LIVER AND EGG

provide the iron, without which there cannot be a good blood-supply.

VEGETABLES AND FRUITS

supply the vitamins which make possible the utilization of the other food materials. Unfortunately, here in New Zealand the amount of fruits and vegetables included in the average diet is sadly lacking in amount.

FATS, CEREALS, AND SUGAR

are included to supply the heat and energy so very necessary in the active life of the growing boy and girl.

COD-LIVER OIL.

is a valuable source of the rickets preventing vitamin D, the vitamin which we can get from sunshine. It is recommended for use especially in countries and districts where there is little sunshine or where the coldness of the climate makes it impossible for children to be exposed to the sun. This does apply in some of our New Zealand districts.

Hence we find that feeding the growing boy and girl is neither difficult or " food-faddish " so far as the selection of food materials is concerned. When it comes to the actual preparation and serving, simple menus planned to include generous portions of the protective foods—milk, eggs, vegetables, and raw fruit—are best. Planning menus ahead for two or three days will help, as so often the real task is not in preparing the meals but in trying to decide what to have.

School-children need food that " sticks to the ribs "—that is, food which remains in the stomach for a reasonable time but which is not painful or difficult to digest.

Good Breakfasts Essential.

" Begin the day with a good breakfast " is a good slogan, and once school days begin the late rising hour so desirable during holiday-time should give way to an hour early enough to assure an adequate, unhurried meal. Especially is this true in the case of those little folk who are setting off to school for the first time. The unaccustomed excitement and long hours of routine work and play can, if we are not careful to foresee and prevent it, result in lost appetites.

A child's capacity for food is often so small compared with his need for it that it may be impossible for him to eat in two meals all he requires during the day. If breakfast is omitted, therefore, his daily total food consumption may be too small to provide the growth and energy-providing material he needs. Even though a child may have a mid-morning lunch at playtime, breakfast is still important. Play lunches seldom offer more than fruit or milk and a biscuit, and the two hundred or two hundred and fifty calories which this furnishes cannot take the place of the five hundred or six hundred calories which breakfast should provide.

A serving of porridge with milk, some fruit, an egg, and a glass of milk with toast and butter is a good guide for the breakfast menu.

The noon-day meal should be hearty yet easy to digest. If it is to be the main meal of the day, soufflés and minced-meat dishes with a generous serving of green vegetables are a good choice for the main course. For warm days a salad makes a good lunch or evening tea, and for colder days a large plate of cream-of-vegetables soup is almost the most welcome meal possible for hungry young people.

Eggs, too, are excellent for lunch or the evening meal, for they provide high mineral and vitamin value as well as good muscle-building material. The fact that they can be so quickly prepared makes them a boon on specially busy days.

The Right Dessert.

Most children like to have a sweet of some kind to finish off a meal, and the right kind of dessert does contribute its share of food value. By " the right kind " of dessert is meant one that is satisfying without being too rich or too sweet. If a milk dish has not been served for the first part of the meal, then junket or custard is a good choice. Fresh or cooked fruits are, of course, always desirable.

What has been said for the noon meal applies equally to the evening one, whether this be evening tea or dinner. Eggs, milk, cheese, fish, meat, green vegetables, and raw fruit should all be given a place. Desserts should again be neither too rich nor too sweet, and when it comes to cake, plain home-made biscuits or cookies are better than rich, iced cakes.

Tomatoes in Many Ways.

Tomato Aspic Salad.

Gelatine, 1½ level tablespoons.
Cold water, ¼ cup.
Boiling water, 1 cup.
The juice of 1 lemon.
Vinegar (preferably white), 2 tablespoons.
Salt, ½ teaspoon.
Pepper, a shake.

Method.—Soak the gelatine in the cold water for five minutes, then add the boiling water and stir till the gelatine dissolves. Add the other ingredients and mix well. Add some sliced tomatoes and chopped celery, and set in individual moulds; or the mixture may be poured into a shallow pan, allowed to set, and then cut into sections which are served on lettuce with salad dressing. (NOTE.—If the tomatoes are very juicy you must reduce the amount of water in the recipe. This should serve six people).

Tomato Juice Cocktail.

1 pint tomato juice (extracted from ripe tomatoes).
1 teaspoon sugar.
1 teaspoon salt.
½ teaspoon Worcester sauce.
Juice of ½ lemon.

Method. — Combine these ingredients and serve cold for breakfast, or as an appetizer for lunch or dinner.

Highland Tomatoes.

1 cup tomato purée.
½ teaspoonful salt.
1 egg (beaten).
1 cup cooked barley.

Method. — Combine these ingredients and bake in a greased baking dish for one hour at 325° F.

Scalloped Tomatoes.

Method.—Fill a casserole or pie-dish with alternate layers of sliced tomatoes and soft bread-crumbs. Sprinkle salt and pepper over each layer. Finish with a layer of buttered crumbs and bake twenty to thirty minutes in a moderate oven (350° F.). This is an excellent luncheon or tea dish.

" Fried " Tomatoes.

Method.—Cut tomatoes into thick ½ in. slices (or if the tomatoes are small merely cut them in half). Sprinkle each cut surface with salt and pepper, and dredge liberally with flour. Fry in butter until the tomatoes are well browned and a crisp golden crust is formed on the cut end of the tomato slices. When almost done pour into the pan either cream or top milk. This will be thickened by the acid from the tomatoes and so makes a delicious savoury sauce. Serve at once. This is perhaps the most savoury of all tomato dishes when made correctly.

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And Miscellaneous Matter.

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