THE NEW ZEALAND
JOURNAL OF AGRICULTURE

Vol. 63. No. 3.
September 15, 1941.
Wellington.

Published by direction of Hon. J. G. Barclay, Minister of Agriculture.

SERPENTINE SUPERPHOSPHATE

Experiments with serpentine superphosphate have shown that, applied at the same rate as superphosphate on grassland, it has given equally good results in a number of districts, and the same effect is seen on most of the common farm crops throughout the Dominion. The saving of phosphate where the new mixture is giving such satisfactory results under the conditions described is of considerable practical importance.

An outcrop of serpentine rock on D'Urville Island.

Recommendations for Use Of the New Mixture

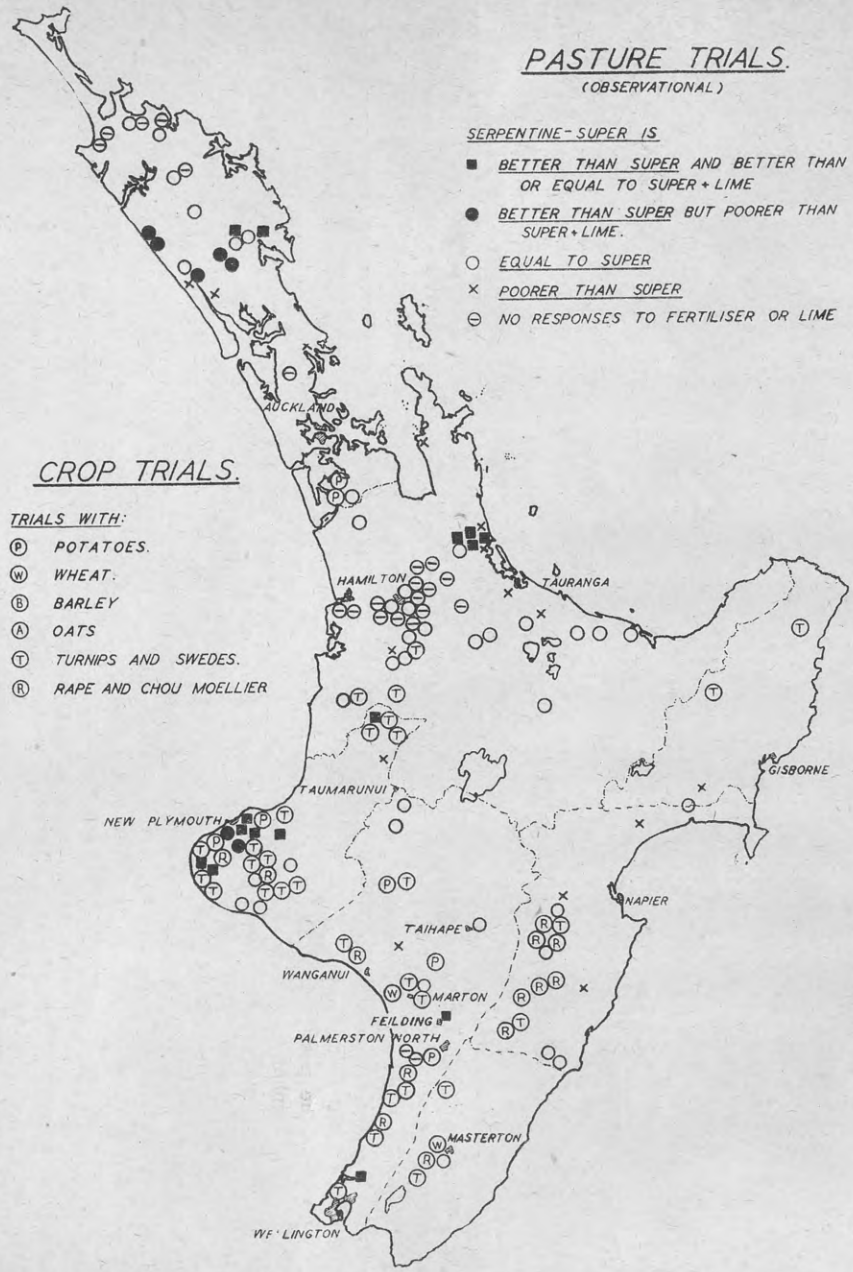
By
A. G. ELLIOTT, Crop Experimentalist, and
P. B. LYNCH, Assistant Crop Experimentalist, Wellington.

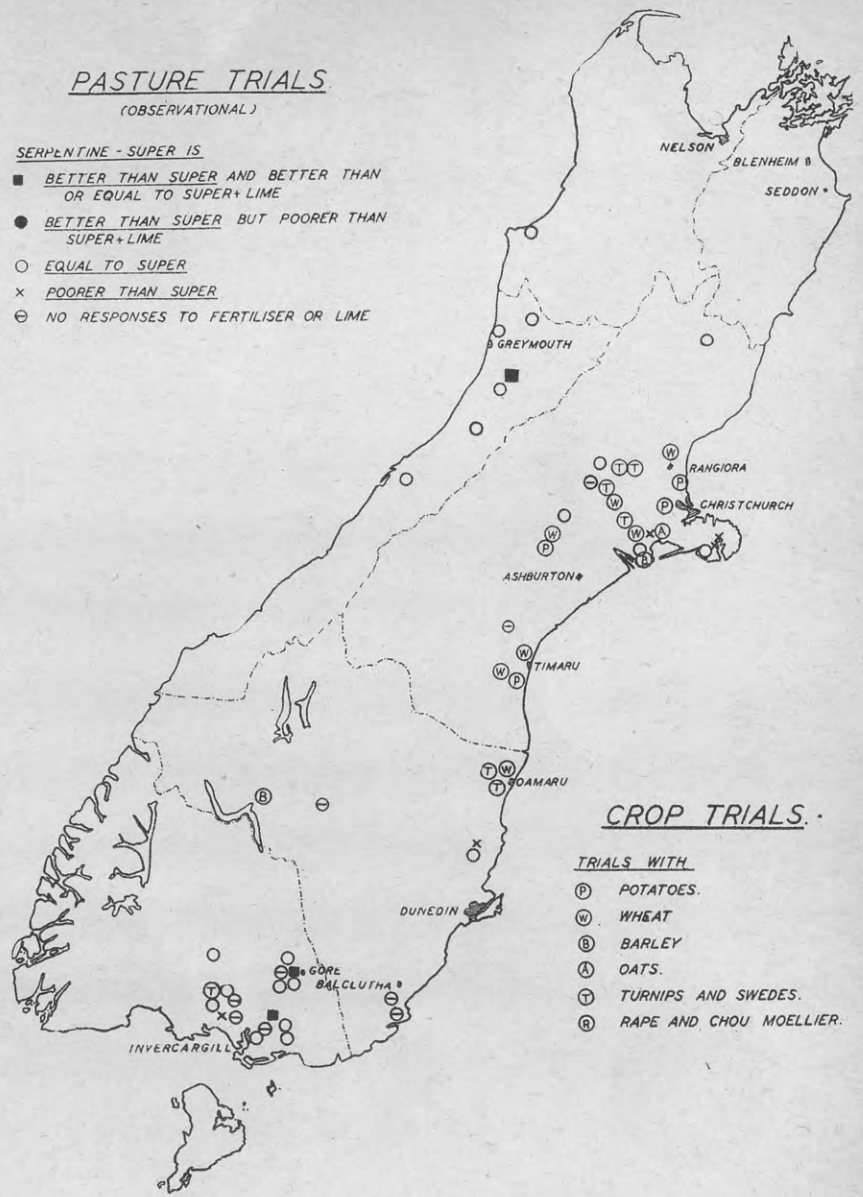
AT the beginning of 1940 two factors made essential an immediate and comprehensive experimental programme with serpentine superphosphate—(1) the promising results of preliminary trials with the new manure, and (2) the possibility of a shortage of phosphatic fertilisers, later to become an unpleasant reality. Data from a large number of trials is now sufficiently complete to make possible an estimate of the value of serpentine superphosphate and to give recommendations regarding its use.

Early Work

In the "Journal" for April, 1940, an account is given of the history of the material and the workers associated with its early development. Interest in the possibilities of serpentine was aroused as a result of Russian investigations into the mixing of dunite (a rock usually containing the mineral serpentine) with superphosphate. Various Divisions of the Departments of Agriculture and of Scientific and Industrial Research in New Zealand then co-operated with superphosphate manufacturers to produce small quantities of a superphosphate serpentine mixture, and a preliminary experimental programme was begun. The indications from this work were sufficiently promising to warrant the comprehensive investigation that was subsequently carried out.

While much work has been done on the manufacturing details and on the chemical behaviour of the mixture, it is intended to restrict the present article to a description of the practical value of serpentine superphosphate to farmers, and to summarise the results of trials carried out by the Fields Division.


PASTURE TRIALS.
(OBSERVATIONAL)
SERPENTINE - SUPER IS
■ BETTER THAN SUPER AND BETTER THAN OR EQUAL TO SUPER + LIME
● BETTER THAN SUPER BUT POORER THAN SUPER + LIME.
○ EQUAL TO SUPER
× POORER THAN SUPER
⊖ NO RESPONSES TO FERTILISER OR LIME
CROP TRIALS.
TRIALS WITH:
(P) POTATOES.
(W) WHEAT.
(B) BARLEY
(A) OATS
(T) TURNIPS AND SWEDES.
(R) RAPE AND CHOU MOELLIER
AUCKLAND
HAMILTON
TAURANGA
GISBORNE
NEW PLYMOUTH
TAUMARUNUI
NAPIER
TAIHAPE
WANGANUI
MARTON
FEILDING
PALMERSTON NORTH
MASTERTON
WELLINGTON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SEDDON
GREYMOUTH
RANGIORA
CHRISTCHURCH
ASHBURTON
TIMARU
OAMARU
DUNEDIN
GORE
BALCLUTHA
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(A) OATS.
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What Is Serpentine Superphosphate?

The name serpentine superphosphate will be used in future in place of "silico superphosphate," as it is a more accurate description of the material. It is made by mixing three parts of hot, newly-made superphosphate with one part of ground serpentine and allowing the mixture to "mature" in heaps for several days. Reversion of the water-soluble phosphate of superphosphate then occurs, with the production of a form of phosphate insoluble in water but soluble in soil water.

Soil water contains small amounts of dissolved substances, and is generally acidic in nature, so that many substances will go into solution in the soil when they will not dissolve in pure water. A weak solution of citric acid is used in the laboratory to estimate the proportion of the material which will dissolve in soil water, and the following typical analyses show what happens when reversion takes place.

	Super-phosphate.	Serpentine Super-phosphate.
Percentage total phosphate (P_2O_5)	23.8	16.4
Percentage citric-soluble phosphate (P_2O_5) ..	—	13.5
Percentage water-soluble phosphate (P_2O_5) ..	19.9	2.6

The lower percentage of total P2O5 is due to the fact that serpentine contains no phosphate. Thus, on the basis of the total amount of phosphate, three parts of superphosphate are equivalent to about four parts of serpentine superphosphate.

Certain Advantages

Serpentine superphosphate possesses certain advantages over superphosphate in respect of its physical condition and other practical features. These may be summarised as follows:—

(1) It is drier, and shows less tendency to "cake" than superphosphate. This means that it is usually more freely-running in the drill or topdresser.

(2) As it is reverted and basic in character, it does much less damage to bags than superphosphate.

(3) It may be safely stored for long periods without material effect on its physical or chemical composition.

(4) It is more pleasant to handle, especially when topdressing by hand.

(5) Being a reverted phosphate, it is of a type which is becoming increasingly popular, and this is in line with modern developments in the fertiliser industry. An article in the "Journal" for February, 1941, by the Supervisor of Fertiliser Supplies (I. L. Elliott) discusses such developments. The two major advantages of reverted phosphates are:—

(a) They can be sown in contact with small seeds, such as turnips and swedes, without causing injury to germination.

(b) On some soils plants may recover a greater proportion of the phosphates of reverted manures than is the case when water-soluble phosphates are applied. Such soils are often termed "high-fixing," for they lock-up easily soluble phosphates in such a way that they are not available to plants. When a water-soluble fertiliser is applied to such a soil, most of it is rendered unavailable, but the reverted phosphate dissolves much more slowly in the soil water, and although it is liable to be "fixed" when in solution, actively-growing plants will absorb a large proportion of the phosphate before this can take place. However, we still have much to learn before the mechanism of "fixation" is fully understood.

(6) If it is equivalent weight for weight to superphosphate (that is, if 3 cwt. of serpentine superphosphate gives as good results as 3 cwt. of superphosphate) a considerable saving in imported phosphate rock and sulphur is possible, for serpentine is a common mineral in several parts of New Zealand. It can be seen, therefore, that, should our investigation show the new mixture to be of **equal** merit to superphosphate on a weight basis, we have every reason to be satisfied with its performance.

(7) Serpentine superphosphate should be at least as cheap or cheaper than superphosphate when the manufacture of the material is on a sufficiently large scale and is running smoothly. Some saving in the fertiliser subsidy should result, as there is every reason to believe that ground serpentine can be produced at the works at a lower cost than superphosphate. The utilisation of a New Zealand product should also make possible a saving in sterling funds overseas.

(8) Serpentine is a magnesium silicate, and magnesium is an element to which increasing attention is being paid. From work carried out by the Soil Survey Division and the Cawthron Institute, Nelson, it would seem that quite a considerable number of soils in New Zealand are dangerously low in magnesium. Certain diseases in apples and tobacco have been shown at Cawthron to be due to a shortage of this element in the soil, and have been cured by the application of magnesium compounds. The value of the magnesium in serpentine superphosphate is being investigated, for this element appears to be present in a form readily available to plants.

Serpentine also contains measurable amounts of cobalt, which is the element used in the control of "bush sickness" of sheep and cattle. However, the amount of cobalt in serpentine superphosphate, although apparently available to plants, is very small, and is probably insufficient for the control of the stock diseases caused by a deficiency of the element. The value of the cobalt content of serpentine superphosphate is being investigated by the Animal Research Division, Department of Agriculture.

Disadvantages

(1) As it is a slow-acting fertiliser, it may not be as suitable for low rainfall districts as superphosphate. In such districts more soluble fertilisers tend to give greater responses.

(2) Where the soil has a low "fixing" capacity, superphosphate is usually held in the soil in a form available to plants. To a considerable extent adequate liming overcomes the disadvantages of superphosphate on soils of medium "fixing" capacity, for the superphosphate reacts with the lime to form another type of reverted and available phosphate.

(3) Serpentine must not be regarded as a substitute for lime. For one thing, it is considerably less pure than reasonably good limestone, and contains fairly large amounts of useless materials. The amount of basic substances applied in serpentine superphosphate is small. Consequently, similar amounts of ground limestone should be applied where the mixture is used to those that would have been applied when using superphosphate.

(4) Unless the mixture is as good as superphosphate on a weight basis, or unless there is some special merit in it apart from the production angle, serpentine superphosphate is merely a "diluted superphosphate" of lower

phosphate-content than superphosphate. In this case, the extra costs of mixing and cartage confer no advantage. There are probably some soils to which this applies, and on them the use of serpentine superphosphate would be uneconomic and undesirable. These areas have to be found by experiment.

Results of Fields Division Trials

The following trials with serpentine superphosphate have been laid down since 1939, and results from them are summarised below:—

5 mowing trials on the effect of pasture topdressing.

160 observational topdressing trials on pasture.

12 potato manurial trials.

9 wheat manurial trials.

1 oat manurial trial.

2 barley manurial trials.

46 manurial trials on turnips, swedes, rape, and chou moellier.

1 mangel manurial trial.

1 maize manurial trial.

237: Total number of trials.

(1) Mowing Trials

Taking yields relative to superphosphate at 100, three trials at the Marton Experimental Area gave the following figures for serpentine superphosphate. Both manures were applied at 4 cwt. per acre.

Trial P (700 days under trial), 100.0.
Trial R (273 days under trial), 100.9.
Trial S (281 days under trial), 100.8.

At Marton, serpentine superphosphate gives almost exactly equal production to superphosphate when both manures are applied **at the same rate.**

At Feilding Agricultural High School, the following results were obtained. Here, a mixture of 3 cwt. of superphosphate plus 3 cwt. of lime was compared with serpentine superphosphate at 3 cwt. When yields of the former treatment are taken as 100, those of serpentine superphosphate (238 days under trial) on the same basis are 111.4. Moreover, serpentine superphosphate has consistently shown to advantage at Feilding.

The trial at Ruakura Animal Research Station, Hamilton, was laid down a few months ago, and there are as yet insufficient results to summarise.

(2) Trials on Pasture

The maps which accompany this article are self-explanatory, and the salient results of observational topdressing trials on pasture are as follows. In all cases the comparison is one of 3 cwt. of serpentine superphosphate per acre with 3 cwt. of superphosphate—that is, at **equal rates.**

(a) In North Taranaki and on the Waihi plains serpentine superphosphate shows to advantage over superphosphate, and because the lime response in these districts is not marked, it is usually better than superphosphate plus lime. Some soils in the Southland district may also come into this category.

(b) North of Auckland serpentine superphosphate on many soil types tends to give better results than superphosphate, but as the lime response is generally very marked here, it is evident that the new mixture can in no way replace adequate liming.

(c) In several localities on the East Coast of the North Island, and in some parts of Canterbury, superphosphate gives better responses than serpentine superphosphate, probably because in

such areas highly-soluble fertilisers show to advantage. A similar effect is seen on some pumice soils, on which excellent results are usually obtained with superphosphate and good results with serpentine superphosphate.

(d) Soils showing practically no responses to any fertilisers are located in Kaitaia in the far north and in the Waikato. In the former district many soils have exceptionally high "fixing" power, and here even reverted phosphates are not effective. Liming plays a big part in the utilisation of many such soils. In the Waikato most soils have considerable reserves of phosphate built up from many years of topdressing, and thus areas receiving no fertilisers deteriorate slowly. As a result, it may be one or two years before the effect of topdressing is seen.

(e) Over most of the rest of New Zealand serpentine superphosphate gives equivalent responses to superphosphate. This group includes the majority of the trials.

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(3) Potato Manurial Trials

The following table summarises the results obtained on a comparison of serpentine superphosphate with superphosphate with potato manurial trials.

Both Manures applied at	Number of Trials.	Average difference (Serpentine-super — Super) Total Yield of Tubers (tons per acre)
3 cwt. per acre	8	+0.2
4 ,, ,, ,,	1	+0.7 (significant)
6 ,, ,, ,,	4	—0.5
9 ,, ,, ,,	1	—0.3 (early potatoes)
12 ,, ,, ,,	1	+1.3
18 ,, ,, ,,	1	+1.2
Ave. difference	—	+0.2

In only one trial was the above difference statistically significant—in this case in favour of serpentine superphosphate. This trial was at Rangiora.

(4) Trials with Wheat Oats and Barley

Seven wheat manurial trials of a detailed layout were located in Canterbury and North Otago, and gave an average yield as follows:—

	Bushels per acre
Serpentine superphosphate 1cwt.	37.5
Superphosphate 1cwt	37.7
Difference	—0.2 (not significant)
Serpentine superphosphate 2cwt.	37.6
Superphosphate 2cwt.	38.4
Difference	—0.8 (not significant)

A trial in the Turakina district yielded as is shown below, but the results were not statistically examined.

Serpentine superphosphate 2cwt.	22.6
Superphosphate 2cwt.	20.0
Difference	+2.6

Two barley manuring trials give the following yields:—

	Bushels per acre. Southbridge trial.	Arrowtown trial.
Serpentine superphosphate 1 cwt.	50.7	20.5
Superphosphate 1 cwt. ..	52.5	19.3
Difference	—1.8	+1.2

Neither of the above differences are statistically significant.

An oat manurial trial was not harvested due to damage from wind and birds.

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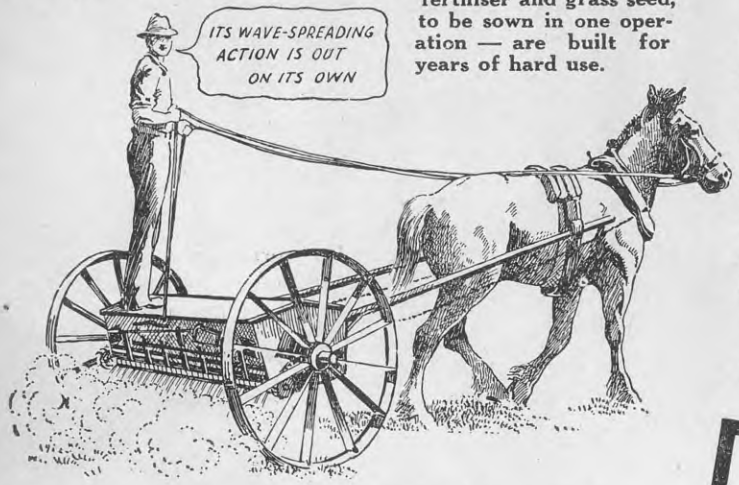

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(5) Maize Trial

Both superphosphate and serpentine superphosphate yielded 60 bushels of shelled maize per acre.

(6) Mangel Trial

This was not harvested due to caterpillar attack on the young plants.

(7) Turnips, Swedes, Rape and Chou Moellier

A comprehensive series of trials was carried out with turnips, swedes, rape, and chou moellier. As it is unwise to sow superphosphate with the seed of these plants, the comparisons have had to be widened to include reverted superphosphate (that is, superphosphate reverted with lime), superphosphate, carbonate of lime mixtures, and proprietary manures. In addition, germination counts as well as yields have been estimated, as fertilisers with these crops have to be "safe" in this respect. In all cases both serpentine superphosphate and the manure with which it is compared are sown at the **same rate per acre.** Germination counts are given in the **number of plants per 10 feet of drill length,** and yields in **tons per acre.** Trials are of three types: "Type A" are detailed replicated trials; "Type B" are "half-drill strip" trials, which also give accurate comparisons; and "Type C" trials are simple trials where there are only a few plots of each fertiliser and statistical examination of the results is not possible.

The following table summarises the average counts and yields from 46 trials. Positive differences indicate that serpentine superphosphate has given more plants or a better yield than the fertiliser with which it is compared, and negative differences show the reverse. The numbers in brackets give the number of trials contributing to the average difference.

Treatment compared with serpentine superphosphate.	Difference (Serpentine Super minus other fertiliser).					
	Germination Counts.			Yields in tons per acre.		
	Type A	B	C	A	B	C
Super: Carb. lime (1:1) Mixture	+1.7(5)	—1.6(3)	—	—1.5(4)	—1.8(2)	—
Super: Carb. lime (3:1) Mixture	—	+0.9(4)	—	—	+2.2(2)	—
Reverted Super (all brands)	—0.2(5)	—1.1(4)	+0.1(4)	—0.9(4)	—0.1(3)	+1.3(4)
Proprietary Manures (all brands)	—	+6.1(9)	+9.3(5)	—	+6.6(6)	+4.5(4)
Farmers' mixtures (all types)	—	+27.0(2)	+4.1(1)	—	+8.4(2)	—3.3(1)
Superphosphate	+1.6(1)	—	+1.8(2)	—3.0(1)	—0.1(1)	+1.3(3)
No fertiliser	—0.1(4)	—	—	+9.4(3)	—	—

Serpentine superphosphate is similar to, but no better than, a "reverted superphosphate" (that is, one reverted with lime and with a minimum of water-soluble phosphate). The same conditions apply whether the superphosphate has been reverted at the works or by the farmer by mixing it with carbonate of lime. The trials have shown, however, that the latter mixture should be 1 part of lime to 1 part of superphosphate, and that the lime should be finely ground and the mixture allowed to "mature" for several days before sowing.

Proprietary mixtures such as "Turnip Manures," have proved unsatisfactory both in their effect on germination and on the yields resulting from treatment, and in these respects they are much inferior to serpentine superphosphate. Farmers' mixtures have given very variable results. Superphosphate has depressed germination, but the season was not sufficiently dry for this to be serious. A few trials, including a "no fertiliser" treatment, show a marked response to phosphates; all of these trials were in the Canterbury district.

Summary and Recommendations

(1) Present information indicates that serpentine superphosphate should prove a useful fertiliser for pasture topdressing in the heavier rainfall districts of New Zealand. In North Taranaki, Waihi, and North Auckland, the new mixture is giving better results than superphosphate.

(2) Serpentine superphosphate has proved a safe reverted phosphate for sowing with the seed of turnips, swede, rape, chou moellier, and other crops liable to germination injury.

(3) Serpentine superphosphate gives equivalent results to superphosphate on most of the common farm crops.

(4) Superior physical condition of the mixture makes it easier to sow, more pleasant to handle, safer to store, and less damaging to bags than superphosphate.

(5) It is possible that the magnesium and cobalt-content of serpentine superphosphate may be valuable under certain conditions.

Acknowledgments

The investigation into the possibilities of serpentine superphosphate is a truly co-operative effort, and is being carried out in collaboration with a number of officers of other Departments, whose assistance is gratefully acknowledged. The practical help afforded by the large number of farmers, members of Young Farmers' Clubs, and pupils of District High Schools throughout the Dominion is providing information which will add to our knowledge of the value of this fertiliser. Future investigations aim to define more exactly those areas and crops on which serpentine superphosphate shows to advantage.

THE Director-General's PAGE

Vaccination Against Pulpy Kidney In Lambs

SINCE its introduction in 1937, vaccination has proved to be the best practical means of control of entero-toxaemia or "pulpy kidney" disease in lambs.

In some districts the main loss occurs in lambs between the ages of three and six weeks. Invariably, the best conditioned and most forward lambs are attacked by the disease. Losses vary from district to district from under ½ per cent. to 5 or 6 per cent. To control this loss of very young lambs the vaccination of the pregnant ewe has been recommended. The vaccination is carried out by giving two injections of specially-prepared vaccine, with an interval of several weeks between the injections. The second injection is given in the last two or three weeks before lambing is due to start. Details of the vaccine and method of carrying out the injections may be obtained from Veterinarians and Inspectors of Stock.

In other districts the main loss occurs in older lambs or even in hoggets, depending mainly on the type of sheep husbandry practised in the district. In order to control losses in this age of lamb, it is not recommended to vaccinate the ewes. The best results are obtained through vaccination of the lambs themselves.

Here, again, a special type of vaccine has been prepared with a view to minimising the possibility of abscess formation after the injection. It will be readily recognised that the control of abscess formation after injections is most important in lambs being fattened for slaughter for export, as it is necessary to reduce the risk of blemishes on the carcass. With this object in view, it is imperative that the strictest cleanliness should be observed at the time of vaccination, whether ewes or lambs are being dealt with. Any instructions given with the vaccine should be carefully carried out, and, as far as possible, asepsis in the vaccination operations should be observed.

Digesters in Freezing Works

FREEZING works in New Zealand are equipped with digesters with sufficient capacity to enable them to process the bones and waste materials from normal killing operations, but, in view of the increased canning programme for next season and the request by the United Kingdom Government for all beef to be boned before shipment, a greatly increased strain will be thrown on the capacity of digesters.

To meet these abnormal conditions the Government is arranging finance for the erection of emergency digester plants, and action has already been taken to procure the steel required for the manufacture of these plants from the United States of America.

Serpentine-Superphosphate

AN article in this issue summarises the first year's result of experiments with the new mixture, serpentine-superphosphate, and gives preliminary recommendations regarding its use. Farmers will no doubt be greatly interested in the degree of success that has been obtained with this fertiliser. While no magical properties are claimed for the manure, the trials suggest that it has a definite place as a fertiliser, and that in certain districts its use should rapidly become widespread.

The investigation leading up to the production of this material on a commercial scale has been a good example of team work between officers of several Departments, who have been generously assisted by the fertiliser manufacturers and by numerous farmers who have participated in co-operative trials. The total of 237 field trials laid down by the Fields Division is a creditable achievement, which has produced fruitful results. In the coming season the help of Young Farmers' Clubs and pupils of District High Schools will further extend the scope of field experimental work with the material.

Proposed Increase in Canning Capacity

SUBSTANTIAL increases are being made in the output of canned meat. The present capacity of the plants in the Dominion, based on an eight-hour day, is 9,600 tons of canned meat, which is equivalent to 16,000 tons of boned meat. Finance has been arranged on plant ordered for the handling of a further 12,400 tons of canned meat, which is equivalent to 21,000 tons of boned meat. Thus, the total capacity of New Zealand plants will be 22,000 tons of canned meat, which is the equivalent of 37,000 tons of boned meat.

Canning plants can be operated for 10 hours daily without undue strain on the female staff. Thus, if required, the total output can be increased by 20 per cent., bringing the total to 26,400 tons of canned meat, which is equivalent to 44,000 tons of boned meat.

This potential capacity would be sufficient to deal with all boned cow beef, all second grade quarter beef, and 2,000,000 ewe carcasses. This is above the number of ewes ever killed for export in one season.

If this quantity of canned meat were shipped in the usual way as refrigerated cargo, it would represent 75,000 tons, and the envisaged canning programme saves refrigerated shipping and local cool storage space to that extent.

Plant for the increased capacity should be in operation early in 1942.

Linen Flax Exhibit

The accompanying photograph shows the exhibit of linen flax arranged by the Fields Division, Department of Agriculture, and on display in the Wellington Public Library. The exhibit shows the various stages in growing and processing the crop, and stresses its importance both to Great Britain and New Zealand.

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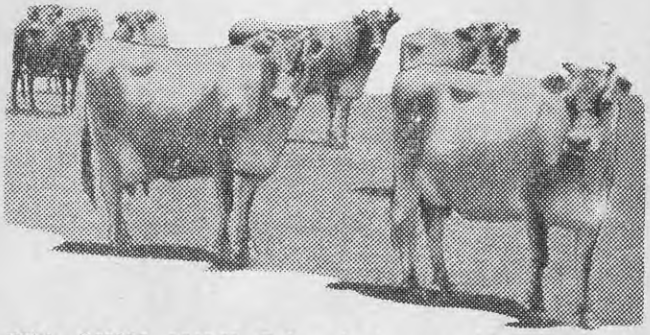

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Phenothiazine

A New Drug for the Control of Internal Parasites

By L. K. WHITTEN

Veterinary Parasitologist,
Animal Research Station,
Wallaceville.

THE control of internal parasites of domestic stock has been a problem studied by scientists for many years. Numerous drugs have been introduced, but each one, if effective at all, can be used against only a few species of parasites. Copper sulphate alone or with other drugs was proved to be effective against the large stomach worm of sheep and cattle. Oil of Chenopodium has been used for many years in the treatment of parasites of man, horses, and pigs. Later, carbon tetrachloride was used against hookworms in man and dogs, the large stomach worm and the liver fluke in sheep and redworms in horses. Tetrachlorethylene was introduced by American workers for the treatment of hookworms in man and dogs, and more recently hookworms, stomach worms, and small intestinal worms in sheep and cattle. A mixture of copper sulphate and nicotine sulphate has been useful in the control of stomach and intestinal worms of sheep and cattle, and in recent years has been very widely used.

Most of the drugs used against stomach and intestinal worms of ruminants must pass directly to the fourth stomach to be effective. When they pass into the first or second stomach they become greatly diluted, and have little or no effect on the parasites. In normal circumstances drenches pass to the fourth stomach in approximately 50 per cent. of cases, but copper sulphate has the property of causing reflex closure of the oesophageal groove, so that other drugs mixed with it or given immediately afterwards pass to the fourth stomach in approximately 80 per cent. of cases. Two drugs, however, are effective irrespective of whether they are swallowed into the first, second, or fourth stomach—carbon tetrachloride and phenothiazine.

Discovery of Phenothiazine

Phenothiazine was first synthesised in 1885, but it was not until 1934 that it was investigated as a possible substitute for lead arsenate in the control of codlin moth. In 1938 it was found that when given in small doses to cattle it prevented the development of hornfly larvae in their faeces, and in the same year was used against worms in pigs with promising results. In the following years much work has been done in U.S.A., Australia, Canada, and Great Britain, and has shown that it is the most effective drug yet discovered for the treatment of many of the more important parasites of sheep, cattle, horses, and pigs.

In sheep and cattle it is highly effective against large stomach worms (*Haemonchus contortus*), small stomach worms (*Ostertagia circumcincta*), small intestinal worms (*Trichostrongylus spp.*), hookworms (*Bunostomum trigonacephalum*), and large bowel parasites *Chabertia* and *Oesophagostomum spp.* Although very little data is avail-

SUBSCRIPTION RATES.

The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

able, it is probably only partially effective against *Cooperia* and *Nematodirus*, while it is ineffective against fluke, tapeworms, whipworms, lungworms, and *Strongyloides spp.*

In horses it is highly effective against redworms (*Strongylus* and *Trichonema*), partially effective against large roundworms (*Ascaris*) and pinworms (*Oxyuris*), but is ineffective against bots and tapeworms. The drug is effective against roundworms and nodule worms in pigs, but in poultry only the caecal worm *Heterakis* is susceptible. In dogs it is practically useless.

Methods of Administration

Phenothiazine itself is a bulky, light-green or yellow powder, which is insoluble in water and practically tasteless. Its physical properties make it very difficult to obtain an even suspension of the powder in water, and for this reason it is generally sold mixed with a small percentage of a wetting agent. In the case of animals which are fed individually the dose can be administered mixed with the feed; with horses this proves very convenient, and most animals readily take the drug in their chaff or mash. This method should not be used where two or more animals are fed from the one manger.

Where animals are to be dosed, methods of administration differ from those used with other drenches because of the bulkiness and insolubility of the drug. It can be suspended in water to form a thin paste, which can be delivered through a simple syringe type of instrument if the plunger is kept well oiled and cleaned regularly. Automatic guns and syringes involving the use of ball valves are unsatisfactory, because the powder causes clogging of the valves. An alternative is to use a more fluid suspension with an old-fashioned drenching funnel or bottle. Dosing with the powder or in the form of pills or capsules is possible but less satisfactory, and is more time-consuming than in liquid form.

Dose Rates

The dose rates which are recommended are as follows:—

	Grams.
Lambs.—6 weeks to 5 months ..	15
Sheep—5 months to 12 months .	20
Sheep—Over 12 months	25
Calves—6 months to 12 months	25-30
Cattle—Over 12 months	30-40
Horses—6 months to 12 months	20-30
Horses—Over 12 months	30-40
Pigs—Up to 25 lb. liveweight ...	5
25-50 lb.	9
50-100 lb.	12
100-200 lb.	20
Over 200 lb.	30

Animals need not be starved before or after treatment, but a short fast may ensure that the whole dose is consumed when exhibited in the feed. Doses greatly in excess of those recommended can be given without ill-effects, but care should be taken with weak and anaemic horses, as a few reports from overseas suggest that such subjects may react severely with larger doses. Repeated doses in calves and pigs may occasionally prove toxic, although such ill-effects are rare.

For a few days after dosing the urine of some animals becomes dark red when exposed to air for some minutes, due to the presence of oxidation products of phenothiazine, but, apart from a slight staining of the wool, it is of no consequence, although it may be mistaken for blood and cause some concern.

Because of its high efficiency against such a wide range of internal parasites and its wide margin of safety, phenothiazine, which is now available in New Zealand, is welcomed as one of the greatest contributions made in recent years in the field of parasite control. The present price of the drug is high, but a greater demand, manufacture on a large scale and improved methods will doubtless result in a reduction in cost and permit its more widespread use in reducing loss from internal parasitism.

MEETING THE SHORTAGE OF TURNIP AND SWEDE SEEDS

— By —

J. H. CLARIDGE, Seed Certification Officer, Wellington

How Farmers Can Help.

Sow the seed at a lower rate per acre than usual.
Purchase only the bare requirements of seed.
Replace swedes by Yellow Fleshed turnips if possible.
Grow other supplementary fodder crops in place of White Fleshed turnips.

REFERENCES were made in the April and July issues of the "Journal of Agriculture" to the steps which had been taken in an attempt to safeguard New Zealand's supplies of mangel, turnip and swede seeds. It is now possible to set out the true position relative to these seeds in so far as it can reasonably be ascertained.

It was known that there existed in the country carry-over stocks from the 1940 sowings, that merchants were endeavouring to import seeds to add to the quantity on hand, and that certain areas, particularly those under Departmental supervision, had been harvested for seed purposes.

Results of Survey

A recent survey of the whole position has revealed that:—

(a) The carry-over stocks held by merchants were considerable.

(b) The quantities available overseas which could be imported into this country have proved to be negligible.

(c) The quantities of seeds produced locally, while disappointing when viewed from one angle, will nevertheless prove of tremendous value to the farmer in arranging for his yearly supply of supplementary fodder.

(d) The figures showing the quantities of seeds available take no cognisance of seeds in farmers' hands or in the hands of storekeepers, etc., whose trade in seeds is of an incidental nature. To this extent, therefore, they may be taken as being a conservative estimate of the stocks available for sowing.

(e) From the information available it may be concluded that—

1. The mangel seed in the country is sufficient to sow the usual New Zealand acreage, allowing 5 lb. of seed per acre over all.

2. The Yellow Fleshed turnip seed available is sufficient to sow our normal acreage at the rate of 14oz per acre.

3. The White Fleshed turnip seed available is estimated to sow a little over 50 per cent. of the usual acreage if sown at the rate of 14oz. per acre.

4. The swede seed available will provide sowings for 80 per cent. of the normal acreage at the rate of 10oz. per acre.

Meeting the Shortage

The question immediately arises, "How can the shortage of swede and Yellow Flesh turnip seeds be met?"

In the first place, the position can be eased to a very material extent by rates of seeding lower than those mentioned above. If the average rate of seeding of swede seed, for instance, can be reduced from 10oz. to 9oz. per acre, the acreage which could be sown would immediately be increased from 80 per cent. to 90 per cent.—an additional 18,000 acres. This avenue for meeting the position should certainly be exploited before any consideration is given to the sowing of a reduced acreage.

Secondly, farmers should purchase only their bare requirements for the

1941 sowings. From information available, it is evident that the little extra purchased by each farmer in normal times "just in case" amounts in the aggregate to a considerable quantity. If this tying up of seed could be avoided this year it would assist to alleviate the shortage of certain kinds of seeds.

Thirdly, the position regarding swedes can be eased by the utilisation wherever possible of Yellow Fleshed turnips in their place. Certainly this has its limitations, and, if overdone, may lead to a shortage of the turnips. Nevertheless, it is worth full consideration by farmers who are so fortunately placed that Yellow Fleshed turnips may take the place of swedes.

Lastly, the shortage of White Fleshed turnip seed can be offset by the growing of alternative crops—rape, Italian ryegrass, or green feed oats, for instance—of which ample seed stocks are available. Farmers themselves will know whether a part or the whole of their requirements of soft turnips can be replaced in this way.

Any inconvenience or minor difficulty brought about by such an action on the part of individual farmers will be many times compensated by the availability of supplies of turnip seed where replacement is not possible. In this connection it is opportune to emphasise the very high production of certified Italian ryegrass seed compared with that of most of the uncertified seed on the market. The extra cost is negligible compared to the increased production.

Farmers may be tempted to lay aside a quantity of mangel, turnip, and swede seed for use in the 1942 sowing season, feeling that if shortages are already being experienced, the position will be critical in another year's time. It is only fair, therefore, to point out what is being done to safeguard next year's requirements.

Safeguarding Next Year's Requirements

The acreage of mangels to be seeded under Departmental supervision next season is double that harvested for seed last autumn, when more than half a normal season's requirements of seed were obtained with no previous experience. The knowledge gained should result in a considerably increased seed yield per acre.

The acreage of turnips and swedes which was harvested for seed under Departmental supervision last year was all sown in the usual manner to produce a bulb crop, and, in fact, most of the area had actually been grazed by sheep before seed production was decided upon. In the coming season, however, the acreage to be harvested is more than trebled, and, in addition, each area has been sown especially for seed production. These two factors, it is considered, will result in ample seed being produced for the following season's requirements.

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the three months, May-July, 1941, have been compiled by the Livestock Division:—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island.						
Meat Export Slaughterhouses—						
Auckland	69,874	134,867	32,376	13,122	125,984	64,828
Poverty Bay-Hawke's Bay	29,238	6,553	34,710	5,351	210,017	7,418
Taranaki-Manawatu ..	36,984	29,189	10,625	1,392	142,639	31,409
Wairarapa-Wellington ..	22,380	1,442	20,541	4,107	127,947	6,228
Totals	31,497	10,217	125,717	24,032	606,587	109,883
Abattoirs	158,476	172,051	98,252	63,873	15,887	29,767
North Island Totals ..	189,973	182,268	223,969	87,905	622,474	139,650
South Island.						
Meat Export Slaughterhouses—						
Nelson-Marlborough ..	665	61	11,214	5,937	70,906	3,279
Canterbury	3,762	3,465	154,038	122,778	386,966	7,732
Otago-Southland	3,408	139	138,616	128,675	467,120	2,032
Totals	7,835	3,665	303,868	257,390	503,992	13,043
Abattoirs	14,937	3,268	70,978	40,359	7,508	11,885
South Island Totals ..	22,772	6,933	374,846	297,749	511,500	24,928
Dominion.						
Meat-expt. Slaughterhouses	166,311	175,716	402,120	281,422	1,110,579	122,926
Abattoirs	46,434	13,485	196,695	104,232	23,395	41,652
Grand Totals	212,745	189,201	598,815	385,654	1,133,974	164,578
In addition the following stock were slaughtered at Rural Slaughterhouses during the three months ended 30th June, 1941	17,448	495	55,307	Unknown	3,431	7,184
Same Period, 1940—						
Meat Export Slaughterhouses and Abattoirs ..	264,506	170,435	873,217	573,481	1,427,101	163,369
Rural Slaughterhouses ..	18,876	614	57,446	—	2,625	7,275
Same Period, 1939—						
Meat Export Slaughterhouses and Abattoirs ..	192,517	155,347	596,080	321,987	1,466,218	115,734
Rural Slaughterhouses ..	19,544	673	57,376	—	2,926	7,259

Slaughterings of Pigs

The 18,965 pigs slaughtered in meat-export slaughterhouses and abbatoirs during July were distributed in weight ranges approximately as follows:—

Under 60 lb.	413
60-120 lb.	12,949
121-160 lb.	2,904
161-180 lb.	351
Over 180 lb.	675
Sundries	1,673

The grading of porkers is 85 per cent. of first quality and 15 per cent. of second quality, and the grading of baconers is 75 per cent. of prime 1's, 18 per cent. of prime 2's, and 7 per cent. of second quality.

In the different weight ranges of baconers, the quality is as follows:—

121-160 lb. .. .. 76%, 18%, 6% of P1, P2 and 2nds respectively.
161-180 lb. .. .. 69%, 20%, 11% of P1, P2 and 2nds respectively.

Farmers Can Help

Summing up, farmers may assist to a material extent to meet the present temporary shortage of swede and White Fleshed turnip seed by attention to the following points:—

Sow the seed at a lower rate per acre than usual.

Purchase only the bare requirements of seed.

Replace swedes by Yellow Fleshed turnips if possible.

Grow other supplementary fodder crops in place of White Fleshed turnips.

Pig Feeding Trials on Copra and Whey

By

M. J. SCOTT,
Superintendent of the Pig Industry, Wellington.

DURING the past year a number of feeding trials to demonstrate the value of copra or of whey have been carried out by farmers under the direction of the District Pig Council Supervisors in different districts, and have been summarised. Where known, the actual prices paid for meals or received for pig-meat have been used in estimating cost and returns; otherwise, meals have been charged at £12 10s. per short ton, and pig-meat valued at 6d. per pound.

A uniform procedure has been followed, giving the essential facts and making the four essential deductions —namely, the cost of meal per pig during the trial period, the return per gallon of milk after paying for supplements used, the feed used to produce 1lb. of carcass, and the cost of meal per pound of carcass gain. Whatever the amount of meal used per lb. of carcass gain is in excess of 6lb. there is something wrong with the quality of the feed, the quality of the pigs fed, or the quality of the attention given them. When the figure approaches 4.5lb. the owner has attained a state of excellence in all departments—feed quality, pig quality, and management.

There is a close relationship between the feed used per lb. of gain, the amount of meal used, and the earning value of milk per gallon. These trials establish a fund of information on feeding problems, and as this information is collected under actual farm conditions, it is worth careful study by those interested in getting better value out of their feed supplies. Farmers who have gone to the trouble of making these experiments have done an excellent service to the industry, and are to be complimented for their interest and effort. The identity of the trial is indicated by the name of the district in which it was made.

Copra Trials

Trial 1: Copra, milk, and green maize (Taranaki).

Seven Tamworth-Berkshire pigs were fed with 1lb. of copra, 4 gallons of skim-milk, and 8lb. of green maize daily per pig for 43 days. These pigs weighed 134lb. when the trial began, and 191lb. when it finished. The resulting carcass increase was 47lb. per pig worth at 6½d. per lb., 25s. 5½d. Meal used at £9 6s. 8d. per short ton cost 4s. 0½d. per pig, and maize at a nominal charge of 5s. per green ton cost 9d. per pig, leaving 20s. 8d. as the earning capacity of 172 gallons of milk. On this basis, milk shows a gross value of 1.44d. per gallon. Feed used per lb. of carcass gain was 5.30lb.; meal used per lb. of carcass gain cost 1.0d.

Trial 2: Barley and meat-meal, milk, and green maize (compare with copra above) (Taranaki).

Six Tamworth-Berkshire pigs were fed with ½lb. of meat-meal, ½lb. of crushed barley, 4 gallons of milk, and 8 lb. of green maize daily per pig for 43 days. These pigs weighed 143lb. when the trial began, and 204lb. when it finished. The resulting carcass increase was 50lb. per pig, worth at 6½d. per lb., 27s 1d. Meal used at an average of £11 per short ton cost 4s. 9d. per pig; maize, as before, 9d., leaving 21s. 7d. for 172 gallons of milk, or 1.50d. per gallon. Feed used per lb. of carcass gain was 4.98lb., and meal used per lb. of carcass gain cost 1.14d. In these trials, copra is not quite as good as a mixture of meat and barley meals. Compare Trials 7 and 8.

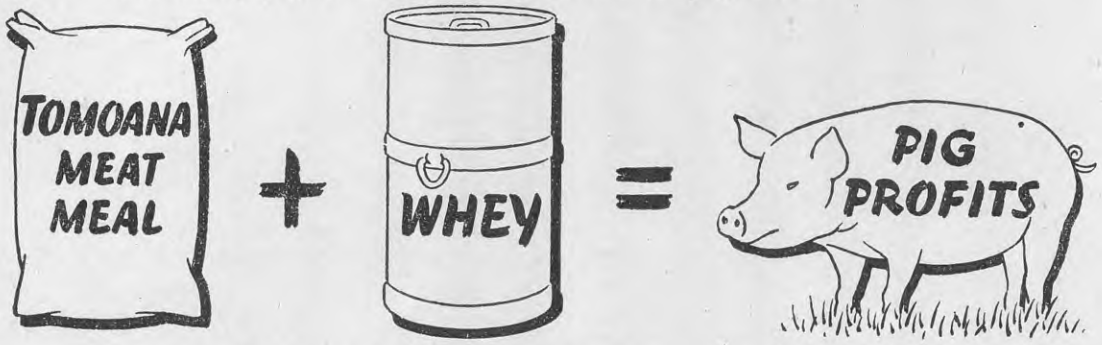
Trial 3: Copra and skim-milk (Pukekohe).

Six pigs were fed 2lb. of copra, plus an average of 4.66 gallons of milk daily per pig for 45 days. These pigs weighed 140lb. when the trial started, and 217lb. when it finished. The resulting carcass increase was 61lb. per pig, worth at 6d. per lb, 30s. 6d. Meal used at £9 5s. per short ton cost 8s. 3d. per pig, leaving 22s. 3d. as the earning capacity of 208 gallons of milk, or 1.28d.

Your Whey is Worth 3/4d per gallon!

Recent feed trials at Hamilton conducted by the Waikato District Pig Council under the supervision of Mr. C. P. Harington, showed that whey, when fed with Tomoana Meat Meal, is worth .76d. per gallon. This was after deducting the cost of Tomoana, the only Meal fed with the whey.

The cost in Tomoana Meat Meal for each lb. of pig flesh produced was 1.32d., *i.e.* for every 1.32d. invested in Tomoana, 6d. to 7d. was returned in pig flesh.



·88 lbs. of Tomoana costing 1·32d.	*plus*	6¼ gallons of whey (average).	*produces*	1 lb. of pig flesh worth 6d. to 7d.

TURN WHEY INTO PROFIT

by feeding in conjunction with

TOMOANA MEAT MEALS

For further information regarding the profitable use of whey as a pig food, write Messrs. W. & R. Fletcher (N.Z.) Ltd., P.O. Box 663, Wellington.

per gallon. Feed used per lb. of carcass gain was 4.89lb. Meal used per lb. of carcass gain cost 1.64d. The pigs had free access to grass.

Trial 4: Copra and skim-milk (Pukekohe).

Six pigs were fed 1½lb. of copra along with an average of 4.36 gallons of milk daily per pig for 45 days. The pigs weighed 120lb. when the trial began, and 204lb. when it finished. The resulting carcass increase was 69lb. per pig, worth at 6d. per lb., 34s. 6d. Meal used at £9 5s. per short ton cost 6s. 3d. per pig, leaving 28s. 3d. as the earning value of 196 gallons, or 1.73d. per gallon. Feed used per lb. of carcass gain was 3.83lb. Meal used per lb. of carcass gain cost 1.0£d. The pigs had free access to grass.

Trial 5: Copra and skim-milk (Pukekohe).

Five pigs were fed on 2lb. of copra along with an average of 2 gallons of skim-milk daily per pig for 45 days. These pigs weighed 75lb. when the trial began, and 133lb. when it finished. The resulting carcass increase was 40lb. per pig, worth at 6d. per lb. 20s. Meal used at £9 5s. per short ton cost 8s. 3d., leaving 11s. 9d. for 90 gallons of milk, or 1.56d. per gallon. Feed used per lb. of carcass gain was 4.50lb.; meal used per lb. of carcass gain cost 2.43d. The pigs had free access to grass.

Trial 6: Barley and skim-milk (Pukekohe).

In order to study the effect of withdrawing copra over the last month, the pigs in Trial 5 above were fed on 1/5th lb. of barley and 6 2/5ths gallons of skim-milk for the last month. Their average liveweight at the start was 186lb., and at the end of the trial 217lb., equivalent to a carcass increase of 23lb., worth at 6d. per lb. 11s. 6d. Meal used at £12 10s. per short ton cost 9d. per pig, leaving 10s. 9d. as the earning value of 192 gallons of milk, or 0.67d. per gallon. Feed used per lb. of carcass gain was 8.71b.; meal used per lb. of carcass gain cost 0.40d.

Trial 7: Copra and milk (Pukekohe).

Six pigs were fed on an average of 1 1/3rd lb. of copra (1lb. increasing to 1½lb.) and about 3 gallons of milk per pig daily for 96 days. The average liveweight at the beginning was 66lb., at the end 184lb. The resulting carcass increase was 89lb. per pig, worth at 6¼d. 46s. 4d. Meal used at £9 5s. per short ton cost 11s. 7d, leaving 34s. 9d. as the earning value of 279 gallons of milk, or 1.50d. per gallon. Feed used to produce 1lb. of carcass gain was 4.53lb.; meal used per lb. of carcass gain cost 1.56d.

Trial 8: Meal (barley, pollard, and meat-meal in equal parts) and milk (Pukekohe). (Compare with copra Trial 7.)

Six pigs were fed on an average of 1 1/3rd. lb. of meal. plus 3 gallons of milk daily per pig for 96 days. Tallow at the rate of about 1oz. per pig daily was fed for the last six or seven weeks. The average liveweight of the pigs was 67lb. at the beginning and 168lb. at the end of the trial. The resulting carcass increase was 74lb. per pig, worth at 6¼d. 38s. 6d. Meal used at £11 per short ton cost 13s. 9d. per pig, leaving 24s. 9d. as the earning value of 286 gallons of milk, or 0.58d. per gallon. Feed used to produce 1lb. of carcass gain was 5.55lb.; meal used per lb. of carcass gain cost 2.23d. This return per gallon of milk is poorer than is usually obtained with milk and meal. From the amounts stated, it seems that the milk was insufficient to the extent of about half a gallon per pig daily all through the trial.

Whey Trials

Trial 9: Whey, meat-meal, and barley (Pukekohe).

Six pigs were fed on ½lb. of meat-meal, ½lb. of barley and whey, 1¾ gallons up to 7¼ gallons—an average of 4¾ gallons per pig daily—for 170 days. The average liveweight of the pigs was 30lb. at the beginning, and 210lb. at the end of the trial. The corresponding carcass gain was 133lb., worth at 6d. 66s. 6d. per pig. Meal used at £11 6s. 8d. per short ton cost 19s. 10d., leaving 46s. 8d. as the earning value of 798 gallons of whey, or 0.70d. per gallon. Feed used per lb. of carcass gain was 5.7lb. Meal used per lb. of carcass gain cost 1.79d.

Trial 10: Whey, meat-meal, and barley; meat-meal reduced as pigs fattened (Pukekohe).

Six pigs were fed on ½lb. of meat-meal and ½lb. of barley, plus whey at rates varying from 1¾ up to 7½ gallons per day—average 4.9 gallons for 170 days. The average liveweight of the pigs was 30lb. at the beginning and 206lb. at the end of the trial. The corresponding carcass gain was 130lb., worth at 6d. per lb. 65s. Meal used at £11 6s. 8d. per short ton cost 18s. 9d., leaving 46s. 3d. as the earning value of 819 gallons of whey, or 0.68d. per gallon. Feed used to produce 1lb. of carcass gain was 6.00lb.; meal used per lb. of carcass gain cost 1.73d.

Trial 11: Whey, pollard, barley, peas, and meat-meal (Taranaki).

Eight pigs were fed with 1lb. of this mixture and 7 gallons of whey daily per pig for 56 days. These pigs weighed 132lb when the trial began, and 203lb. when it finished. The resulting carcass increase was 58lb., worth at 6½d. per lb. 31s 5d. Meal used at an average cost of £13 per short ton cost 7s. 3½d. per pig, leaving 24s. 1½d. for 392 gallons of whey, or 0.74d. per gallon. Feed used per lb. of carcass gain was 6.04d.; meal used per lb of carcass gain cost 1.50d.

Trial 12: Whey, copra-meal, meat-meal, and pollard (Taranaki).

Eight pigs were fed with 1lb. of this mixture and 7 gallons of whey daily per pig for 56 days. They weighed 108lb. when the trial began and 175lb. when it finished. The resulting carcass increase was 54lb., worth at 6½d. per lb. 29s 3d. Meal used at a cost of £13 per short ton cost 7s. 3½d. per pig, leaving 21s. 11½d. for 392 gallons of whey, or 0.67d. per gallon. Feed used per lb. of carcass was 6.46lb.; meal used per lb. of carcass cost 1.62d.

Trial 13: Whey and linseed-meal, copra-meal, meat-meal, pollard, barley, bran, and minerals (Taranaki).

Six pigs were fed with 1lb. of this mixture and 7 gallons of whey daily per pig for 56 days. They weighed 85lb. when the trial began and 147lb. when it finished. The resulting carcass increase was 44lb., worth at 6½d. per lb. 23s. 10d. Meal used at a cost of £13 per short ton cost 7s. 3½d. per pig, leaving 16s. 6½d. for 392 gallons of whey, or 0.51d. per gallon. Feed used per lb. of carcass was 7.95lb.; meal used per lb. of carcass gain cost 1.98d.

Trial 14: Whey and meat-meal (Hamilton).

Fourteen pigs were fed on meat-meal (½lb. increasing to 1lb.), average 0.80lb., and whey (4½ gallons increasing to 6 gallons), average 5.5 gallons per pig daily for an average of 130 days. One pig died during the trial. The thirteen remaining pigs weighed 40lb. at the beginning and 198lb. per pig at the end of the trial. The resulting carcass increase was 116lb., worth at 6d. per lb. 58s. per pig. The cost of meal per pig at £12 10s. per short ton was 12s. 9d., leaving 45s. 3d. as the earning value of 717 gallons of whey, or 0.76d. per gallon. Feed used to produce 1lb. of carcass 5.5lb.; meal used per lb. of carcass gain cost 1.32d.

Value of Animal Fat In Pig Feeding

Trial 15: Milk, molasses, meal (grain and meat), and fat (Pukekohe).

Six pigs were fed with approximately 1¼ gallons of milk, ½lb. of molasses, 2 1-8lb. of meal, ½lb. meat-meal, and 1-3lb. of animal fat per pig daily for 77 days. The pigs weighed 100lb. when the trial started and 189lb. per pig when it finished. The corresponding liveweight increase was 71lb., worth at 6½d. per lb. 38s. 5d.; meal used at £12 10s. per short ton cost 33s. 1d. per pig, leaving 5s. 4d. as the earning capacity of 90 gallons of milk, or 0.70d. per gallon. Feed used per lb. of carcass gain was 5.01lb.; meal used per lb. of carcass gain cost 5.6d.

Trial 16: As above, but without fat (Pukekohe).

Six pigs received the same amount of milk, molasses, and meat-meal, but 2 7-8lb. of grain-meal (grain was used to replace fat at the rate of 2lb. grain to 1lb. of fat). The carcass gain was 67lb., worth at 6½d. per lb. 36s. 3d. Meal used at £12 10s. per short ton, cost 35s. 11d., leaving 4d. as the earning value of 90 gallons, or 0.004d. per gallon. Feed used per lb. of carcass gain was 5.6lb.; meal used per lb. of carcass gain cost 6.44d. Both these trials were conducted during the winter months.

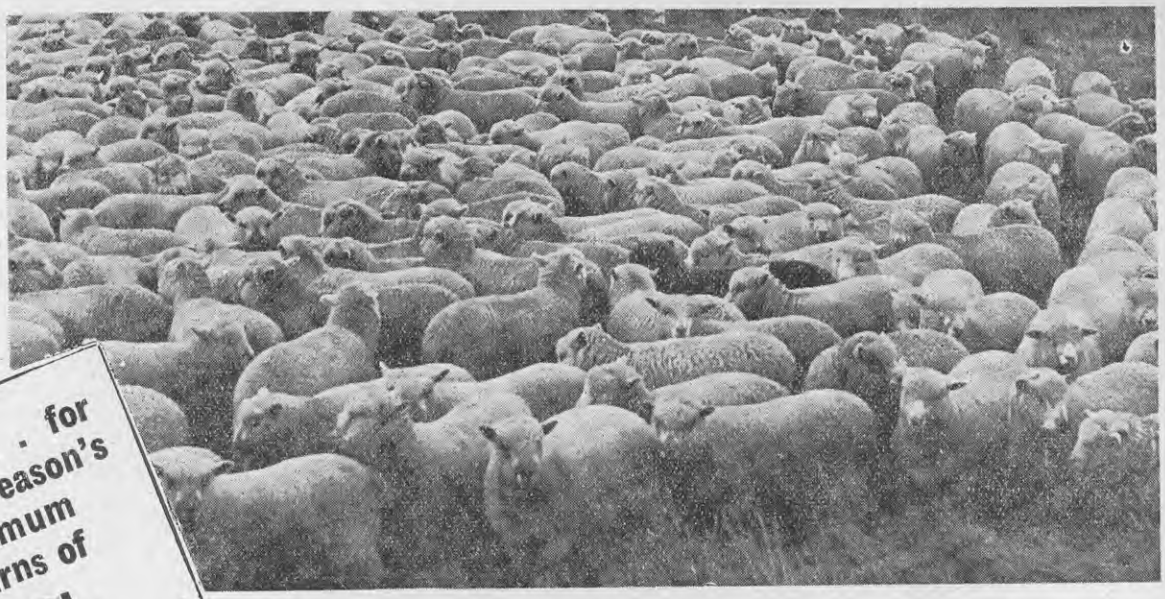
The use of fat does make it possible here to get some value out of milk, but the most striking thing about these two trials is that while the feed used to produce 1lb. of grain indicates good pigs and conditions, the excessive amounts of meal used make profits low. On the other hand, the meal used in this way may have been more than justified if it avoided selling store pigs when the market was crowded.

Trial 18: Milk, meal, and animal fat (Pukekohe).

Six pigs were fed about 2½ gallons milk, 1¼lb. of meal, and 2oz. of fat per pig daily for 124 days. They started the trial at 45lb., and finished at 186lb. per pig. The corresponding carcass gain was 104lb. per pig, worth at 6½d. per lb. 56s. 8d. per pig. The cost of meal at £12 10s. per short ton was 21s., leaving 35s. 8d. as the earning capacity of 326 gallons of milk, or 1.31d. per gallon. Feed used to produce 1lb. of carcass was 4.7lb.; meal used per lb. of carcass gain cost 2.41d.

Trial 19: As above, but without fat (Pukekohe).

Six pigs were fed the same amount of milk as in the previous trial, with a slight increase in meal as in Trial 17. The carcass gain was 101lb., worth at 6½d. per lb. 54s. 9d. per pig. Meal used at £12 10s. per short ton cost 21s. 4d., leaving 33s. 5d. as the earning value of 326 gallons of milk, or 1.23d. per gallon. Feed used per lb. of carcass gain was 4.86lb.; meal used per lb. of carcass gain cost 2.53d.



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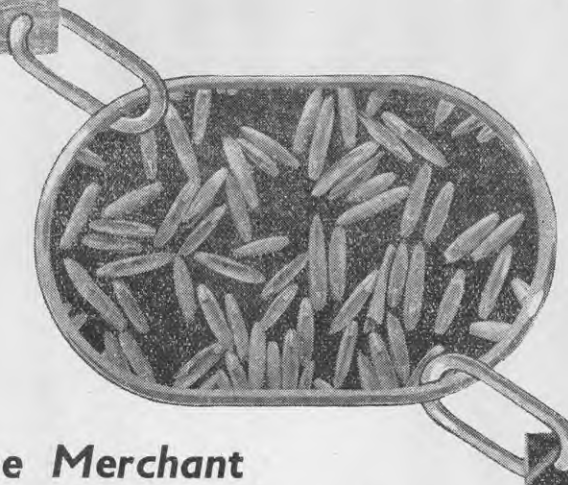
Clean Seed Production In Otago



The Link Between The Farmer And The Merchant

By
S. H. SAXBY,
Instructor in Agriculture,
Dunedin.

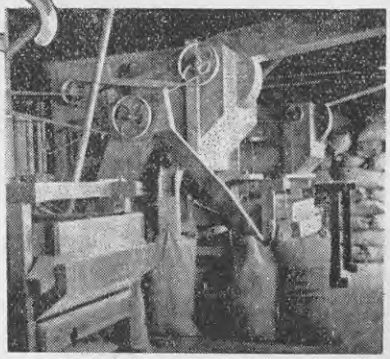
FOR many years a number of mercantile firms in New Zealand have specialised in the cleaning of farm seeds, and improvements in both machinery and methods have been made continuously, with the result that at the present time the standard of seed-cleaning is very high.

The New Zealand seed trade has to supply two markets. Firstly, there is the New Zealand or local market, and, secondly, there is the export or overseas market, which is worth some quarter of a million pounds each year to New Zealand. Overseas buyers demand that the standard of purity of all seed must be of the highest. Consequently, New Zealand merchants are able to export only seed of the very highest purity, and it should therefore be the aim of every seed producer and dresser to produce not merely "seed" but "the purest seed."

In the seed trade, in which both farmers and merchants are participants, good quality, clean seed is marketed at a premium, and it should be the aim of every seed-producing farmer to assist both himself and the seed cleaner by harvesting seed with a minimum of undesirable impurities. By doing so, not only is the firm handling the seed able to make a more satisfactory job from the point of view of the subsequent sale of the seed, but also the farmer himself is assured of correspondingly low dressing losses, thus ensuring a better net return to himself.

Purity Standards

With the use of certified seeds, where the standard of purity required is comparatively high, the production of clean seed becomes more necessary, especially as the value of this seed is, as a rule, higher than that ruling for ordinary commercial lines. The following purity standards which seed must reach before they may be finally sealed and bagged certified seed should serve as a guide to growers:—



Browntop (*Agrostis tenuis*).—Purity 97 per cent.

Cocksfoot (*Dactylis glomerata*).—Purity 70 per cent with maximum of 5 per cent of ryegrass.

Perennial Ryegrass (*Lolium perenne*).—Purity 96 per cent.

Italian Ryegrass (*Lolium multiflorum*).—Purity 98 per cent.

Red Clover (*Trifolium perenne*).—Purity 96 per cent. with maximum of 2 per cent of weed seeds.

White Clover (*Trifolium repens*).—Purity 85 per cent. with maximum of 3 per cent. of weed seeds.

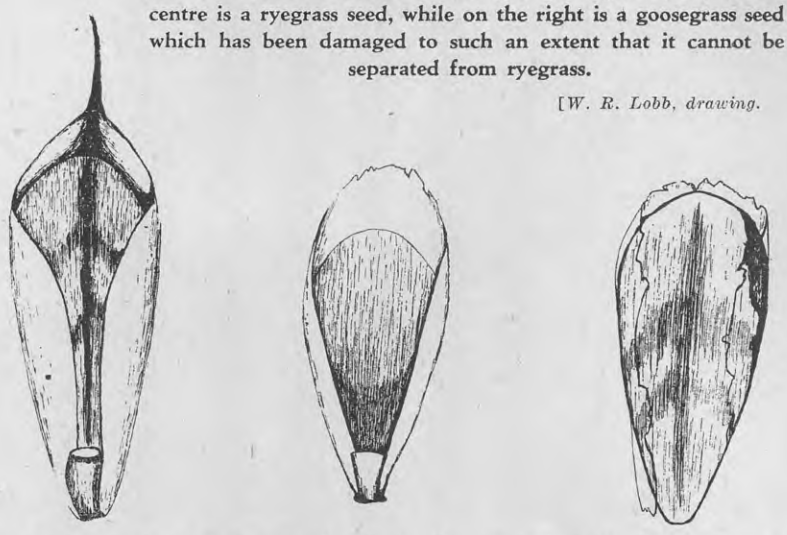
Good as the seed cleaners' machines are, there are certain groups of seeds that are very difficult to separate, or, if separation can be effected, it is often accompanied by high and costly dressing losses, which are disliked both by the farmer and the merchant. The production of clean seed undoubtedly begins on the farm.

Farmers intending to go in for seed production should, among other things, always procure and sow seed that is as far as possible free from objectionable impurities and sow it on ground that is equally free from these impurities.

Nevertheless, although these precautions may be taken, objectionable impurities frequently reach and worry the seed cleaner. It is all very well for a farmer with a dirty sample of seed to consider that it is for the seed cleaner to do the worrying, but he is apt to forget that this worrying of the seed cleaner is likely to become a costly item, and that it is reflected in the net return to the farmer. It is not uncommon for a farmer with a dirty line of seed to haunt the dressing plants while his seed is going through and to express his disgust at what appears to be an unnecessarily

The effect of damaging goosegrass is shown in this drawing. On the left is a normal undamaged goosegrass seed, in the centre is a ryegrass seed, while on the right is a goosegrass seed which has been damaged to such an extent that it cannot be separated from ryegrass.

[W. R. Lobb, drawing.



Both before and during harvest much may be done to ensure that the seed reaches the cleaners in good condition.

large amount of good seed being removed in the "seconds." The seed cleaner knows that he is obliged to produce a high quality line of seed and that in order to do so it is essential for him to sacrifice some of the good seed, much as he dislikes the necessity for doing so. That this sacrifice of good seed in dirty lines is necessary is not always recognised by farmers.

Seeds Discussed

It is quite impossible to make a complete list of impurities which are difficult to separate, as the difficulty of separation varies with the species of seed being dressed. For example, suckling clover (*Trifolium dubium*) causes little or no trouble when being dressed out of ryegrass, but 100 per cent. separation of suckling clover and white clover is practically impossible. Thus, seed cleaners have for practically every kind of seed that they dress one or more impurities which they regard as their pet aversions.

The following information has been prepared with the object of pointing out to farmers the undesirable impurities in various kinds of seed as well as measures which should assist in their control from the farmer's end. As the treatment of seed at harvest time is also very important, some notes on this aspect are included where considered necessary.

Perennial Ryegrass.

Undoubtedly one of the most difficult impurities to remove from perennial ryegrass seed is the damaged seed of goosegrass (*Bromus mollis*). Whole and undamaged goosegrass is seldom troublesome, as it is larger than ryegrass seed, and can be riddled out with comparative ease. Damaged goose-

Before the seed is sent to be cleaned it should be thoroughly dry. Damp seed is not only difficult to dress, but is also of lower value because of its musty smell and discoloured appearance.

grass seed—that is, seed which has had the awns and wings broken off—is, however, very difficult to remove, as it then becomes almost identical in size, shape, and weight to ryegrass seed. Farmers harvesting ryegrass for seed should, therefore, endeavour to sow only clean seed on clean land.

In the event of goosegrass becoming aggressive, as it often does after several harvests, the paddock should be grazed or at least cut for an early crop of hay or ensilage. Being an annual plant, goosegrass may be controlled by preventing it from seeding. Building up the sward by grazing throughout the summer and topping with the mower is doubtless the best way of controlling goosegrass. Most farmers recognise that goosegrass increases with each harvest, which is, of course, due to the opening up of the ryegrass sward and the rapid establishment of the somewhat earlier ripening goosegrass.

At threshing time care should be taken that the goosegrass seed is not damaged. This damage may be obviated to a considerable extent by removing the pegs on the concave or in a beater type of thresher by opening up the concave as far as is compatible with efficient threshing. Nevertheless, some damage is unavoidable, especially if the seed is very dry. In this case, steady feeding rather than "bumping" the sheaves through will assist.

During the last few years methods in harvesting have changed considerably, the latest development being the header harvester. With its advent have come troubles as well as very great advantages. The header does its best work when crops are thoroughly dried out and are consequently very brittle. As the result of this brittleness the straw is frequently broken up into small pieces about ½-inch long. In some dressing plants these are very difficult to separate from the ryegrass seed. This unfortunate position is brought about not because the header harvester is an inefficient machine—it is actually a very valuable addition to our list of modern farm implements—but because of two sets of circumstances. Firstly, the crop must be dry to be thrashed efficiently, and secondly, headers can be worked economically only in districts where continuous dry weather can be expected. These two factors have a cumulative effect on the dryness of the ryegrass straw.

Another impurity which sometimes causes concern in perennial ryegrass is unshelled and partly ripe black medick (*Medicago lupulina*). Fortunately, black medick is localised, and

Because of the similarity in size, timothy and white clover seeds are very difficult to separate, and should therefore not be harvested together.

is of serious consequence in only a few districts. Comparatively little can be done to counteract this plant when it has become thoroughly established. It increases fairly rapidly, but, being a short-lived perennial, it cannot be controlled as effectively as annuals, such as burr clover or goosegrass. On country where black medick is liable to be a serious competitor seed production might well be confined solely to young pastures, in order that the seed may be harvested before the black medick has a chance to become thoroughly aggressive.

It should be emphasised that in sowing down pastures for perennial ryegrass seed production it is essential that Italian ryegrass should not be included in the seeds mixture. If a mixture of these two were sown and the paddock and its progeny harvested over several generations the product would be a mixture of the two species, together with a large amount of hybrid seeds possessing few desirable qualities. Another point to be watched in the production of perennial ryegrass seed is that hay containing ripe Italian ryegrass is not fed out on proposed seed-producing areas. This practice has on several occasions been responsible for the rejection of seed-producing areas for seed certification.

Italian Ryegrass.

Although Italian ryegrass seed is superficially very similar to that of perennial ryegrass—the main difference being the presence of an awn on the former—the more serious impurities are somewhat different. Firstly, Italian ryegrass does not, as a rule, contain many impurities, as it is by force of circumstances harvested from young pastures only.

Secondly, most farmers realise that in order to obtain a good price for the seed very light threshing is necessary so that the awn is not broken off. On this account, goosegrass is seldom damaged badly, and may be separated fairly easily. Damaged goosegrass is just as difficult to remove from Italian ryegrass as it is from perennial ryegrass, but its presence is not common.

Probably the most disconcerting impurity in Italian ryegrass seed is unshelled white clover. This is of no moment in perennial ryegrass seed, as the seed cleaner merely runs the line of seed through the brushes, thus effectively shelling the clover and enabling a separation by blast and riddle to be made. With Italian ryegrass this brushing is not possible, as by doing so the awn—which indicates that it **is** Italian ryegrass—is broken off.

It is, however, only on the heaviest country that white clover is liable to grow to such an extent that it is harvested in any quantity in first-year Italian ryegrass. In the event of white clover being present in large quantities in an Italian ryegrass seed crop, the binder should be raised sufficiently high to miss as much of the clover as possible.

Cocksfoot.

The cleaning of cocksfoot seed gives, on the whole, more headaches to the seed cleaners than any other seed. The seed of cocksfoot varies very much in weight, inert matter, double heads,

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(Signed) A. SAVIN, Ellesmere.

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(Signed) H. W. BARKER, "Acton," Hexton, Gisborne.

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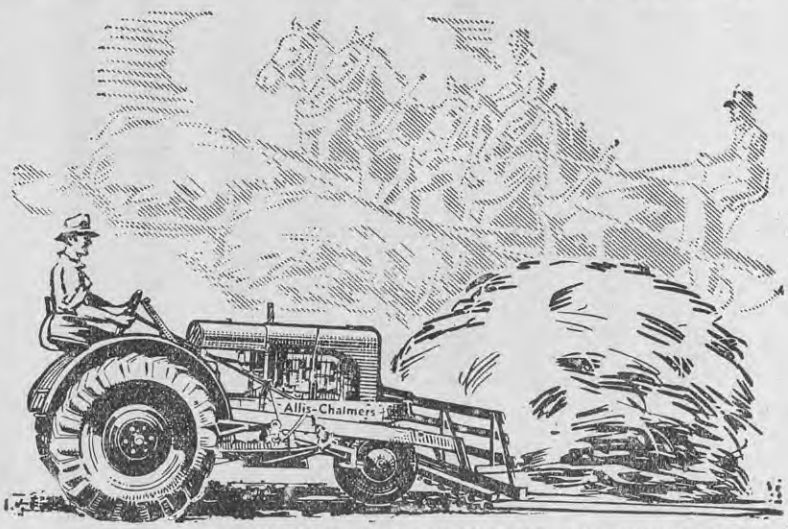
(Signed) F. SOMERTON, Hexton, Gisborne.



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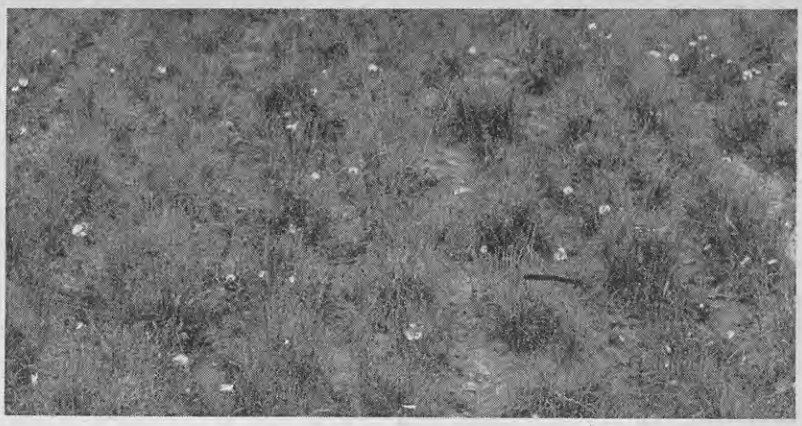

Catsear is an undesirable impurity in Chewings fescue seed. Here it may be seen in a renovated fescue sward.

and various weeds. Consequently, every line presents a separate problem. This problem also occurs with other species, but it is accentuated with cocksfoot. Inert matter consists mainly of husks, which do not contain a viable seed. Much of this can be removed satisfactorily, but because of the light weight of the good cocksfoot seed some of this latter is usually removed as well. As the amount of seedless husk is governed largely by the weather, the farmer is able to do little except to expect a possible high dressing loss.

Small ryegrass seed is a serious stumbling block in some lines of cocksfoot. Cocksfoot is a tussocky and shade-loving grass, whereas ryegrass is much closer growing and will not tolerate shade. These factors are turned to advantage in the best cocksfoot seed production areas, where the cocksfoot is seldom if ever grazed and is usually cut at a height of about 8 to 12 inches. Under this treatment the growth of the cocksfoot is satisfactory, while the ryegrass is gradually smothered out.

Any farmer anticipating cocksfoot seed production should make every endeavour to purchase seed free from ryegrass seed. Even 2 per cent. or 3 per cent. of ryegrass in a line of cocksfoot seed may result in trouble with ryegrass as an impurity for several years.

In some cocksfoot paddocks there is present a certain amount of Yorkshire fog (*Holcus lanatus*), the seed of which may be harvested as an impurity. Under normal conditions this causes no trouble, as the line is run through the brushes and the fog shelled, making separation simple. If, however, the seed reaches the cleaners in a damp condition, as it sometimes does, brushing is ineffective on the damp unshelled Yorkshire fog seed, with the result that the line has to be tipped out and dried on the floor or this part of the separation abandoned. The remedy for this is obvious—send only dry cocksfoot seed to be dressed.

Timothy.

Although only a comparatively small quantity of timothy seed (*Phleum pratense*) is harvested and dressed in New Zealand, there is no doubt that the southern districts could produce considerably more than they do. As is the case with other species, the cleaning of timothy seed sometimes presents considerable difficulty. The main bugbear in dressing timothy seed is the presence of white clover and alsyke (*Trifolium hybridum*). These seeds are very similar in size and

weight, and defy 100 per cent. separation. Consequently, farmers producing timothy seed for sale should try to ensure that the paddock contains little or no white clover or alsyke. If the production of timothy seed is regarded as a long-term project, this objective may be achieved.

Timothy, like cocksfoot, is a tall-growing, shade-enduring plant, and will dominate in a pasture after several consecutive seed crops have been taken. These seed crops will also have the effect of reducing to a small quantity the amount of white clover. Grazing should at all times be light in order that the "bottom" will not be opened up enough for the establishment of young clover plants.

Chewing's Fescue.

The dressing of Chewings fescue (*Festuca rubra, var. fallax*) presents certain difficulties regarding impurities. As most of this seed is used for the sowing down of lawns and playing areas, very high purity is desirable. Unfortunately, two of the most difficult impurities to remove are also regarded as being undesirable in lawns. These are catsear (*Hypochoeris radicata*) and perennial ryegrass.

In an undamaged condition catsear seed has a long, slender beak, and can be easily separated from fescue seed, provided this beak is not broken off. It is very difficult to prevent this from breaking during harvesting, with the result that control methods should aim at preventing the catsear from seeding. This may be accomplished with considerable success by running a few sheep in the fescue paddocks almost up to harvest time. The sheep will pick out a large amount of the catsear without doing much harm to the fescue. So effective is this treatment that merchants are able to tell by the quality of the field dressed seed whether or not sheep have been running in the paddock.

Small ryegrass seed is another most undesirable impurity in Chewings fescue, and is very difficult to separate. Because of the fact that ryegrass seed is readily distributed in the wool of sheep and the fact that fescue areas are periodically renovated, little can be accomplished in the control of ryegrass in fescue paddocks other than by ensuring that clean seed is sown on clean land.

Red Clover.

The most serious impurity with which the seed cleaners have to contend in dressing red clover is rib grass (*Plantago lanceolata*). The com-

plete separation of ribgrass and red clover is possible with specialised machinery, but the cost in relation to the quantity of seed with which it would have to deal is too high to warrant its installation.

Ribgrass is common as an impurity in red clover seed harvested in areas which dry out to a considerable extent in the summer and on which the cover of red clover is relatively thin. Almost the only remedy for a paddock which is badly infested with ribgrass is the plough. Prevention is better than cure, and every effort should be made by suitable management to ensure that a dense cover of clover is obtained.

White Clover.

The production of clean white clover seed also presents its difficulties in the nature of impurities, of which the most common is undoubtedly suckling clover. Although the seed-cleaning machinery is extraordinarily efficient in this separation, some lines of white clover which contain large seeded suckling are very difficult to clean thoroughly, with the result that the value of the white clover seed is correspondingly low. In such lines heavy dressing losses are often inevitable in order that a reasonably satisfactory sample of white clover may be produced.

Suckling clover is a second-rate annual clover, and is usually present in white clover crops taken from dry or fairly low fertility country. In addition to this, there is also a large amount of white clover seed saved more by accident than design as an associate seed in a ryegrass crop. In such cases the presence of suckling clover is fairly common.

If, however, an area is sown down with a good strain of white clover on a good seed bed and is well limed and manured, the growth of the white clover is usually sufficient to smother out the suckling clover. Here, again, emphasis should be laid on the necessity for managing a seed production area for one particular species rather than endeavouring to obtain a crop of two species or, as sometimes happens, shutting up a paddock and harvesting whatever happens to look best at harvest time. Alsyke and timothy are also undesirable impurities in white clover seed, and should be discouraged in any area to be used specifically for the production of white clover seed.

The control of timothy in an area closed for white clover seed production may be secured by topping the heads of timothy with a mower before they have produced fully-developed seeds. This is roughly a month or so before the clover is ready to cut. Topping later will, of course, be of little use, as the mature heads will merely be picked up and threshed with the clover.

Alsyke.

There is comparatively little alsyke harvested in New Zealand, although a certain amount of the larger seed is dressed out of white clover as an impurity. In harvesting alsyke for seed, white clover, suckling clover, and timothy are likely to be most troublesome as impurities when it comes to dressing the crop.

It should be understood that in addition to the foregoing species there are several others which are harvested more or less regularly in this country.

For example, the annual production of browntop seed is considerable, but pastures are seldom sown down and managed specifically for the production of the seed of this species, and the harvest in many cases is fortuitous. Consequently, it is hardly worth making any recommendations regarding the control of undesirable plants.

Summary.

In the production of "clean seed" the following points should be borne in mind:—

(1) Sow seed which is free from impurities that are known to be difficult to separate in the dressing plants.

(2) Sow clean seed on clean land.

(3) Try to ensure that the crop desired is the dominant species at harvest.

(4) Keep an eye on the seed, not when it is being dressed, but when it is being threshed.

(5) For seed production areas sow only mixtures that will not produce undesirable impurities.

(6) Remember that the seeds of certain useful pasture plants become almost "weed seeds" when occurring as impurities in a line of another kind of seed.

(7) Don't send damp seed to be dressed.

The following table shows the most common undesirable impurities encountered in the dressing of pasture seeds:—

Seed being dressed.	Impurities that are hard to remove.
Perennial ryegrass	Shelled goosegrass, Italian ryegrass, English trefoil in the shell, cocksfoot, broken straw.
Italian ryegrass ..	Goosegrass (occasionally), White clover in the pod, Hairgrass.
Cocksfoot	Small ryegrass, shelled goosegrass, damp yorkshire fog in the shell.
Timothy	White clover, Alsyke, Suckling clover.
Red clover ..	Ribgrass, Dock (sometimes).
Alsyke	White clover, Timothy, Suckling clover.
White clover ..	Alsyke, Timothy, large Suckling clover.
Chewings fescue	Catsear, small ryegrass, Cocksfoot, Dogstail.

Acknowledgments

Grateful acknowledgment is made to Messrs. J. E. Macassey and J. Sutherland, of Dunedin, for some of the information embodied in this article. Photographs are by H. Drake.

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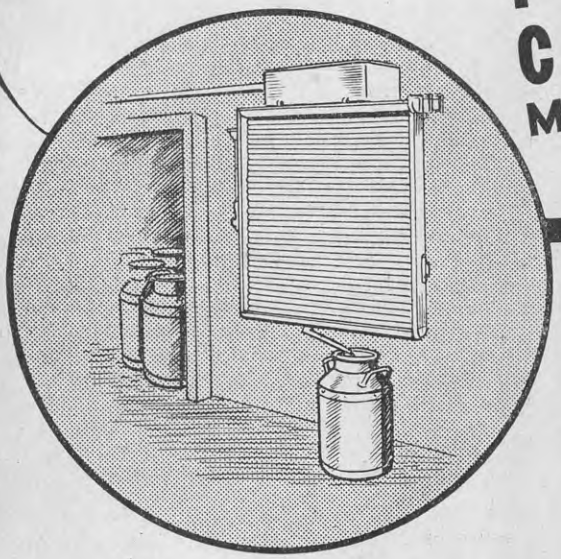

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Bull Fertility Testing Service

Results of the first year's work have shown that the bull-testing service is of real value in detecting the bull of low fertility. Steps are being taken this year to increase the efficiency of the service, which is available free of cost to all dairy farmers in New Zealand.

By

T. A. BLAKE,

Veterinary Research Officer, Ruakura Animal Research Station.

RESULTS are now available for the first year's work in the bull fertility testing service, the initiation of which was described in the September, 1940, issue of the "Journal." Semen samples were submitted by veterinarians and stock inspectors from 138 bulls, and for seven of these repeat samples were forwarded to check the result of the first examination. The bulls were classified as follows:—

Good	48
Moderate	49
Unsatisfactory	21
Bad	6
Sterile	7
Useless samples	7
Total	138

During the past few months data have been collected from owners which have enabled the performance of 69 of these bulls to be tabulated against their classification by semen examination. The results are shown in the following table, in which only bulls with data for at least ten services have been included.

Performance percentages of fertile matings.	Good 100-70 per cent.	Moderate 70-50 per cent.	Unsatisfactory. 50-30 per cent.	Bad. 30-10 per cent.	Sterile. 10-0 per cent.
91-100	2				
81-90	5	2			
71-80	5	5	3		
61-70	6	3		1	
51-60	5	2	1		
41-50	2	1	2		
31-50	1	2	2		
21-30	4		1	1	
11-20	1	2	1		
1-10	2	1			1
0			2	1	2
Total:	33	18	12	3	3
Average per cent. fertility.	58	57	38	31	0.3

"Good" and "Moderate" Bulls

It will be noted that a number of bulls appear in both the "good" and "moderate" columns whose fertility was below 50 per cent. It should be explained, however, that the performance of these bulls was reckoned by calculating the percentage of successful services on all cows, including those which remained empty. This, of course, does not give a true index of the bull's fertility, as it is not possible for any bull to fertilise a cow whose reproductive organs are in an unsatisfactory condition.

Two herds may be quoted in this connection. In one of them, a bull was classed "good," but only two out of 39 cows held to the first service. The owner, however, reports that he has had trouble in the herd during the past 20 years. In the other case, samples were examined from three bulls, and all were classed as "good," yet their performances were only 0, 6, and 16 per cent. respectively. The fact that three bulls all failed in the same herd would appear to indicate that the trouble lay with the cows. It must be emphasised that the bull is not the only factor in producing a bad calving record, and where an owner is experiencing trouble and the bull is classed as "good" or even "moderate," steps should be taken to obtain veterinary advice concerning the reproductive efficiency of the cows. The figures 58 and 57 considerably underestimate the respective average percentage fertility of the "good" and "moderate" bulls.

"Unsatisfactory" Bulls

Altogether, 21 bulls were classified as "unsatisfactory." Four of these are shown in the table as having performances of more than 50 per cent. One, however, recorded only 51 per cent. Of the three with performances between 71 and 80 per cent., the sample from one was very unsatisfactory for examination; a second examination of the semen sample from another indicated that it had been graded rather harshly, and "moderate" would have been a more accurate assessment; the

third bull, which was 14 years old, served only 12 cows, and it is highly probable that his performances would not have been so good had he been asked to serve a full quota. Eight bulls in the table had records of under 50 per cent. Incomplete data are available for three other bulls. It was reported that cows were returning to one; a second was destroyed; the third was said to be giving fair results, and was retained for further trial. No data are available concerning the other six bulls classed as "unsatisfactory."

"Bad" Bulls

Six bulls were classified as "bad." One bull shown in the table obtained 65 per cent. conceptions from 17 services. The sample submitted was a very few drops of dirty material, and should have been rejected; the second bull in the table was successful in 27 per cent. of services, and the third left no calves. Incomplete data are available for two others, neither of which appears to have got many cows in calf. No data are available for the other bull classified as "bad."

"Sterile" Bulls

Seven bulls were classified as "sterile." One of these obtained two conceptions from 27 services. Two others left no calves. Incomplete data are available for three others, none of which was known to have got any cows in calf. No data are available from the seventh bull.

If the diagnosis of "bad" or "sterile" is accepted in the cases for which no data are available, it will be found that at least 19 bulls have been detected with less than 30 per cent. fertility, and four others with less than 50 per cent. fertility.

Collection of Semen

Many very good samples were received from the veterinarians and stock inspectors, but some were too poor for any useful diagnosis. This was expected, because it is known that the quality of semen is not always constant, especially when dealing with bulls of moderate or poor fertility. Moreover, the very fact that trouble is being experienced in a herd would suggest the probability of a poor sample being obtained. If the semen is watery, the collector has a difficulty in obtaining a representative sample from the cow, and the examiner also is placed in a difficult position because he does not know whether the sample is a fair one or not. This unfortunate position may be overcome in many instances by the use of the artificial vagina, which is used to collect the whole semen sample uncontaminated by the secretions from the cow, thus enabling the collector and the examiner to know the quality and quantity of the service without any doubt.

For this purpose, artificial vaginas are to be placed at the disposal of the officers of the Department of Agriculture in the main dairying centres, and true samples can be obtained where conditions are suitable. These suitable conditions include a bull which is not very nervous or wild, and the use of a quiet cow in season. In many cases it may be necessary to halter or otherwise put restraint on the cows being used, but this can usually be done without great trouble. A dehorning bail with a large gate opening at the side is excellent for taking samples, but the gate must open on the right-hand side of the cow if the collector is right-handed. This method of obtaining semen is usually quick, and enables the collector to obtain clean and representative samples without interference to the cow except

in keeping her quiet during the operation.

Two New Methods

This year, two further methods of assessing fertility will be tested on a limited number of bulls. Both of these have been sponsored by workers at the Wisconsin Agricultural Experimental Station in America. It has been found that in some bulls of low fertility the concentration of ascorbic acid or vitamin C in the blood and semen is lowered, and in these cases intravenous injections of ascorbic acid have resulted in improved fertility. As occasion offers, the ascorbic acid status of infertile bulls will be assessed and if the results appear to warrant it injections will be made in an attempt to alleviate the condition. The same group of workers have evolved a diluting fluid in which semen will remain alive for prolonged periods, and they suggest that the fertility of the bull can be assessed by measuring the length of life of the semen when preserved at low temperatures in their diluent. This method, too, will be tested this year on some bulls.

It is desired that the bull-testing service be made available to all farmers whose cows are returning or who, for some reason, wish to utilise the service in order to find out, as nearly as possible, what the performance of the bull is likely to be in practice.

In one district during the past season some confusion arose through the belief that samples taken at a distance could not arrive at Ruakura in a suitable condition for examination. In this connection it is pleasing to be able to report that some samples taken from as far afield as Dunedin arrived in excellent condition, and correct diagnosis was made on a number of them.

Submitting Samples

As indicated last year, farmers desiring to have a bull tested should approach the nearest Government veterinarian or stock inspector, who will arrange to collect a semen sample and forward it to Ruakura for examination. Should owners so desire, collections may be made by qualified veterinarians in private practice. If the latter contemplate forwarding samples, it is suggested that they communicate with the writer, who will forward full particulars concerning the samples which should be submitted for examination.

There may be a little trouble in arranging dates for visits of the officers to collect samples from farms situated

a long distance from the centres because of the petrol restrictions, but it is hoped that most farmers who inquire will be attended without undue delay.

It will be much appreciated if farmers who make use of this service will be good enough to keep the usual shed sheet up to date so that records may be obtained at the end of the season. The data required are principally:—

1. The number of cows served by each bull.

2. The number holding to the first service.

3. The number holding to the second service.

4. Any items of interest relating to the herd.

It must again be stressed that the test is not 100 per cent. perfect, but if an artificial vagina is used to collect the samples, a good deal of reliance may be placed on the assessments of fertility, because the material is suitable for examination and is, moreover, a true sample of the semen produced if two services are obtained under suitable conditions.

Because of the fluctuation in quality of services, I desire to stress the desirability of a second examination before such drastic action as culling is undertaken, unless the history of the animal agrees with the classification made by the examiner.

Summary

1. Results of the first year's work have shown that the bull testing service is of value in detecting the bull of low fertility.

2. During the year at least 19 bulls were found with less than 30 per cent. fertility, and a further four with less than 50 per cent. fertility.

3. The bull is not the only factor in sterility, and where trouble is experienced and the bull is diagnosed as good or even moderate, veterinary advice should be sought in regard to the cows.

4. Steps are being taken this year to increase the efficiency of the service, which is available free of cost to all dairy farmers in New Zealand.

Acknowledgments

Thanks are tendered to Mr. A. H. Ward, Technical Officer, New Zealand Dairy Board, for assistance in tabulating data, to veterinarians and stock inspectors of the Livestock Division for sympathetically co-operating in the collection of samples and the intelligent interpretation of results to owners, and to all dairy farmers who forwarded breeding statistics for use in checking the efficiency of the service.

Sooner or later the poorer pastures on the farm must be renovated. What is the best way to go about it? This article discusses the various methods available, and particularly deals with the question of ploughing and cultivation versus surface sowing. It is emphasised, however, that no matter which method is adopted, the ultimate result will depend largely on the topdressing practice and subsequent management.

RENOVATING FARM PASTURES

By

P. S. SYME,

Instructor in Agriculture,
Warkworth.

EVERY farmer is at some time confronted with the problem of how best he can renovate his poorer pastures. Almost inevitably the time must arrive when he is called on to decide whether to make a clean sweep and a fresh start with the plough, whether to rely on a programme of surface sowing combined with topdressing, or whether the object might possibly be economically achieved by generous topdressing alone.

Although, in the extreme case of a pasture which is very poor or one which is moderately good, the answer is obvious, the problem is frequently very complex, and only too often the correct answer is found too late at the price of costly experience.

Importance Of Clovers

Considering the last-mentioned method first, experience goes to show that it is indeed difficult to over-estimate the cumulative effect of a sustained programme of efficient topdressing. While this is undoubtedly true, it must also be admitted that heavy topdressing is expensive, and that if insufficient of the better clovers are already present in the sward, the cost may well be altogether disproportionate to the results obtained.

Wherever really spectacular results have followed topdressing, a detailed study would almost invariably have shown that, although very minute and inconspicuous, nucleii of clover plants already existed in the sward before the topdressing. Even though only one starving, pin-head-sized white clover plant per square yard can be found after diligent search, this, considering the rapid spreading powers of its runners and seeds, can, under conditions of improved fertility, quickly produce a complete ground cover.

Clovers Not Always Present

It may be argued that nowadays such nucleii will invariably be found in any pasture, no matter how poor. It should be pointed out, however, that clover is not always present. In poor

danthonia country which has been repeatedly burned over it is frequently conspicuous only by its absence, and on such land much water will have run under the bridge before an appreciable return is obtained from topdressing. Moreover, the clover present may well be of a very inferior and low producing strain, having little value compared with modern clover standards.

While it is sometimes extremely difficult to decide whether topdressing alone will prove a practicable and effective method of renovation, a close examination of the proportion of the more valuable species of grasses and clovers will at any rate provide some indication, and this, in conjunction with any previous experience obtained by topdressing somewhat similar adjacent pastures, may enable the farmer to arrive at a reasonably safe decision.

Ploughing and Resowing

Where the land is easily ploughable and the area not too extensive, and where the existing pasture is particularly poor, ploughing and resowing is likely to prove the best method of renovation. If, in addition, the farmer can perform the whole of the work with his own labour, this may very confidently be recommended as the most satisfactory method. Whether or not the opportunity should be taken to crop the land before the final grassing must depend largely on circumstances. It should be borne in mind, however, that while cropping may reduce the overhead cost of grassing, the difference in value between a poor pasture and a really good pasture is so great that future prospects should not lightly be jeopardised merely for expediency or for present gain.

The speedy establishment of the more valuable pasture species is very largely dependent on the soil fertility, and where this is even a matter of doubt, every effort should be made to conserve the food reserves for the crop which matters most—the permanent pasture—rather than to dissipate this fertility on a crop which, after all, may be of only secondary importance.

Under modern conditions, with the seeds and fertilisers now available, really excellent pastures can be comparatively easily established even on land which a generation ago was regarded as almost worthless. By ploughing, the inferior grasses and weeds are at once eliminated instead of having to be completely displaced over a period of years by the spreading of a relatively small proportion of the desirable grasses and clovers, encouraged by suitable topdressing.

The ploughing and cultivating raises the level of fertility, and at the same time permits of a full sowing of selected strains of the best species of grasses and clovers. Sown on a clean, well-prepared seed bed with no weed competition, these germinate quickly and speedily establish a high producing pasture. Although the cost may appear fairly high, the returns in proportion are still higher. There is no long interim period of waiting for results; with proper management, high production may be expected within a matter of months.

Surface Sowing

Where, for various reasons, ploughing is either impracticable or inadvisable, the surface sowing of selected

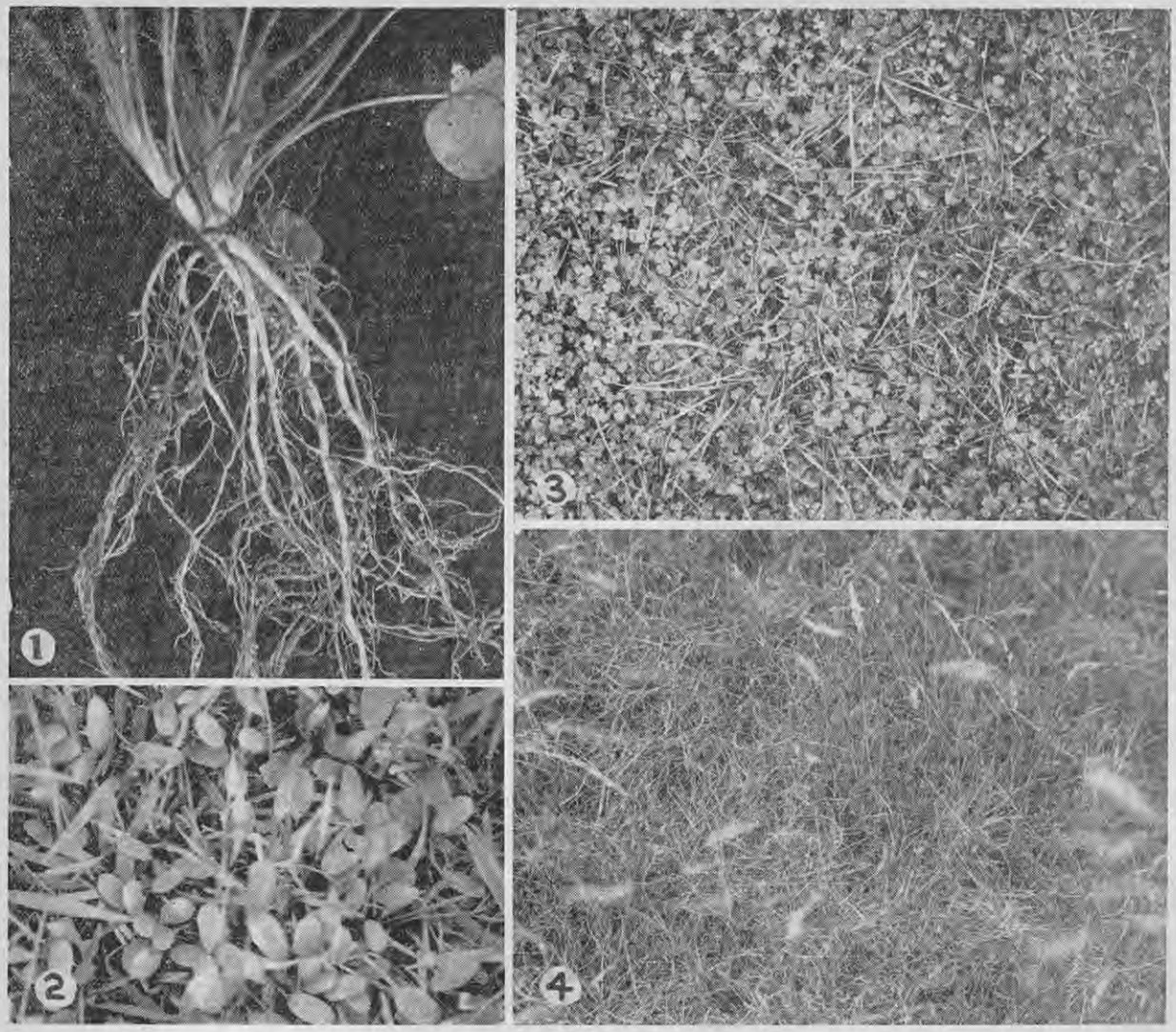

Fig. 1.—The nitrogen factory of the farm. The nodules shown on the roots of the clover provide all the nitrogen needed for vigorous growth of the plant, and leave a surplus for the grasses in the pasture. *Fig 2.*—Minute subterranean clover plants establishing after surface sowing. The soil was very exposed and white clover was difficult to establish. Subterranean clover was sown at 5 lb. per acre. The photograph shows a selected and exceptionally good patch. *Fig. 3.*—The same patch about 18 months later. The subterranean clover has established well, and in addition to providing much valuable feed it is raising the fertility for the grasses. *Fig. 4.*—A very poor and exposed danthonia pasture. Through repeated burnings the sward is practically pure danthonia. On this class of country topdressing, even when combined with surface sowing, is apt to prove a very slow and expensive method of renovation.

pasture seeds may provide a satisfactory alternative. While spectacular results have been achieved by this method, much depends on the soil and on the sward. In general, success is more slowly achieved than by ploughing, and it may be necessary to continue the sowings over a number of years.

Although costs are low, the loss in production during the building-up period as compared with the almost immediate increase obtained by ploughing must be taken into account when making a comparison. This particu-

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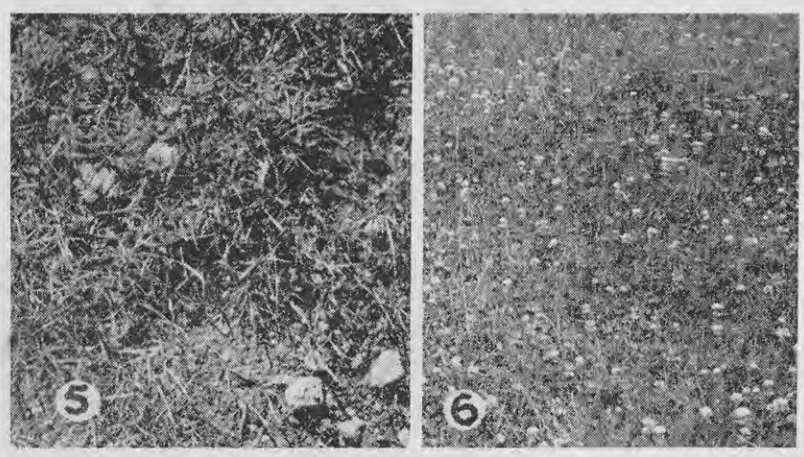
larly applies where the existing pastures are very poor. Surface sowing does, however, permit the introduction of the best species and strains of seeds, and in this respect it may have a decided advantage over topdressing alone as a means of pasture renovation.

Select Species By Fertility

Although the practice of sowing a general mixture of both grasses and clovers is fairly common, it is apt to be wasteful. If the clover is seriously deficient and the fertility low, the sowing of high fertility grasses, such as perennial ryegrass, at this stage is likely to prove a mere waste of money. Under these conditions, an effort should first be made to build up the fertility by means of clovers before sowing the better grasses. If, however, the clovers are already fairly abundant, ryegrass may be sown with fair prospects of success.

In selecting the grasses and clovers to be sown, preference should be given to the most valuable and productive species, having regard to the existing standard of fertility and the projected topdressing programme. Although the choice of the grasses may cover a fairly wide range according to the varying soil conditions, in general practice perennial ryegrass and crested dogstail are probably those most commonly included.



Figs. 5 and 6.—Showing the effect of lenient grazing of a young pasture to permit re-seeding. The seed was sown under very adverse conditions and the original establishment (Fig. 4) was very thin and poor. Following careful management, the pasture re-seeded freely in the following autumn, and now carries an excellent rye-clover sward (Fig. 6).

The clovers are even more important than the grasses, and should receive special consideration. Where conditions are likely to favour its growth, a good strain of white clover should certainly receive first preference. Where conditions are somewhat too hard for

white clover, subterranean clover may offer better prospects of success. Although subterranean clover is inferior to white clover on good land, its ability to thrive on land which is too dry for white clover, its earliness of growth, its persistence, and its high efficiency as a nitrogen-producer combine to make it worthy of consideration under a wide range of farming conditions. When used, this clover should be sown when conditions are favourable in the autumn.

Lotus major is well worthy of inclusion where the soil is moist, and is a useful ally in the combating of rushes. Red clover is sometimes included because of its bulk of feed, but unless conditions are particularly favourable for its establishment, it is probable that it is much inferior to the long-lived and rapid-multiplying white clover for this purpose.

Time of Sowing

Just when the sowing should be performed must depend largely on circumstances and on the locality. Usually, however, autumn is the time most favoured, and, as the success of the sowing largely depends on the topdressing, it is common to apply the seeds with the fertiliser during the normal autumn topdressing. When superphosphate is used, the seed should be mixed and sown on the same day to avoid risk of germination injury.

Before sowing, the pasture should be fairly well grazed to ensure that the seeds will actually come in contact with the ground. While good results are sometimes attained without harrowing, much depends on the type of the sward. Where the turf is close and matted, or where moss is prevalent, a good penetrating harrow can frequently be employed to considerable advantage to open up the turf and prepare a bed for the seeds. The use of a roller or the running of sheep over the area after sowing will greatly improve the prospects of a successful strike.

Rates of Sowing

Sowings may range from a few ounces of subterranean clover per acre repeated over a number of years up to 10 lb. of mixed clovers per acre in one year. While the mixture to be used must depend on circumstances, it should be remembered that with a poor seed bed and severe competition from already established plants, mortality must inevitably be high. For this reason the heavier sowings are not to be recommended unless conditions appear to be reasonably favourable.

The following sowings might be considered as fairly representative, but the species and quantities may be materially altered according to requirements:—

Good Quality Land where Clovers are Deficient.—2 to 3 lb red clover; 1 to 2 lb. white clover.

Where both Grasses and Clovers are Poor on Land of Fair Quality.—6 lb. perennial ryegrass; 1 to 2 lb. white clover; 1 lb subterranean clover.

Second-class Land Deficient in Clovers.—2 lb. subterranean clover; 1 lb. white clover; ½ lb. *lotus major.*

When the Clovers are Established.—6 lb. perennial ryegrass; 1 lb. crested dogstail.

Seeding From Hay

This modified method of surface sowing as a means of improving the poorer areas of the farm by a systematic programme of feeding out hay is

well known to every farmer, and has proved particularly successful in the establishing of ryegrass and paspalum. Quite apart from the seed which may be shed, the manurial return from the hay has a very potent effect in raising the fertility, and this in turn tends to encourage the spread and development of the better species of pasture plants.

So far as the seeding aspect is concerned, however, it should be noted that the germination percentage of useful seed in hay cut at the proper time must be extremely low. When, owing to circumstances, the hay has been cut too late, the germination of the seed may be proportionately higher and may provide a very appreciable sowing. The trampling effect of the stock combined with the rise in the soil's fertility greatly assists in improving the strike, and tends to promote rapid development of the young plants.

While the practice of delaying the cutting of the hay for the sake of the seed cannot altogether be recommended, some farmers with ryegrass-paspalum swards have made it a practice to allow the ryegrass to ripen before cutting. By this time the young paspalum is making vigorous growth, and it is contended that the inclusion of this more than compensates for any deterioration of the ryegrass element, so that such hay not only possesses a high feeding value, but is also extremely useful for renovating the poorer areas. Whether or not this practice is desirable must obviously depend largely on the relative proportion of the ryegrass and the paspalum in the hay.

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Leaving the Sowing To Nature

Under certain conditions a surface sowing can be efficiently applied by leaving the work to Nature alone. Where the sward is rather thin and the ground reasonably clean in a young pasture, excellent results are often obtained by lenient grazing, which permits the plants to produce considerable quantities of seed. This seed is eventually shed, and readily germinates when conditions are suitable in the autumn, the shelter afforded by the rough growth of stems helping to prevent drying out and promoting speedy establishment.

This method is only to be recommended where conditions are favourable, however, and good results cannot be expected where the bulk of the seed falling is from weeds or the soil conditions are unsuited for the development of the young seeds. Needless to say, the subsequent management should be designed to encourage and establish the regeneration.

Choice of Methods

Just which of the above methods will prove most profitable must necessarily depend on the farm and on the farmer. On many farms, particularly if the area is large and the majority of the pastures poor, all these methods may usefully be employed. It must be emphasised, however, that no matter which method is adopted, the ultimate result will be largely decided by the topdressing practice and the subsequent management of the pasture.

TREATMENTS FOR THE CONTROL OF SMUTS IN CEREAL CROPS

By
D. M. E. MERRY,
Instructor in Agriculture, Nelson

THE cereal smuts of oats, wheat and barley cause heavy annual losses, which now more than ever must be prevented. Smut fungi are of two types, perpetuated by (1) spores carried on the exterior of the seed or (2) fungous threads (hyphae) embedded in the tissues of the seed. These differences govern methods of treatment.

Oat Smut

The oat is susceptible to loose-smut (*Ustilago avenae*) and covered-smut (*Ustilago kolleri*), both of which are readily controlled by treatment with organic mercurial dusts. The fungous spores producing loose-smut of the oat are carried by the wind from smutted to clean heads, usually at about the time the grain in the healthy ears is nearing maturity. Infection arises through one or more spores lodging in the enveloping husk, where the spore remains, if untreated, until the next sowing season. It then germinates along with the germinating grain, and the fungous hyphae penetrate and grow along with the oat plant. Infected plants may indeed be wholly indistinguishable from others, although in some cases they are said to grow even more vigorously.

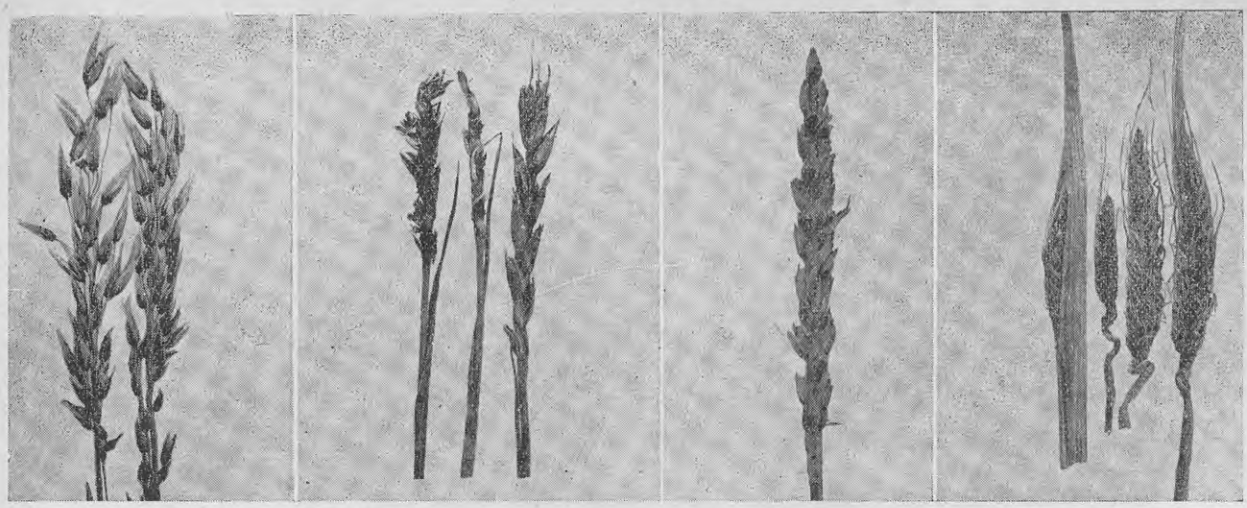
At about the time the grain in the ear should be maturing the familiar brownish-black smut heads appear in the diseased plants, and the smut spores are wind-borne to continue the fungous life cycle by reinfecting healthy ears. Eventually, only the bare and barren oat straws remain. Covered-smut of the oat replaces the grain by a mass of smut spores, but, unlike loose-smut, the spores of which are carried away on the wind, covered-smut spores are spread at threshing when the smut masses are broken and distributed through the grain. As both infections are carried externally and do not develop further until the next sowing season, dusting or pickling is an effective means of control.

Loose-smut Of Wheat

In contrast, loose-smut of wheat (*Ustilago tritici*) differs in its mode of infection in that the spores, while also wind-spread, are liberated principally in the early flowering stage of the crop. They lodge on the floral parts of healthy ears, immediately germinate, and produce hyphae, which penetrate the ovarian tissues, remaining there in a dormant state while the grain matures normally. Such infected grain is indistinguishable from healthy grain. When infected seed is sown the fungus grows parasitically along with the wheat plant, and converts the developing grain into masses of black smut spores. Once again the wind disperses the spores to other plants, leaving barren stalks. Loose-smut of barley is caused by the same fungus.

The covered-smut of wheat (*Tilletia foetens* and *T. caries*) and barley (*Ustilago jensenii*), familiar from the masses of spores held within the skin, which in healthy plants envelops the grain, are recognisable by their offensive and fishy odour. From this characteristic they are commonly known as "stinking-smut." Infection seriously lessens the value of the crop for milling purposes. The masses of spores are liberated at threshing, and contaminate healthy grain. As the spores adhere to the outer seed coating and do not develop further until sowing time, they are readily controllable by surface treatment with organic mercurial or copper carbonate dusts.

Because they are internally seed-borne infections, the control of loose-



Smut of oats. Loose-smut of wheat. Stinking-smut of wheat. Covered-smut of barley.

smut of wheat and barley is more difficult. In practice, it has been found that the only satisfactory method of treatment is to immerse the grain before sowing in water heated to a temperature sufficient to kill the hyphae without injuring the embryo. Treatment often lowers the germinating vigour of the seed, and increases the time it takes the seedling to appear above ground.

Clean Seed Lines

In the main cereal growing districts of New Zealand much work has been done in freeing the principal varieties of wheat and barley from loose-smut infection, and relatively clean seed lines are now available either in certified (wheat) or commercial lines of wheat and barley. These may be several times removed from an originally hot-water treated line yet show high smut-freedom, as they have not been subject to reinfection.

In the Nelson district, where milling wheat is not grown, the variety Major is commonly sown as a feed wheat. Seed has for many years been saved from crops containing appreciable percentages of loose-smut, but control of this disease is now being undertaken.

A small acreage has been sown in Nelson of suitably hot water treated Major wheat seed, which should provide a nucleus line for more widespread sowings of clean seed in subsequent seasons.

As may be appreciated from the foregoing description of smut diseases, the wise farmer will either purchase oats, wheat, and barley which have been given a fungicidal treatment (dust or pickling solution) for the checking of these diseases, or will treat the seed himself. Freedom from loose-smut in wheat and barley can be assured only by sowing lines known to be from disease-free stock, or which are recently removed from, or have received, hot-water treatment.

Radio Broadcasts

RADIO broadcasts to farmers will be given from 1YA Auckland at 7.15 p.m. on the following dates:—

September 29.—"Feeding the Pig," by Mr. J. Hitchcock, Animal Research Station, Ruakura.

October 6.—"Reclamation and Grassing of Tidal Flats, Part 2," by Mr. E. B. Glanville, Instructor in Agriculture, Auckland.

October 13.—"New Zealand Flora," by Mr. W. J. Fix, Apiary Instructor, Auckland.

October 20.—Lecture in connection with livestock, by a member of the Livestock Division.

October 27.—Young Farmers' Clubs Session—Youth Movements Overseas, by Mr. L. W. McCaskill, Teachers' Training College, Christchurch.

Pig Industry Broadcasts.

The following programme of Radio Broadcasts will be given during October under the auspices of the National Pig Industry Council:—

2YH, Napier.—October 9, 7.30 p.m.; 'Line breeding in relation to uniform carcass," by N. Owtram, Tairawhiti District Pig Council (Gisborne).

4YA, Dunedin—October 13, 7.15 p.m.: "What Pig Councils are doing," by N. MacDonald, Otago and Southland District Pig Council.

1YA, Auckland.—October 16, 7.15 p.m.: "Breeding programme to suit feed supply and size of herd." by N. W. Carter, Bay of Plenty District Pig Council.

2ZA, Palmerston North—October 21, 8.30 p.m.: "Cropping for pigs," by L. Marsdon, Wellington District Pig Council.

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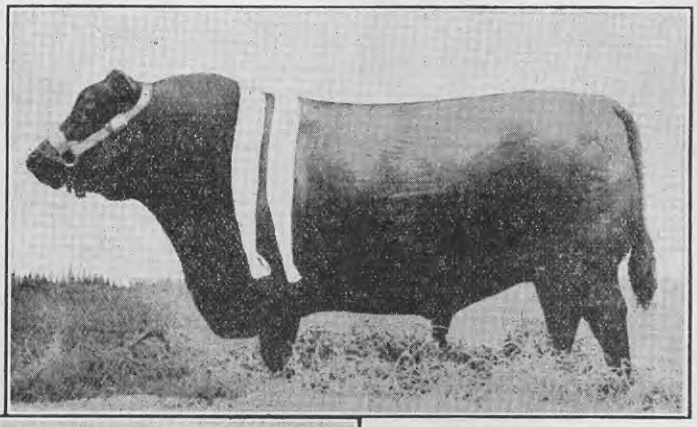

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Although black-leg has caused many deaths of calves, the disease can be prevented by vaccination. As the disease is an acute infectious one, each case must be reported so that control measures may be taken, and it is essential that each carcass should either be burned or deeply buried.

PREVENTION OF BLACK-LEG IN CALVES

By the

LIVESTOCK DIVISION

BLACK-LEG, a microbic disease of calves, is known under several names, such as quarter-evil, quarter-ill, black-leg, black-quarter, etc.

Black-leg is caused by the entrance of a special microbe or germ into the system through scratches or abrasions of the skin or through the food. The germ forms spores, which are very resistant, and may live in the soil for several years, which accounts for the disease appearing again after a lapse of years on some farms. In New Zealand the disease is scheduled under the Stock Act, and each case must be reported to the local Stock Inspector of the Department of Agriculture so that adequate steps may be taken to carry out the necessary control measures.

The disease mainly attacks young cattle up to two years of age, but occasionally sheep or older cattle may be affected. Young calves in good condition are the most common victims, and where dairy farmers raise a number of calves annually it is important that any sudden deaths should be reported, so that the exact cause of death may be ascertained.

Symptoms

The most notable symptom is the development of a characteristic swelling underneath the skin of one or more quarters, in which case the affected calf will be very lame. The swelling may appear on the neck, shoulder, breast, loin, or rump. The animal is dull, loses appetite, and becomes very feverish. The swelling becomes tense, and when the hand is passed over it a peculiar crackling noise is heard, due to the presence of gas. When cut into, the affected area exudes bad-smelling fluid of a frothy

nature. The flesh is blackish in colour at the affected area.

Quite frequently, no symptoms are seen by the owner, the calf being found dead. Occasionally, however, the affected calf may linger for a period of from 24 to 48 hours. Death is due to the absorption of poisons produced by the germ.

Treatment

There is no curative treatment for the disease; hence the importance of protecting susceptible stock by vaccination. In order to prevent the perpetuation of the causal germ or its spores in the soil or the contamination of pastures, it is essential to burn the carcass of an animal which died from the disease. If burning is impossible, the carcass should be buried deeply. If carcasses are not properly disposed of there is every possibility that the germs and spores of the disease will be broadcast by dogs or hawks, thus making the property a permanent source of danger to unvaccinated calves.

Prevention

The disease is preventable. This means that a potent vaccine is available for use in protecting calves against the disease. When the calves are vaccinated an immunity is set up which enables the animal to withstand any germs that may be picked up. The vaccine is prepared at the Animal Research Laboratory, Wallaceville, and is sent on request to the Inspector of Stock in any district where the disease is known to occur. Calves will be vaccinated against the disease free of charge at the request of the owner.

In order to control the disease effectively in a district it is important that all owners should report any suspicious deaths in calves so that the exact cause of death may be determined. If this cannot be carried out in all cases, the owner should burn or bury the affected carcass.

The next step is to arrange to have all the calves on the farm vaccinated against the disease. It is fatal to try and cover up the disease, as it will recur and become worse from year to year. Neglect in reporting suspicious cases or in burning or burying carcasses is merely aggravating a position which lends itself to reasonable control.

A Prominent Breeder of Pedigree Dairy Cattle Pays Tribute to the

Value of Certificate-of-Record Testing

By

MR. H. J. KAYE,
Huinga, Stratford.

IT is a regrettable fact that the majority of dairy farmers, and even many breeders of pure-bred cattle, fail to realise or appreciate the true value of the system of Certificate-of-Record testing.

The fact that cows, when under C.O.R. test, are generally fed a certain amount of concentrated food, such as bran or meat-meal, and receive general all-round better treatment than the balance of the herd condemns the system in the eyes of many dairymen. Such dairymen maintain that their cows are being **forced**, and therefore that the record achieved is a fictitious record. On the contrary, as I will endeavour to prove, the fact that the cow under C.O.R. test receives every facility to produce to her utmost capacity is where the real value of this system lies.

The other systems of testing, such as the "Group Herd Test" and even the "Government Official Herd Test," were devised solely with the object of gaining a comparison of one cow against another as members of the same herd. Granting that conditions throughout any one herd are equal for all members of that herd, then almost any system of testing, if properly carried out, will give a true comparison as between members of that herd.

This, however, is as far as the comparison can go. When it comes to comparing records of cows in different herds, it must be admitted that the difference in herd conditions enters into the argument, and must be taken into consideration.

To give an example, let us take a certain cow which we will name "Darkie." Now, in Brown's herd, where conditions, climate, etc., are pretty tough, "Darkie" produces, say, 200lb. fat. In Black's herd, where conditions are a little better, "Darkie" would produce 250lb. fat. In White's herd she would probably produce 300lb. fat, while in Green's herd, where she would get really good treatment, she might produce 400lb. fat. And still she may never have been really extended.

What is "Darkie's" true production? It becomes obvious, then, that to get a true comparison between cows in different herds the cows must, if possible, be put under the same conditions. This, of course, is impossible, but the nearest we can get to it is to put them on the **best** of conditions. And that is where the value of the C.O..R test comes in. Even on a poor farm it is generally possible to give a few cows at a time a chance to give of their best.

To put the thing into a nut-shell: **the only way to gain a true comparison between different cows in different herds is to extend them to their full capacity.**

It must be recognised, therefore, that the C.O.R. testing system is the only system devised for competitive purposes, and the only one which can justifiably be used as such.

Another common error among dairymen is the belief that a big record can be produced by almost any average cow if she is what they term "forced." Don't you believe it! If the ability to produce heavily is not in the cow's make-up, no man can force it out of her. Unless she has the right conformative capacity, ability, and temperament, she will not respond to better treatment. Let those who doubt it try it.

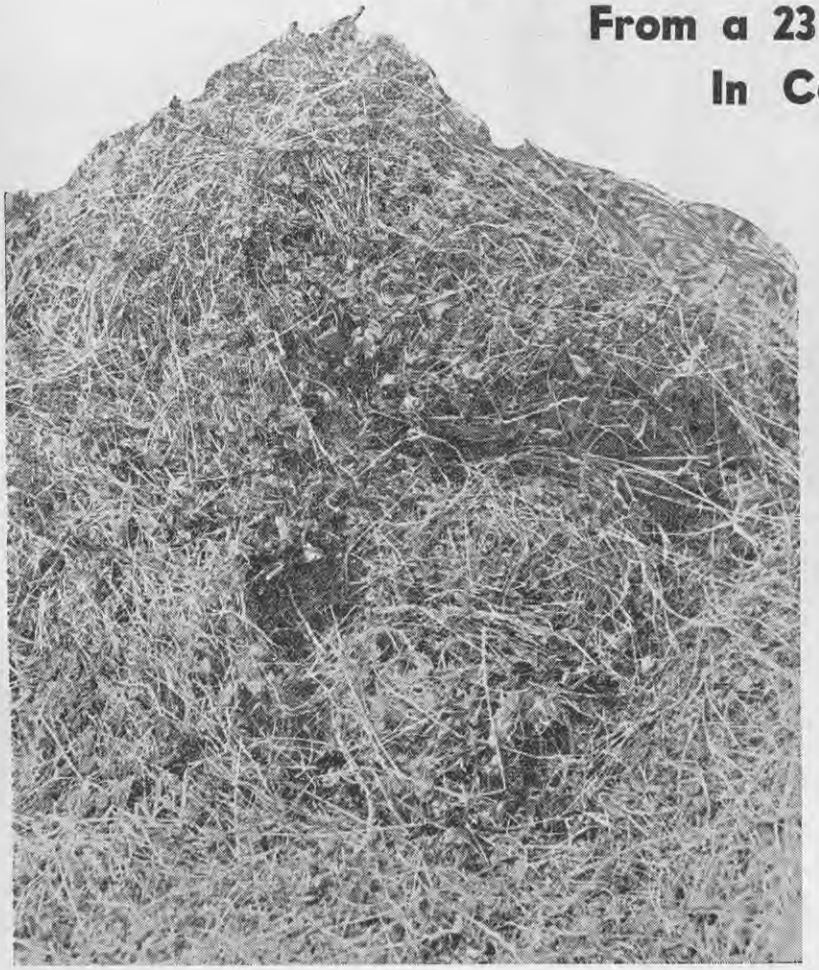
As a matter of fact, considerable judgment is required to feed a cow for high production. Too much dry food will result in the cow putting on abnormal condition; too much rich food will upset her digestion. After all, the most one can do is to handle her gently, keep her warm, and provide ample milk-producing food, and for this purpose there is nothing better than good quality pasture.

READERS . . .

Use Our Free Postal Service On Page 258

Subterranean Clover Hay

How 57 Tons of Hay Were Obtained From a 23 Acre Paddock In Canterbury



The picture above is a close-up of the hay just before baling.

Subterranean clover is not usually regarded in New Zealand as material for hay, but this article tells how some 57 tons of hay were obtained from a 23-acre paddock in Canterbury.

IN Australia large areas of subterranean clover are cut for hay each year, and experience has shown that this is a very valuable fodder for both cattle and sheep. This product is somewhat rare, however, in New Zealand, and the following details of a very successful subterranean clover hay crop which was cut last year on the farm leased at Kirwee by the Department of Agriculture for the study of hogget mortality will be of interest.

A paddock of 23 acres which had been ploughed out of old grass and sown with rape in 1935 and cropped with oats in 1936 was sown with subterranean clover in 1937, 1¼cwt. of superphosphate being applied with the seed. The next year, following a poor germination of clover, the paddock was top-cultivated and sown with grass seed. Grass grub caused damage in 1939, and this, with the dry autumn and late spring, resulted in little feed being obtained.

The picture across the top of the pages is a general view of the 23-acre paddock on the Kirwee Experimental Farm, Canterbury, showing the stacks of baled subterranean clover hay.

By

T. K. EWER,

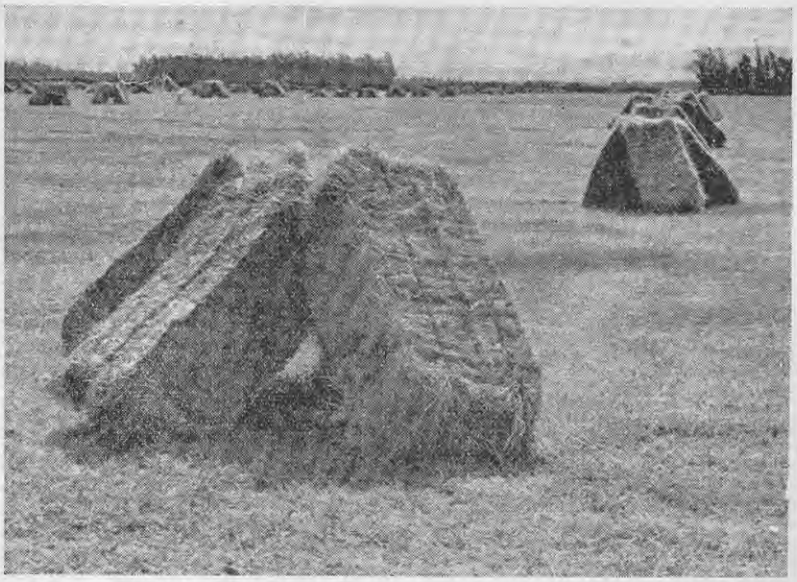
Veterinary Research Officer,
Christchurch.

In the autumn of 1940 the paddock was topdressed with 1½cwt. of superphosphate and 5cwt. of lime. Rain fell shortly after the topdressing, and remarkable growth followed during April, when very useful grazing was obtained. The paddock was shut up in May with the intention of providing feed for ewes after lambing, but such good growth was obtained during the spring that this particular paddock was not required for the ewes, and it was therefore decided to cut it for hay. This was done in the last week in November.

Farmers who have attempted to make subterranean clover hay have experienced trouble in cutting this crop, but in this case a simple dividing device was attached to the end finger of the mower, and no serious difficulty was encountered.

After being turned twice the hay was baled from the windrows, with a pick-up baler, four days after cutting. A really first-class sample of hay was obtained, and an estimate made by weighing the bales showed that approximately 57 tons of hay were cut from the 23-acre paddock, which is situated on medium, light land. Although this paddock was shut up from May onwards, most of the growth took place during October, November, and December, and it is probable that the same result could have been obtained by shutting up at the end of September.

The making of subterranean clover hay in seasons such as this can be confidently recommended to farmers with suitable paddocks in the Canterbury district.



A close-up of several bales of hay.
[*Green & Hahn, photos.*

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The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

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Veterinary Notes for the Farmer

Lamb Losses at Marking Time

LAMB losses at marking time may be due to several causes, some of which are preventible, while a few lambs may be lost after all care has been taken. Losses may result from haemorrhage, from mis-mothering, or from infection of wounds by a variety of germs. In the last-named case lambs may die from infection by the invasion of the wound by the tetanus germ, or by the germ causing blood poisoning. Other germs may invade the wounds, and, although not causing death, may result in causing lameness, involving the joints in what is known as arthritis. A certain amount of loss of condition results. The lamb receives a distinct check, and although it eventually recovers, the joints may remain permanently enlarged, even when the lamb is fattened and slaughtered.

The operations involved at marking time are therefore of some importance, and require to be given considerable thought if all loss is to be reduced to a minimum.

Primary Precautions

In the first place, it is important to check the site of the yard or temporary enclosure in which the marking operations are to be carried out. Old yards used permanently for the purpose are somewhat dangerous as sources of infection. The best procedure is to enclose an area in the corner of the paddock by using hurdles and netting wire, selecting a fresh site each year. All knives and instruments used should be sterilised by boiling before use. When the instruments are not being used, such as between operations, they should be returned to a vessel containing a reliable antiseptic solution. The hands and finger-nails of the operator should be clean.

As soon as the operation has been completed the lamb may be returned to the paddock, where it should be placed on its feet to prevent the infection of the wounds by soil organisms. The risk of loss from mis-mothering should be considerably reduced if each paddock is dealt with separately, as the mob is much smaller than if all sheep are concentrated at a central or permanent yard.

Loss of lambs from bleeding following the operation of marking depends to a large extent on the methods used for castrating and tailing. There are many safeguards available nowadays to prevent excessive bleeding following operation. There are several castrators and tailers on the market, all designed to prevent excessive bleeding from the castration and tailing wounds. In addition, some owners use the hot iron for tailing and in this way bleeding from the tail is controlled.

The Burdizzo method of castration is also used with a view to preventing infection and bleeding.

Where castration and tailing are carried out by using the knife, it is important to guard against infection by observing cleanliness during the operations. A common extra precaution is to apply an antiseptic lotion to the wounds before the lamb is released. If these precautions are not observed, together with the use of temporary clean grassy enclosures, infection of the wounds may follow.

Arthritis

The first symptom of infection following marking is the development of lameness in a number of lambs. When the lambs are caught and closely examined a certain amount of swelling of joints is noticeable, and the wounds are frequently covered with a scab, underneath which is found pus in varying amount. Occasionally the lamb dies following infection, when small abscesses are found in such internal organs as the liver and kidneys. As a rule, however, the lameness gradually disappears, the swelling in the joints subsides, and an apparent recovery takes place. The lamb receives a severe check, however, and on slaughter may be found with one or more enlarged joints.

In the case of infection with other organisms causing blood poisoning, the deaths occur suddenly. The site of operation quickly turns black and gassy, and such animals quickly undergo putrefaction following death.

Lockjaw or tetanus infection is caused by the entrance of the soil germ, known as the *tetanus bacillus*. This organism more frequently shows up during the healing stage of the wounds, when the infection lies locked up in the wound underneath the scab. Frequently there is very little pus, if any, found in such cases. Affected lambs first develop a stiffness in movement. and later lie down and are unable to move or suck. During the late stages before death supervenes, the lambs are frequently twisted or distorted due to the tetanic spasms bringing on irregular contraction of certain groups of muscles.

Tetanus infection is more likely to be seen on farms where a certain amount of cropping is carried on. It is more rarely seen on purely grazing properties.

Paralysis in the Cow After Calving

PARALYSIS in the dairy cow after calving is quite commonly seen from time to time. Paralysis is regarded more as a symptom of disease, although quite frequently paralysis by itself is regarded as a disease or diseased condition. It is rare, however, to find paralysis not associated with some other disease or set of circumstances in which paralysis is a common or expected complication.

Thus, paralysis may be associated with an accident in which the spine or backbone is involved. Paralysis is seen as a complication of the syndrome known as milk-fever, especially when the animal is in the comatose stage. It may be seen as a sequel to milk-fever, in which case the animal recovers consciousness and to all intents and purposes is normal in many respects, but is unable to get up and move about. It is frequently seen in animals in low condition due to sheer debility and weakness following upon a period of feed shortage and exposure to severe weather.

A partial paralysis or inco-ordination of movement is seen in many cases of poisoning, in cases of grass tetany or grass staggers, in paspalum staggers, or in numerous cases coming under the heading of malnutrition in young growing animals.

Treatment

Where paralysis develops in the dairy cow after calving without any complications, the following line of treatment may be carried out. Any complications must first be dealt with in order to expedite and assist recovery. The paralysed animal should be kept dry and warm. If possible, remove it to a dry, warm shed, even though a sledge or large door is required for the removal. Plenty of straw bedding should be provided to prevent bed sores and to enable the animal to be turned from side to side at regular intervals. A laxative diet should be given, and may include green feed or bran mashes. Forced feeding is not desirable unless the animal is very weak or emaciated, when various easily-digested but nourishing gruels may be given in this way.

It is a common practice to apply a blister or liniment to the loins and back. If a mustard paste is used it

should be well rubbed in for several minutes; the animal is then covered and kept warm and free from draughts. Stimulants of various types are frequently prescribed. A common mixture is that prepared by mixing ½oz. of carbonate of ammonia with ¼ oz. of powdered nux vomica and dissolving the powder in a pint of cold water. This drench may be given twice daily for several days or until recovery takes place.

In all cases it is advisable to consult your veterinary surgeon and have the animal thoroughly examined. There may be hidden injuries or fractures of bones accounting for the conditions which are not apparent to the ordinary observer. Frequently, such injuries occur at calving time, due to difficult calving, large foetus, narrow pelvis, mal-presentations of various types, or unseen injuries.

Good nursing is a first essential in the treatment of uncomplicated cases of paralysis, and this applies to all classes of animals.

Answers to Correspondents

Worms in Stock

K.S. (AUCKLAND):—

In a publication entitled "Internal Parasites of Sheep and Calves and Their Treatment," the writer mentions using a 2 per cent. solution of CuSO4 and nicotine sulphate and a 5 per cent. one. Is it safe to use a 5 per cent. solution for the 8- to 12-month-old lambs? I give 1 oz. of the 2 per cent. solution. Would 10 ccs. of the stronger mixture have any injurious effect, especially as the nicotine portion is more or less powerful? If you could let me know I'd be very much obliged. It seems to me that the stronger the actual dose, the bigger chance of killing the worms—is this so?

LIVESTOCK DIVISION:—

It is quite safe to use the 5 per cent. solution provided the warning given in the bulletin is also observed—that is, where lambs are weak draft them off and give them the next dose lower down according to age and repeat in 10 days; otherwise with a full dose they may die.

The reduction in the total amount of the dose is not made with the idea of increasing its strength, but with a view to convenience as regards dosing. No matter what strength solution is given by mouth, it is rapidly diluted by the fluids present in the stomach and bowels; consequently the concentrated action does not take place.

Ailment of Cow's Stomach

L.S. (AUCKLAND):—

I have just lost a pedigree Jersey heifer 11 months old. When we opened her up, two stomachs were empty; one of the left side was full of soft food and fibre, etc., and the other up on the right side was packed tight with slabs of dryish material like fibro-plaster between the partitions. She has been eating hay lately, so we presume that was the trouble, and probably not drinking enough water with it. She was passing nothing except mucous tinged with blood.

We were told she had a chill, and dosed her with salts, lime water, raw eggs, whole milk, etc., to keep her strength up, but of no avail. She had about 12 quart bottles a day.

Is there any cure for this condition? The calf's stomach was as hard as a football and packed tight.

We lost a yearling two years ago which had had a lot of hay in winter.

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.

She lingered on until February. Would this be the same trouble possibly?

LIVESTOCK DIVISION:—

The third stomach which you describe as containing dry material is always of a much firmer consistency and its contents drier than any of the other stomachs. In the case you refer to, however, this dryness seems to have been excessive.

The third stomach is under different nerve control from the others, and does not respond to dosing with the ordinary purgatives; stimulating treatment is necessary to restore its functions.

A drench made up as follows should be given in cold water every fourth hour:—

½ ounce of carbonate of ammonia.
½ dram of powdered nux vomica.

No gruels, milk, etc., should be given as drenches; hay tea should be given in their place.

If no response is obtained to treatment after two days, then two pints of liquid paraffin should be given as a drench and the stimulant treatment continued.

This stomach rarely becomes affected in the first instance. Its derangement usually results from the cessation of the normal movements of the first and second stomachs due to disease or unsuitable feeding.

Skin Irritation in a Horse

F.W. (WARKWORTH):—

A valuable draught mare, aged, in good condition, seems to be getting affected with some skin sores. Up to quite recently her coat of hair was shiny and sleek, but now pretty well all over the head from the nose up there are patches of hair coming off clean from the skin, and, apart from a watery appearance, shows no discharge. I notice she spends a lot of time rubbing on posts, etc., as if irritated with some itchiness. I do not really know whether these patches are actually rubbed off as they form or not, but when first I noticed the fresh ones they just seemed as if they had been shaved off, and sort of watery skin was left. So far only the head is affected, much disfiguring the appearance.

I was wondering whether there would be some external treatment, or, if internal, could I mix the remedy with some feed, chaff, or bran. The horse has been running on short but fresh grass all the winter, and has had access to plenty of fairly good quality hay, but has never been on hard feed, and is also rugged.

What do you consider the best treatment for cattle tick on horses? As I live in badly-infested areas, they are very severe on horses later in the year.

LIVESTOCK DIVISION:—

The condition affecting the mare's head is most likely due to digestive disorders. The mare should be given a bran mash for two nights in succession, and then given a drench of 1oz. of barbados aloes in 2 pints of hot water.

As a local application the following may be used every third day:—

Flowers of sulphur 8oz.
Rectified oil of tar 4oz.
Linseed oil 1 pint.
Lime water 1 pint.

The best method of dealing with cattle tick on horses is to spray as required with a reliable cattle tick dip.

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Farm Practice and Management

Fields Division Exhibit at Winter Show

MUCH interest was displayed at the New Plymouth Winter Show in the exhibit of the Department of Agriculture. The Fields Division exhibit dealt with the growing of sugar beet for pig feeding and its comparative values to all other farm-grown crops, and also featured a number of sugar beet crops grown this season in Taranaki. Another feature of the exhibit was the new scheme for the certification of ryegress and white clover, the stages from foundation stock right through being explained by suitable show cards and illustrated by turfs and by samples of seed.

Value of Sugar Beet

In North and Central Taranaki, at least, sugar beet is a comparatively new farm crop, and its wholesale introduction was brought about by the drive for increased production and the demand for bacon by the British Government in its war effort. At the 1940 Winter Show a similar exhibit displayed crops grown in South Taranaki, explained the preparation for, and the sowing of, the crop, and compared its food value with other farm crops.

From that display and through a great deal of publicity in the "Journal of Agriculture," the local Press, and other papers, many farmers have successfully grown the crop this season, and in every case they are enthusiastic as to its value as a pig food. Although the season has been favourable in every way, it is certain that sugar beet can be grown with success in the district. Its introduction has, indeed, created a considerable impression, and it is felt certain that many farmers will continue to grow the crop.

Seven crops grown in Taranaki this season were featured in the show exhibit, the details of weights being as follows:—

Name of Grower.	Weight per acre of crop.	Weight of Roots alone.	Weight of Leaves alone.
G. H. Bell, Oakura	52 tons 1 cwt.	32 tons 2 cwt.	19 tons 19 cwt.
W. J. Bridgman, Okato ..	45 tons 5 cwt.	28 tons 2 cwt.	17 tons 3 cwt.
O. Stockwell, Tarurutangi ..	49 tons 16 cwt.	26 tons 16 cwt.	23 tons 0 cwt.
H. C. Taylor, Ngaere ..	55 tons 1 cwt.	24 tons 5 cwt.	30 tons 16 cwt.
Dem. Farm, Stratford ..	38 tons 14 cwt.	16 tons 9 cwt.	22 tons 5 cwt.
Dem. Farm, Manaia ..	65 tons 17 cwt.	36 tons 4 cwt.	29 tons 13 cwt.
C. J. Preston, Normanby ..	62 tons 6 cwt.	33 tons 2 cwt.	29 tons 4 cwt.

From the weights of the above crops it will be seen that the leaves weigh very heavily, and that in two cases the leaves are heavier than the roots. Being of high feeding value, the leaves form a valuable part of the crop, and can be pulled and fed to pigs while the crop is still growing. Mr. W. J. Bridgeman, Okato, has pulled and fed leaves to sows with very good results since January of this year.

Seed Certification

Most farmers in New Zealand realise the value of certified seeds for pasture sowing, and to demonstrate the new

scheme for the certification of ryegrass and white clover, the exhibit was staged at the Winter Show. In the "Journal of Agriculture" for December, 1940, Mr. J. H. Claridge, Seed Certification Officer, fully described the new classification for the certification of ryegrass. Similarly, white clover is also under a new classification, the general lines upon which certification is based being similar to that of perennial ryegrass.

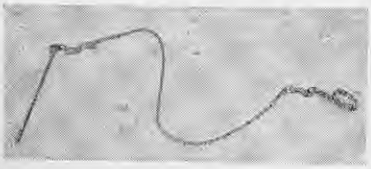
The accompanying photograph illustrates exactly how the exhibit was set up, and how each process was suitably described and demonstrated by turfs and by seed. Each sample of seed was also accompanied by the correct certificate. The demonstration attracted much attention from farmers who visited the show, and special interest was taken by the agricultural students from the New Plymouth Boys' High School.

In spite of the trying conditions brought about by the war, it is felt that the whole exhibit was appreciated by the visitors, and that the effort was well worth while.

—J. M. HOPKINS, Instructor in Agriculture, New Plymouth.

Rearing Motherless Lambs

AT this time of the year much of the sheepfarmer's time may be spent in collecting motherless lambs, or, rather, persuading ewes which have a dead lamb to adopt another lamb.



The peg, chain and strap. The device is easily carried about, and is inexpensive to make.

The general practice seems to be to skin the dead lamb and fit this skin over the lamb it is proposed to mother. The ewe, recognising the smell, will then usually allow the changeling to drink.

Another practice used by many sheepfarmers with success is to tether the ewe up to a fence or post and leave the motherless lamb with her. This has the disadvantage that the ewe may not take to the lamb and in her struggle may knock the lamb or herself about; and, further, there is not always a fence or post conveniently near.

The ewe pulls back on tether for some time.

A very effective practice used by Captain L. Forde, Matapiro, Hawke's Bay, is to tether the ewe to a peg just wherever he should find her. The tether consists of an iron peg about 18 inches long, pointed at one end, and with a curved ring top, to which is attached one end of a dog chain. To the other end of the chain is fastened a swivel attached to a short length of strap (an old dog collar suits admirably, the tongue of the buckle being removed so that it may form a running noose). The running noose is placed over the ewe's front leg, just above the hoof, and pulled tight. The iron peg is then pushed firmly in the ground.

The ewe's first action is to pull back on the noose, and she will hang back in this position for some time—in fact, she is so occupied with her endeavours to pull away from the chain that the lamb has every opportunity to approach from the rear and obtain a drink. Once the lamb has succeeded in drinking once or twice there is no difficulty in the ewe finally mothering it.

Captain Forde states that he sometimes skins the dead lamb, but skinning does not appear to be essential. He claims that this practice has much in its favour. Several pegs and chains may be inexpensively put together, and they are easily carried and can be brought into action in any part of the paddock. A ewe tied up in this manner in the morning may generally be released the same afternoon, or, in any case, the following morning.

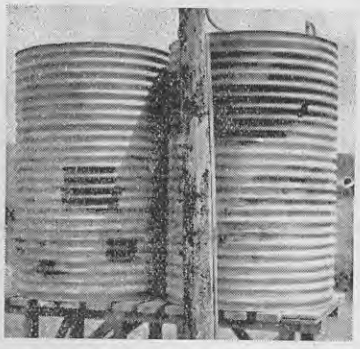
It is hardly necessary to point out that the ground on which the ewe is pegged should be reasonably flat.

—R. P. HILL, Fields Instructor, Hastings.

Eventually, the ewe is content with the lamb.

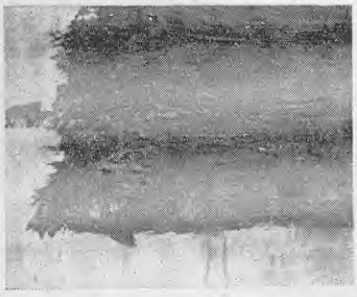
Another Method of Repairing Worn-out Tanks

A DESCRIPTION of a method employed in repairing worn-out tanks with reinforced concrete appeared in the January issue of the "Journal." While this method proved highly effective and seems almost to have conferred everlasting life on what was once a hopeless ruin of a tank—two merits which would be hard to surpass—what is claimed to be even a better alternative has recently been demonstrated by Mr. Robert Taylor on his farm near Warkworth.



Repaired tanks on Mr. Taylor's farm. The condition of the tanks before repair can be gauged by the numerous large patches shown in the illustration.

The water used by Mr. Taylor is highly impregnated with corrosive minerals, and the normal life of a tank is only about two and a half years. After costly experience, Mr. Taylor concluded that the recurring replacement charge for new tanks was too high, so he decided to patch up the old ones. He began by scraping the inside of a tank, intending to paint it over with water-proofing paint, but found that the metal in many parts was too thin to stand scraping.



A near view of a patch. The hole has been covered by two layers of cheese cloth, the texture of which can be seen in places showing through the paint.

He accordingly began by treating the holes and weak places from the outside with alternate coats of water-proofing paint and cheese cloth as follows:—

A covering of water-proofing paint.
A covering of cheese cloth stretched evenly over the part.
A covering of water-proofing paint.
A covering of cheese cloth, as above.
A covering of water-proofing paint.

Where the metal around a hole was very thin, the edges were held in place from the inside while the first coats were applied. When the various patches had been completed, a coating of the paint was then applied to the inside of the tank.

As will be seen by the numerous patches in the illustration, the tank was indeed far gone. The repairs, however, have actually resulted in a tank which was demonstrably better than new, as it has already given three years of trouble-free service, and appears good for many years more. As previously mentioned, a new tank was good only for about two and a half years' use.

As the work entailed is simple, while the cost in money is relatively trifling, the method adopted by Mr. Taylor has much to recommend it, particularly at a time such as the present, when new tanks are both expensive and difficult to procure. The fact that this profitable economy aids the national war effort is an additional incentive to repair rather than to renew.

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

Manuring of Maize

ALTHOUGH much valuable information comes from research work, and of that the most valuable probably from the work carried out by the instructor himself in his own district, there is another method from which the Fields Division obtains information.

There is no doubt that field officers are indebted to the farmers in a very large measure for their agricultural outlook and knowledge. As they travel from farm to farm this knowledge is modified and increased as more and more evidence is gained on the numerous diverse matters on which it is necessary for them to have some information.

We know that in even the most carefully carried out trial, some small but important factor may escape notice, which, if recognised and noted, would show that the results are not accurate, and the investigator must be continually on guard against errors which will upset the judgment. This applies more so to trials conducted in a rough manner, as they must be by the farmer. The results, however, are always noted and a watch is kept for correction which may be shown to be necessary from evidence gleaned on the same or on other farms.

In the manuring of maize for greenfeed the usual practice in my district is to plough the land, sowing the seed and fertiliser in the furrow. One farmer in the Ararimu district began in this manner for a few yards and then decided to sow the fertiliser broadcast at the same rate. The results are shown in the accompanying photograph. In the foreground the maize grew at only half the rate of the maize in the background. On the land in the foreground the fertiliser was sown broadcast, while in the background the fertiliser was sown in the furrow. Thus, the general practice is vindicated. The fertiliser was applied at the rate of about 3½ cwt. per acre.

—J. E. BELL, Instructor in Agriculture, Auckland.

Novel Method of Stacking Hay

A NOVEL method of stacking hay has been in use on a small farm in the Ashburton County for a number of years, and is giving great satisfaction. It depends upon the use of a tractor for hauling, and a large low trailer with broad wheels. Essentially, the system consists in loading the hay in the paddock on to a frame on the trailer, and then dropping the frame and hay together on a stand, releasing the trailer immediately for another removable stack. It is the quick method of dropping the load which makes the plan practical, as no jacking is done.

A front view showing the stack in position and the trailer ready to be removed.

The trailer must have two very strong longitudinal runners, the top edges of which are clear above the tops of the wheels. In other words, the top is smooth, except for two blocks at the very front, and the trailer can thus slide out from under the frame quite easily. A sufficient number of frames must be ready to hold the whole crop, each frame on this farm holding about four tons of hay. A frame consists of four good cross-members (say, 7in. x 3in each and 10ft. long) carrying a rough framework of poles. These cross-bearers project about 1ft. outside the wheel hubs, and this overhang rests down on to the stationary stand when the trailer is dropped from under the loaded frame. The stand (one for each frame) consists of eight posts in two rows of four, corresponding exactly to the ends of the cross-bearers.

A side view illustrating the method of constructing the stand.

In practice, the frame on the trailer is loaded from the windrow by two forkers (this would be ideally performed by a mechanical loader). When the limit of height for the forkers has been reached, the load is driven exactly centrally into the stand, rising as it goes the last yard or two, on to two strong planks, about 12in. x 4in., with a long gradual ramp sawn at the end of the approach, but square at the front end. The trailer wheels must be brought to the very end of these planks when the load is nearly in position over the stand, and there stopped. The overhanging bearers will now be some inches above the posts, and this gap is filled up by inserting a sufficiently thick rail on each side. The whole outfit is now moved cautiously forward, and the trailer wheels drop down from the planks, leaving the load perched upon the stand. The stack is then topped off with a couple of drayloads of hay, and the process is repeated with the trailer and another frame.

The unloading is much easier to do than to describe. Actually, it is done by driving through the stand, with a minute's pause to insert the packing

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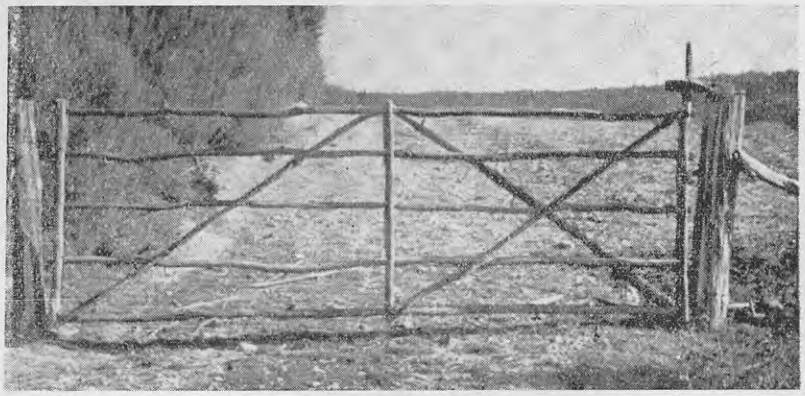
rails, but farmers would be well advised to have a rehearsal or two with an empty frame.

The advantages of this system are obvious. The stacking is done in little more than half the time, and with half the labour. A whole stack can be finished and tied down in a couple of hours, and if rain or heavy wind intervenes, nearly twice as much hay is saved than by the ordinary methods. It is especialy good with lucerne, as it eliminates that heavy handling from dray to stack which knocks off so much leaf. And then how easy it is to make excellent pig shelters out of these stacks on stilts!

—G. K. McPHERSON, Instructor in Agriculture, Ashburton.

Cheap Farm Gate from Tea-tree

THE accompanying illustration shows a manuka or tea-tree gate constructed by a farmer who finds the type serviceable yet superior in ease of operation to the more common "Taranaki" gate. Several of these tea-tree gates have been in use on this property for 10 years or longer.



The rails have been nailed together and clinched, although to prevent splitting it was necessary to bore the nail holes first with a brace and bit. Wire netting was then fastened over the rails, and the gate was swung on the end stake, the bottom portion of which was sharpened to turn in an oiled hardwood block at ground level. The top hinge was made by passing the stake through a hole in a piece of hardwood nailed to the post top.

Although cheap and light, these gates have proved their worth on this property, and have saved the expense and maintenance of heavier structures.

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

Orchard Notes

Spraying, Drainage, Grafting and Cultivation

SEPTEMBER is generally recognised as the month when serious spraying operations in the orchard begin. Proper equipment must be used, for if the capacity of the spray pump is not enough to give the necessary volume of spray under the required pressure, spraying operations are made laborious and costly, and are of little value.

The need for complete spray coverage cannot be stressed too strongly.

The question of obtaining correct dilutions should not be left to chance, and weights and measurements of materials used should be closely checked.

Much experimental work has been done in order to obtain accurate data on which to base spray schedules, and those issued by the Department have been very carefully compiled.

Some growers are in the habit of adding a little extra material to the spray tank or reducing the quantity of water recommended for the dilution of mixtures. This is not necessary, and, moreover, any excess may lead to serious injury both to fruit and foliage.

Control of Diseases

Factors other than spraying which have an influence on the control of disease are drainage, general hygiene, and the general health of the tree caused by unsuitable soil conditions, lack of cultivation, manuring, and overcropping. Healthy fruit trees possess powers of resistance to disease, and it should be the aim of every fruitgrower to prune, cultivate, and manure his orchard so that the trees will be kept in as healthy a condition as possible. Debilitated trees are more susceptible to spray injury, which is an added reason why health and vigour should be maintained.

Control of some insect pests by means of natural parasites has in some instances been effective, and investigational work is still proceeding in the hope that further parasites will be found to combat a number of pests, but in the meantime spraying cannot be neglected if success is to be obtained.

Spray Schedule

Because of climatic variations it is not possible to fix definite spraying dates for the whole of the Dominion. Therefore, the following spray programme is given as a recommendation applicable to all parts of the Dominion, with modification according to districts, and fruitgrowers following the schedule should experience little difficulty in reducing the pests and diseases to a minimum. Periods are given when applications should be made, but the success or failure of spraying depends largely on the equipment and materials used, time and thoroughness of application, and the strength at which the spray is applied.

APPLES.

Period of Application.	Treatment.
Green-tip Period ..	Bordeaux mixture 3/4/50 or lime sulphur 1/30.
Open Cluster to Pink Period	Lime sulphur 1/75 or lime sulphur 1/150 + colloidal sulphur 2/100 of the mixture. The latter spray is preferable at this stage, especially on varieties susceptible to russet or where powdery mildew infection is severe.
Petal-fall Period ..	Lime sulphur 1/150 + colloidal sulphur 2/100 + lead arsenate 1½/100 + hydrated lime 3/100.
Ten to 12 days later	Same as No. 3.
15 to 18-day intervals to mid-December	Same as No. 3.
15 to 20-day intervals to end of Jan. and later as required	Same as No. 3 with lime sulphur reduced to 1/200.
End of January and early February ..	Summer oil 1/100.

Should leaf hopper become prevalent in the early part of the season, the addition of nicotine sulphate at a strength of 1 in 800 at the petal-fall period when the insects are in the nymph stage is recommended.

It may be necessary to make two applications of summer oil at 10-day intervals, strength 1 to 100, for the control of red mite during January or February, but care must be taken not to apply the oil within ten days of the sulphur spray.

When leaf-roller caterpillar is prevalent, applications of lead arsenate for its control may have to be extended into February. In districts where powdery mildew is prevalent an additional spray of lime sulphur plus colloidal sulphur is recommended after the tight cluster period.

PEARS.

Period of Application.	Treatment.
Green-tip Period ..	Bordeaux mixture 5/4/50.
Pink Period ..	Bordeaux mixture 3/4/50 or lime sulphur 1/75.
Petal-fall Period ..	Bordeaux mixture 1½/3/50 + lead arsenate 1½/100.

Subsequent sprays same as No. 3.

For Winter Cole, Josephine, and other tender-skinned varieties which will not tolerate Bordeaux mixture, substitute lime sulphur after the green-tip period and spray as for apples.

Period of Application.	Treatment.
Bud Movement Period	Bordeaux mixture 5/4/50.
Pre-blossom Period	Bordeaux mixture 3/4/50.
Petal-fall and at 3-weekly intervals	Lime sulphur 1/180 + colloidal sulphur 2/100.

Apply summer oil at strength 1/100 or nicotine sulphate at strength 1/800 for control of black and green aphis on first appearance of pest, and repeat within ten days. The leaf-roller caterpillar and pear slug of cherries and plums can be controlled by an application of lead arsenate 1½/100 + hydrated lime 3/100. A thorough application of Bordeaux mixture at strength 5:4:50 in late autumn when leaves are falling will greatly assist in the control of leaf-curl for the following season. The use of sulphur on apricots for the prevention of brown rot is not recommended because of the danger of foliage and bud injury.

Drainage

Drainage plays an important part in orchard hygiene. Stagnant water at the roots of fruit trees is not only one of the main causes of sour sap, but has a direct influence on root action, without which no tree can thrive. If necessary, artificial drainage must be provided, either by means of tile drains, scrub, or rubble or open drains.

Cultivation

If not already done, ploughing should be attended to as a first step in reducing the soil to that fine tilth so necessary for the conservation of moisture during the warmest period of the year. With subsequent discings and harrowings capillary attraction between the soil particles will be increased, the land will be warmed to enable the beneficial bacteria in the

soil to function, weeds will be destroyed, and conditions created which will give the best results.

Grafting

At the present time, too, many varieties of apples which are of little or no commercial value are grown. Although some growers are reluctant to dispose of these varieties, serious consideration should be given to the overworking of these trees.

Varieties known to be unsuitable for a particular district should be replaced by other varieties of proved value, while trees known to be uneconomical from the working and marketing point of view should be grafted over to better commercial varieties. The reduction in number of varieties in an orchard will prove more profitable in the long-run. The aim should be to have a succession of good varieties throughout the season, avoiding as many small lines as possible.

Grafting can be carried on throughout September and October. The two methods now adopted are either the form of grafting in which the trees are de-headed and scions are inserted in the main branches, or the refurnishing method, by which trees are more or less skeletonised and scions are inserted along the length of the main limbs and larger laterals. The former method is the quicker, but the time which elapses before the variety grafted on comes into bearing is longer. The refurnishing method, although entailing much extra initial work, has the advantage of the trees coming back into production within two seasons.

Whichever method is adopted, it is imperative that the scions should be healthy, well-ripened, one-year-old wood which has been kept in good fresh condition by placing in cool, moist soil until required. Care in the cutting of both stock and scion, the clean insertion of scions (making sure that the cambium layers of both stock and scion are in contact), and the secure binding of the grafts to exclude all air should result in a high percentage of successful taking.

—G. STRATFORD, District Supervisor, Dunedin.

Citrus Notes

Classification of Oranges

THE recognition of the varieties of sweet orange is an even more complex problem than with lemons, because of the very large number of varieties which have been planted. The classification system for oranges adopted by H. Harold Hume in his publication "The Cultivation of Citrus Fruits" will be followed as closely as possible. The chief classifications are Spanish oranges, Mediterranean oranges, Blood oranges, and Navel oranges. An additional classification is the Island orange.

The Spanish oranges are large trees of vigorous growth, well foliaged, the leaves are oval, pointed, and with petioles frequently strongly winged. The fruit is rather coarse grained, and has numerous seeds. Example: Parson Brown, rounded, colour yellow-orange to yellow, 16 sections, should be picked early to obtain best flavour.

The Mediterranean oranges are smaller trees with abundant foliage, the fruit being fine-grained and generally round in shape. In this category are many locally-grown varieties, and they should be grouped into subdivisions as follows:—Shamooti, Jaffa, Joppa, St. Michael, Hamlin, Pineapple, Valencia Late, Lue Gim Gong.

The Palestine oranges are Shamooti, Jaffa, and Joppa. All three are vigorous, thornless trees, and bear fine-textured fruit. The Shamooti is the original Palestine orange—oval in shape and not often seen in New Zealand. Jaffa and Joppa are round fruit, and originated as seedlings from Shamooti.

Jaffa.—Jaffa generally ripens about September. The fruit is rounded, of medium size, juicy, of good flavour, and fine texture. There are 11 well-defined sections, and the flesh is orange-yellow.

Joppa.—Joppa is generally not as good as Jaffa, for although in flavour the fruit is practically identical it is generally smaller. It will, however, hang longer on the tree. The rind is somewhat rough, and there are 10 sections.

St. Michael.—This tree is a vigorous, prolific bearer, the fruit ripening in October-November. The fruit hangs well, and holds its juice; it is oblong in shape, of medium size, and seedy. The rind is slightly thick, somewhat rough, and yellow in colour, with a slightly-pitted appearance through countersunk oil cells. There are 9 to 13 sections. Paper rind St. Michael is probably a seedling of St. Michael, and generally has smaller fruit.

Hamlin.—Hamlin is probably better known than St. Michael, and ripens in August. It is a medium-sized fruit, changing in colour from deep golden yellow to orange-red at maturity. The rind is very smooth and bright; there are 11 to 12 uneven sections, and the juice is of good flavour. There are few seeds.

Pineapple.—This tree is characterised by large foliage. The fruit ripens in September-October. It is round in shape, medium to large in size, and a deep orange colour when mature, with sometimes a reddish tinge. There are 11 sections, a large solid pith, and generally 15 to 30 large seeds.

Valencia Late.—This variety has medium-sized pointed leaves. The fruit ripens in November, and is characterised by the fact that locally it seldom develops full colour and if left on the tree has a habit of turning green again. This habit is more noticeable with young trees, with more fertile soil, and when heavy manuring is practised. The fruit is usually slightly oval or elongated in shape and medium to small in size. The rind is often ribbed, pebbled, and tough. A blue appearance is often noted inside the inner lining of the rind (albedo). There are nine or more sections and up to six large and plump seeds. The flavour is often insipid.

Lue Gim Gong.—Lue Gim Gong is reported to be a cross between Valencia Late and Mediterranean Sweet. It has the same general characteristics as Valencia, but the fruit is reported to hang on the tree longer.

The Blood oranges are characterised by the pulp of mature fruit having a distinct red streak. The fruit is generally small or medium sized, and the rind also assumes a reddish blush at maturity. The trees are of a dwarfish distinct growth habit. The foliage is abundant, and leaves are small and oval, petioles being generally without wings. Varieties are Ruby Blood and Maltese Blood.

Reminders for the Month.

Get the orchard soil in good tilth.

Hoe lightly around the trees.

Complete spring manuring.

Apply the first 3-4-50 Bordeaux spray.

Begin systematic pruning as the main harvesting is completed.

Ruby Blood.—This variety crops well. The fruit ripens about October-November, and is a typical blood orange. It is somewhat flattish in shape, and of a fine colour. Juice is plentiful and of a splendid flavour. There are 12 sections, a small, compact pith, and generally about ten seeds.

Maltese Blood.—Maltese Blood is similar to Ruby Blood, but somewhat larger and more elongated in shape.

(To be continued.)

—A. M. W. GREIG, Citriculturist, Auckland.

Viticulture

Points in Making Cider

THE construction and use of this home-made filter has been described by Hickok and Marshall as follows:—

The set-up for performing the filtering operation consists of three principal parts:—

1. A mixing and supply tank.

2. Elevation of the supply tank to provide a pressure head on filter unit.

3. The collecting or filtering unit.

The collecting unit is the novel and most essential part of the outfit. It is a long, slender, cloth tube, closed at one end, with the other end connected to a rubber hose extending from the supply tank. This tube is laid in a horizontal position in a trough. When the mixture of cider and filter aid is fed into the closed tube the pressure swells the tube to its full dimensions. The cider is forced out rather uniformly over the entire surface of the tube, and the filter aid forms a cake of uniform thickness on the inside. The trough is given a slight slope so that the clear juice runs out of one end into a receptacle.

The cloth tube is made of unbleached muslin, sewed to give a diameter of approximately three inches. A tube of a larger diameter will not support the filter cake satisfactorily, and subsequent cracking and breaking of the cake may cause cloudiness in the filtered cider. A tube one yard long is most convenient. It cleans easily, coats evenly in a short time, and is the usual cloth width sold. It is recommended that both ends of the tube be left open to facilitate cleaning. In use, the dead end should be folded back and carefully gathered and tied, preferably with a single miller's knot.

The tube should be supported in the trough by a stainless steel screen. This allows free flow from the trough, and makes the entire area of the tube effective in filtering. The stainless steel screen is essential, because it is not affected by fruit acids.

It is necessary to have a small pressure head on the filter, and this can be satisfactorily secured by elevating the supply tank. The greater the elevation, the more rapid the flow will be from the filter. The net head should not exceed 15 feet (with muslin tube) and eight feet results in very satisfactory operation. Less head may be used where small quantities are to be filtered, but will necessitate more frequent cleaning of the collector.

Tests with cider gave the following rates of filtration:—

Net Head (ft).	Gallons per Minute.*
4	.65
6	1.05
8	1.43
10	1.80
12	2.50
14	3.34

* These were for short runs of about five gallons, and rate would be lower for longer runs with thicker filter cakes.

Hickok and Marshall recommend mixing 1lb. of filter aid with each 30 gallons of cider to be filtered.

In conclusion, good cider is not difficult to produce, provided that good, sound, ripe apples are used, that the utmost cleanliness is exercised in the process, and that cider is protected from all unnecessary contact with the air.

—B. W. LINDEMAN, Vine and Wine Instructor, Auckland.

Cool Storage Notes

Inspection of Fruit in Storage

CAREFUL inspection of all lines of fruit still held in cool storage should be continued at weekly intervals until they are placed on the market. Deterioration in stored fruit can generally be detected by its external appearance, as many forms of breakdown develop on the surface. A forward state of the maturity is an important factor to be considered during inspection, as this class of fruit is subject to rot development. The distinctive flavour and quality of the variety deteriorates if held too long in cool storage.

Delicious apples should not be held too long if the state of their maturity has been allowed to advance before or during storage; the external appearance of this fruit does not always indicate its condition, and when the fruit is cut and sampled it may prove to be soft, mealy, and lacking in quality. All lines of Delicious apples still held should be tested for condition, for if soft, flavourless Delicious apples are placed on the market they will have a detrimental effect on the sale of the variety.

Large-sized Sturmers may develop flesh collapse or internal browning. The only reliable method of detecting this in the early stages is by cutting samples of the fruit from each line. The smaller sizes should also be tested similarly from time to time until they are placed on the market.

Bitter-pit, discolouration, and rots may develop on Granny Smith apples from now on during the season. The large sizes should receive attention, as they are subject to deterioration, particularly if the fruit was picked from grafts or from a light crop. Granny Smith are subject to the development of discolouration if the fruit was picked too early and immediately placed in cool storage. The variety should give a good out-turn after a long period of storage if they were picked about April 15, wrapped in oil wraps, placed in cool storage about April 25, and held at a flesh temperature of 33 deg. F. If Granny Smith apples are allowed to become too fully matured before storage and are held at unsuitable temperatures (above 33 deg. F.) they are subject to the early development of rots and discolouration from over-maturity. This variety, when wrapped in plain wraps, is more subject to the development of discolouration and lenticel rots.

When carrying out an inspection of apples at the cool store, the cases to be opened up for examination should be removed to the packing shed, as the

(Continued on page 248.)

Guide for the Home Garden

Beans — A Valuable Garden Crop

EVERYBODY has to eat. The slogan of the home gardener should therefore be "More food from the garden," and one of the most useful crops from the food value point of view is the bean. As a substitute for meat, it has no rival in the garden. Uncooked haricot beans, it is estimated, contain about 21.4 per cent. by weight of protein and 52 to 120 international units of Vitamin B1. Concerning the food value of beans, Mr. H. V. Taylor, British Ministry of Agriculture, writes: "Eaten with potatoes, they form a balanced ration." Another writer described the bean as the "iron ration par excellence."

This article deals only with snap and haricot beans, dwarf or French beans, and climbing or runner beans.

Genetically, the bean can be traced to tropical, semi-tropical, and relatively cold climates. It is grown in almost all parts of the world, and supplies a valuable human food. Varieties differ in accordance with climatic conditions, and may be classified according to use.

Varieties

"Snap" beans is a term applied to those used when young and tender, and which "snap" readily when an attempt is made to bend them.

"Greenshell" of "Flageolets" are beans which are shelled before maturity and cooked in this condition.

"Haricot" beans are the seeds of the plants which have been allowed to grow to maturity. These are stored for future use.

According to habit of growth, beans may be classified as dwarf or bush, pole or climbing, the former being generally considered hardier than the latter Light frosts, however, will destroy both varieties.

Commercial growers prefer the dwarf varieties, because the entire crop can be harvested in two—or at most, three—pickings, and can be followed by a planting of late cabbage or cauliflower. This method of cropping might well be adopted by the home gardener. If it is desired to have an extended period during which beans may be utilised for household purposes, the climbing variety should be planted. On the other hand, a small planting of dwarfs for haricots could be grown, the product of which might be used during winter. If this is done no beans should be removed from the plants. Picking will prolong growth and prevent the crop maturing, with consequent disappointment. It should not be assumed that runner beans will not make good haricots; there is, indeed, little difference, if any, in their palatability or nutritional value.

On an average dwarf varieties require from eight to nine weeks from sowing until the first beans will be ready for picking. Climbing varieties require from 10 to 12 weeks, but will continue to bear longer than the dwarfs.

Varieties Recommended

Dwarf.—The Prince, Tender Green, Burpees Stringless Pod, Sydney Wonder (the last-named is specially recommended for haricots).

Climbing. — Emperor, Fardenlosa, Epicure, Market Wonder.

Soil

The bean can be grown successfully on many different types of soils. A good friable loam, well supplied with organic matter, suits the crop admirably, and a slightly acid condition is not a great disadvantage, but the soil must be well drained. Cold conditions above or below the surface will result in restricted root development.

Seed Sowing

The most favourable position in the garden for growing the dwarf crop is one with a north-easterly aspect. The bean is not a deep-rooting plant, and to provide ample rooting facilities in the soil the seed is best sown in the bottom of trenches, which should be about four inches deep. In light soils, and for early sowings, a covering of two inches will suffice, while in heavy soils a little less will do. Later sowings in dry weather will necessitate deeper plantings—three inches and two inches for light and heavy soils respectively. Subsequent filling of the trench will provide ample depth for plant stability. Sow the seeds about three inches apart, and the plants can be thinned to stand six inches from each other.

Fertilising

The bean is not classed as a "gross" feeder, and, provided the preceding crop was well manured, a dressing of superphosphate at the rate of 1lb. to seven yards of row will be adequate. This should be applied after growth has started, and should be spread in a narrow strip on each side of the row. Keep the fertiliser two inches from the plants, and lightly hoe it in immediately after it is applied. In commercial gardening this method is termed the "band" system of fertiliser application.

Climbing or Runner Beans

For economy of garden space in the production of runner or climbing beans the best method of growing is on stakes, which may be 8ft. long, or longer if desired. If erected as a tripod, the stakes should be pushed a few inches into the ground and set to form an equilateral triangle, 3ft. at the base, and fastened at the top with wire. In the soil at the bottom of each stake plant half a dozen seeds, but allow only three plants to grow, and fertilise as directed for dwarfs. To assist the plants to climb, the tendrils should be tied loosely to the stakes. Occasionally, as growth proceeds, train the tendrils round the stakes **always in the same direction as the sun travels—east to west by north.**

The first beans should be removed as soon as they are ready, and regular picking must be continued. This is the only means of ensuring continuity of production, as if early pods are allowed to mature on the plant, subsequent growth will be checked, with disastrous results to the crop.

Home gardeners are recommended to give the climbing variety a trial. Modern varieties are prolific bearers of tender, succulent pods, and they will continue to bear until exhausted or destroyed by frost. The tripod can be placed in a corner of the garden, and will occupy very little space. They can also be grown on a piece of fowl netting on the end of a shed or along a fence.

Insects and Caterpillars

In the early stages of the growth of the plants, insects and caterpillars may be dealt with by spraying with arsenate of lead or nicotine sulphate. A spray mixture of the former is made by adding 1oz. of arsenate of lead to

What To Do In The Garden Next Month

Summary of Operations During October

VEGETABLE SECTION.

SUCCESSIONAL SOWINGS.

French beans and sweet corn (where frosts are over); lettuce, peas (a main-crop variety such as Greenfeast or Onward), radish, spinach (round-seeded), spring onion.

OTHER SOWINGS.

Marrows and pumpkins (where frosts are over); beetroot (main-crop long varieties), borecole, broccoli, cabbage (savoy, red and winter varieties), carrots (main-crop, intermediate and long varieties), leeks, parsnip (if not sown last month), New Zealand spinach, tomato (for a late crop).

SEEDLINGS TO TRANSPLANT AND PLANTS TO SET.

Lettuce, main-crop potato (unsprouted), kumara (in very warm districts the shoots, if ready, may be planted out, otherwise set them in nursery beds where they can be protected).

PERENNIAL CROPS.

Asparagus.—Remove shoots from two-year-old plantations for two weeks and from three-year-old plantations for four weeks, after which apply blood and bone and plenty of wood ashes. Apply nitrogenous dressing to newly-planted areas (½oz. to 9ft. of row).

CROPS IN SEASON.

(The month in brackets represents the month of sowing the seed).

Salads.—Lettuce (October till June), spring onion (March).

Greens.—Asparagus, broccoli (October), broad beans (May), peas (May and early August), silver beet (October), spinach (August).

Roots in the Ground.—Carrot (Shorthorns, August), potatoes (May in warm districts), turnip (August).

GENERAL WORK.

Keep the ground cultivated and destroy weeds. Earth up early potatoes. Give transplanted and thinned onions a dressing of nitrate of soda, ½oz. to 9ft. of row.

SMALL FRUITS SECTION.

Cape Gooseberries.—Transplant seedlings in frost-free districts.

Strawberries.—About the end of the month mulch the beds with straw. Before this the crop should receive a dressing of Peruvian guano (1½oz. to the square yard or 3 to 4cwt. per acre), or sulphate of ammonia (1oz. to the square yard or 2½cwt. per acre).

Raspberries, Loganberries, etc.—Apply the third and final Bordeaux spray (3-4-50), combined with arsenate of lead (2lb./100 gals. water), two months after bud movement in control of cane wilt, leaf spot and bud moth.

FLOWER SECTION.

Trim hedges; use secateurs on broad-leaf hedges and clippers on others.

Plant gladioli in succession.

Attend to seedlings. Prick into boxes when large enough to handle, and plant out as spring annuals are cleared away from the beds.

Plant out dahlias and chrysanthemums.

Lift, divide and replant gerberas. Small pieces each with one bud and roots are the best to plant. They should be planted firm with the bud level with the ground.

Take cuttings of violets and set them in fertile soil that does not dry out during the summer.

GLASSHOUSE SECTION.

In the heated tomato house and in forward cool houses a liquid dressing of artificial fertiliser should be applied when the fruit is swelling. A mixture of ½oz. each of nitrate of soda and sulphate of potash and 1oz. of superphosphate in 1gal. of water is sufficient for four plants, and should be applied several days after watering.

At this stage of development in dry localities a large amount of water will be required by the forward plants. If all the ground between the rows is flooded there should be no need for additional water for possibly a fortnight.

Remove the lower leaves to expose the first bunch of fruit, and so facilitate the movement of air about the plants.

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three gallons of water. To be effective, the foliage must be completely covered by the liquid. Nicotine sulphate should be used as directed by the manufacturers. When the pods begin to develop, Derris, either as a dust or a spray, should be applied. While the rotenone-content of Derris is toxic to these pests, it is non-poisonous to human beings, whereas arsenical sprays are likely to leave an injurious residue on the beans, which might not be removed even by cooking.

Diseases

Prevention of diseases of beans is preferable to any attempt at control. The three principal diseases of this crop are: (1) Anthracnose, which is recognised by the appearance on the pods of black spots which spread quickly under humid conditions; (2) bacterial blight, which attacks the leaves of the plants much in the same way as blight on potatoes; and (3) mosaic (a virus disease), which is distinguished by yellow mottling of the leaves.

Good cultural practices and crop rotation are, however, of greater importance than any remedial measures which might be taken.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

Setting Out Tomato Plants

FOLLOWING on the notes in the September issue of the "Journal," the time for "safe" planting of tomatoes has almost arrived. In favourable situations planting may be done earlier, but Labour Day, as previously intimated, is a reliable guide. Thousands of tomato plants are lost annually through too early planting.

Planting

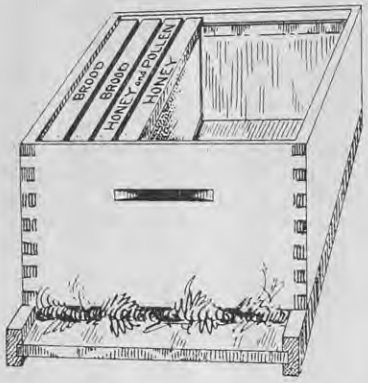
When preparing for planting, try to allow each plant to retain around the roots its full share of the soil in the seedling box. To set the plants, drive the hoe (a short-handled one) into the soil and pull backwards, but do not release it from the soil. Behind the

(Continued on page 248.)

Seasonal Work for Beekeepers

Increasing the Number of Hives

IN some parts of New Zealand, chiefly in southern districts, the bees come through the winter greatly reduced in numbers. Bees which have passed through a hard winter are vigorous enough for a time, but they quickly die off in the spring after the first cycle of brood has been raised. The secret of successful spring apiary management, therefore, is to get a force of young bees to care for the queen and brood as soon as possible, and this can be done only by supplying the bees with dry, comfortable hives and sufficient stores, as indicated in last month's notes. After the bees have had an opportunity to carry on brood-rearing the next visit to the apiary should be for a close examination of each hive.



Position of combs.

Queenless Colonies

Where colonies are not successfully re-queened by the beekeeper before wintering them down, or where a queen has died for any reason late in the autumn, the colony becomes hopelessly queenless. A number of worker bees then attempt to perform the duties of a queen, and they eventually start to lay eggs. Although worker bees are females, they are capable of laying only unfertilised eggs, from which drones develop. These drones are raised in worker cells, and are always much smaller than normal drones raised in natural drone cells used by fertilised queens.

The presence of bullet-shaped cappings over cells scattered through the brood nest and small drones in the hive is sufficient indication that a colony is queenless, and also that laying worker bees are present. Although it is possible to re-queen colonies reduced to this condition, they are very slow in building up, and it is best to unite them immediately with hives which have laying queens.

Making Increase

Many small beekeepers will now be considering how to increase the number of their hives without purchasing new colonies or depending on swarming. Before attempting to make increase by artificial methods the beekeeper must thoroughly understand the fundamentals of colony requirements and the habits of the bees.

The queen must have the protection of large numbers of worker bees and sufficient comb room (worker cells) in which to lay her eggs during the breeding season. Each colony must have sufficient worker bees, including a large portion of nurse bees, to maintain the necessary warmth for brood-rearing and to feed the young larvae. A colony containing only old field bees is not capable of raising brood satisfactorily, and can make but slow progress.

In addition to honey, bees require a good supply of pollen and water. Pollen is a source of proteins and fats in the food prepared for feeding the larvae in the brood nest, and without pollen or a suitable substitute no brood or young bees can be developed. Fresh water should be provided where there is no readily accessible natural source. The elimination of long flights for water enables the bees to return to the hives before they become chilled on cold days in the spring, and is at all times a distinct saving of bee energy.

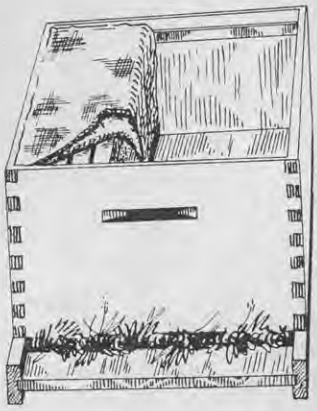
Dividing Hives

In districts where the honey season is fairly long and there is a relatively late main honey flow, the brood stores and bees of a strong colony may be divided into two parts without serious loss of honey crop, provided the division is made early in the season and the queenless portion is given a young laying queen immediately. The division should be made six to eight weeks before the main honey flow begins, and care must be taken to get the largest portion of nurse bees into the section moved away to a new stand. The entrance should be closed with a wad of green grass for at least two days; otherwise this new colony would be weakened considerably by the return of the majority of field bees to the original hive location. Great care must be taken to prevent robbing of the weakened colonies and to see that they are well supplied with suitable stores.

In localities where the main honey flow begins early and is of short duration, there is usually insufficient time for the bees to build up and store a normal surplus when divided in this manner. They will, however, build up into good strong colonies and store a little surplus, provided the season is favourable.

Rapid Increase

Rapid increase by dividing each colony into three or four at one time can be accomplished only at the expense of the honey crop for that season. Where the beekeeper has good Italian stocks, brood-rearing should be encouraged by feeding a little sugar syrup regularly three or four times a week to the colonies to be divided until each hive contains at least eight combs of brood and has an abundance of nurse bees.



Prepared nucleus colony.

The time to divide is when the hives are in that condition before the main honey flow begins and when nectar is available in the fields. A simple plan is to remove the queens and leave the hives for ten days, during which time the bees will have raised queen cells on nearly all of the brood combs. Queens removed in this way may be used to make further increase by introducing them to the queenless portion of divided hives as explained earlier.

On the tenth day after the removal of the queens a sufficient number of hives should be prepared and placed in position about the apiary ready to take the increase. Divide the brood combs

and place two together with one or two combs of honey and pollen, and with all the adhering bees, into each of the prepared hives, making sure that there is one good-sized ripe queen cell present in each division and plenty of nurse bees. The brood combs should be placed next to the wall of the hive, with the queen cell between the two combs.

When each division is completed two good mats should be placed over the frames, and the entrance to the hive completely closed with a wad of green grass tight enough to prevent the escape of bees for at least two or three days. If this is not done the field bees will immediately drift back to their original stand in great numbers, thus leaving insufficient bees to keep the required warmth necessary for hatching the queen cell and brood.

Ventilation and Mating

There will be sufficient ventilation through the crevices about the hives, and the bees will gnaw a small passage through the grass as it withers, by which time the majority of the bees will make no attempt to drift back to their original location in the apiary. If the best cells are chosen, the queen cell in each division will not hatch before the tenth or eleventh day after removal of the queens from the parent hives, and the young virgin queens will not require their liberty for mating for at least another three days. In the meantime, the beekeeper should widen the entrance to each hive to about two inches, but before doing so he should make sure that there are no robber bees about to molest these weakened colonies. When the young queens are mated and laying, the frames should be moved over from the side of the hives as each colony makes progress, and the empty spaces filled with good worker combs according to requirements. The entrance to each hive may also be extended accordingly.

The same results may be obtained by dividing a colony which is preparing to swarm, using only the best queen cells for the purpose and destroying all others, together with the old queen. Only hives which have given good results the previous season should be used for increase in this way; otherwise inferior stocks may result.

More advanced methods of raising queen cells to provide a supply of young queens will be dealt with next month.

—T. S. WINTER, Senior Apiary Instructor, Wellington.

COOL STORAGE NOTES—Continued from page 244.

hoe "set" the plant—do not "drop" it—to the depth of the first two leaves. Hold the plant down firmly while releasing the hoe, then gather the soil round it and press compactly round the root and stem, levelling off with the fingers. Set in this manner, the young plants will not be affected to the same extent by high winds as those planted shallow.

Staking

Growing single-stem plants is recommended as most suitable for the home gardener. If this method is adopted, place the stakes in position immediately planting is completed. These should be 4 ft. 6 in. long, and at least 1 inch by 1 inch thick. Drive them into the soil to a depth of 15 inches and as close to the plant as possible without damaging the root. Stakes set when the plants are partly grown damage the root system and create opportunities for parasitical attacks on the plants. A reasonable distance between the plants is 12 to 14 inches.

Tying

Use light binder twine or raffia—preferably the latter—for fastening the plants to the stakes. Flax, if properly prepared, is also suitable. The first tie should be about 8 to 10 inches from soil level. In tying, turn the binding material twice round the stake and fasten tightly with a double knot. Then circle the plant and tie somewhat loosely. The next tie will bring the plant close to the stake, but the method of fastening just described should be followed until the plant is full-grown.

Cultivation of tomatoes should be shallow, and only for the purpose of weed destruction and the conservation of moisture.

Make another small sowing of seed, the plants from which should be ready for setting out about the middle of December. Tomatoes from this planting should, if properly grown, supply the household to the end of the season.

In addition to pruning, tying will be further dealt with in the October issue of the "Journal."

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

SETTING OUT TOMATO PLANTS—*(Continued from page 246.)*

lighting in cool storage chambers is unsuitable for inspection purposes. This applies particularly to the Granny Smith variety, as the fruit may appear to be green in colour when viewed under electric lighting, but it may be quite yellow when inspected in daylight.

Freezing injury is likely to occur in cool chambers where pears are stored, as the storage temperatures are lower than those required for apple storage. The freezing of fruit is brought about by maintaining the flesh of the fruit at too low a temperature, often due to an imperfect system of air distribution in the cool chamber.

The freezing temperature of pears is 28.5 deg. F., and wrapped and packed fruit held under conditions where the temperature of the circulating air when it enters the chamber is lower than this reading is likely to suffer injury. Temperatures should be taken with a flesh thermometer. The temperature of the fruit stacked adjacent to the delivery air trunk or cooling pipes is the most reliable guide to the cool storage engineer in preventing freezing injury. One degree of variation will be sufficient to cause freezing when suitable temperatures are being maintained for successful pear storage. Thermometers used for registering cool storage temperatures should be checked from time to time with a standard instrument in order to prove their accuracy.

—A. A. POWELL, Cool Storage Officer, Wellington.

Avoid Heavy Losses In Chick-rearing

By F. C. BOBBY,
Superintendent of Poultry Husbandry, Wellington.

THE CHICK-REARING SEASON.—This all-important and busy season of the year has arrived. Upon success in rearing during the next few months depend the profits of next laying season, and for this reason every effort must be made to secure a maximum of success.

Unfortunately, there is a possibility of a certain number of poultrykeepers meeting with management difficulties and disease; for such poultrykeepers, immediate help is essential if losses are to be reduced to a minimum. The Department, therefore, wishes once again to remind poultry keepers that help, as is required, may be obtained through the services of the Poultry Instructors stationed at the Department's offices in Auckland, Wellington, Christchurch, and Dunedin.

A further important point is that when serious losses occur among chickens, poultrykeepers are asked not to accept these losses without ascertaining the real cause of such mortality. Guesswork is dangerous and entirely unnecessary. A few birds forwarded immediately following death to the Superintendent, Animal Research Station, Wallaceville, will bring a full report and advice upon future management free of charge. It is often difficult, and sometimes impossible, to ascertain the cause of death by a brief examination of chicks on the farm; brief examinations at home lead to guesswork, while a laboratory examination affords an accurate diagnosis of the trouble.

With all the problems of chick-rearing, whether of management or disease, **immediate action** is the most important factor in checking serious losses—a point which should never be forgotten. All too often officers of the Department are not called in until trouble has become acute and heavy losses sustained. Act early, act quickly, and prevent these heavy losses during the present season.

Management and Feeding of Chickens During the Brooder Stage

By L. COCKER, Poultry Instructor, Christchurch.

POULTRYKEEPERS should by now have completed their preparations for the coming chicken-rearing season. Much depends upon a careful preparation of the housing and equipment for rearing, and brooder houses and equipment should have been thoroughly cleaned and prepared to receive the first batch of chickens.

There is no better lesson in the art of brooding than that provided by a good broody hen. Her first care is to see that her brood is kept warm and comfortable. She will not let them stray too far, and will call them back for a "warm-up" at short intervals, and when food is available. If a brooder is substituted for a hen this same careful attention must still be given, and, with no hen, this responsibility rests with the chicken-rearer until the chickens are old enough to take care of themselves.

Warmth and Comfort

Modern type brooders provide excellent conditions for rearing, and if worked in a common-sense way with due regard for changes in weather, they can be relied upon to produce good chickens. Ample heat when the chicks are first put under the brooder is **essential.** No chicks straight from the incubator must be allowed to feel cold, and consequently crowd towards the heater. Have sufficient heat to allow the chicks to rest in comfort towards the edge of the brooder. Once the chicks are feeding well and become really active, the heat may be reduced with safety, but not before. A thermometer under the brooder will help the novice to be certain of a temperature of 85 degrees to 90 degrees F. at the start, but the experienced chicken-rearer will watch the chicks and their position under the hover, as their behaviour will clearly demonstrate whether the temperature is right or wrong.

To ensure comfort and to prevent chills, every precaution must be taken to prevent a floor draught. This is usually achieved by placing a metal, cardboard, or wooden guard about 8in. to 12in. high round the outside of the hover for the first few days. The guard is placed about 6 inches from the hover when the chicks are first put in, and is gradually moved further out as the chicks become established. This guard also prevents the chickens from straying too far from the hover, and possibly crowding into corners when they have failed to find their way back to the warmth.

Fresh Air and Dry Litter

Although any form of draught is highly dangerous, fresh air is essential. The brooder house itself should be well ventilated, but a regular supply of fresh air under the hover is even more important. If this is not ensured the litter will quickly become damp, and the chicks will be subject to colds.

The bedding material under the hover, whether chaff or other material, should be turned over daily and removed as often as it shows signs of becoming damp or badly fouled with droppings. Damp floors and damp litter provide ideal conditions for disease, particularly coccidiosis. One of the main factors in successful chick-rearing is the maintenance of clean litter and clean equipment, and any neglect may easily lead to uneven growth and disease.

Overcrowding

Overcrowding must be avoided, as it causes more second-grade chicks or dead chicks than any other trouble. It checks growth and reduces constitutional vigour until the chickens are ripe to take any disease that may come along.

Feeding

There are numerous methods of feeding young chicks, but if satisfaction is being obtained with any particular system, the poultrykeeper would be unwise to make any radical changes. The birds must receive the correct type of feed, and the food must be of good quality.

If possible, day-old chicks should be put under the brooder during the late afternoon or evening, and at this time they require only water. The first feed should be given next morning, when it is a common practice to give a chick-raiser or chick-grain. This chick-grain mixture may consist of broken wheat (60 per cent.), broken hulled oats (20 per cent.), and finely-kibbled maize (20 per cent.). Added to this mixture right from the first feed should be a chick-size hard metal grit.

During the first week chicks should receive five meals daily of this mixture, being allowed as much as they will readily eat up within about 20 minutes. After a week of grain feeding it is necessary to give meal. Many poultrykeepers prefer to give this in a dry form for two or three weeks, at the end of which time the birds are gradually changed over to a wet mash feeding. Others start immediately with a wet mash at the end of a week. This latter method is quite satisfactory, provided care is taken to mix a crumbly wet mash and not a sticky one. Many different mashes are used for this purpose, but one consisting of pollard 2½ measures, bran 1 measure, together with 3 per cent. buttermilk powder by weight will be found to be satisfactory. Meat-meal (3 per cent.) may be substituted for the buttermilk powder if liquid milk is used for moistening the mash.

The grain mixture should still be fed morning and night, and two wet mashes given during the day. Where this formula is used as a dry mash it should be placed before the birds after giving an early morning feed of grain, and be removed before giving a further feed of grain about an hour before dark.

Apart from supplying water, grit, grain, and meal, the young birds will require a good supply of green food, which should be young and succulent. If it is chopped up finely and placed before the birds, there is rarely any trouble in getting them to eat it.

Value of Careful Observation

Apart from the quality of the chicks themselves, successful rearing depends very largely upon careful observation and attention to detail. Success comes from intelligent anticipation of trouble. The careful observer will often note the very first signs of approaching trouble, and by prompt action will save much trouble in the future.

Attention to detail should include a careful watch on sanitation, the supply of clean, fresh water at all times, and regular times for feeding. Accumulatively, all these small details properly watched spell success over the rearing season.

Summary

In conclusion, the elements of satisfactory rearing may be summarised as follows:—

(1) Start with quality chicks from strong parents.

(2) Understock rather than overload the brooders.

(3) Give adequate heat and clean litter.

(4) Ensure satisfactory ventilation, but prevent draughts.

(5) Damp litter is a menace to all chickens at any age.

(6) Supply clean water and good food, including grit and green food.

(7) Add to the above, common sense, observation, and patience in the attention to details.

Federation of Young Farmers' Clubs

Report of Annual General Meeting

THE seventh annual general meeting of the N.Z. Federation of Young Farmers' Clubs (Inc.) was held this year at Hamilton, following the decision to hold meetings in turn at the four Council centres. The meeting next year will be at Dunedin.

The attendance this year was a record, more than 70 delegates and members being present, and all Councils were well represented. Pilot Officer E. W. Barnett, who has been Dominion President for the past two years, presided.

Opening the meeting, the Minister of Agriculture, Hon. J. G. Barclay, referred to the difficulties confronting farmers at the present time, and gave an indication of the manner in which some of the problems were being handled. He also paid a tribute to the progress and activities of the Y.F.C. movement, and stated that the Government was again making a grant of £500 to the Federation, and expressed the hope that the organisation would be able to carry on and do good work after the war.

The president's annual report gave a clear indication of the position of the movement to date, and for the information of readers the report was published in the August issue. A report read by the secretary dealt with the major difficulties and handicaps experienced during the year, and made suggestions by which organisation could be strengthened. Figures were also given dealing with the recently inaugurated Y.F.C. Experimental Scheme, indicating that, with the inclusion of trials already laid down and those for which definite arrangements had been made, more than 340 trials would be undertaken by the clubs throughout the Dominion during the current year. In addition, the report stated that arrangements had been made for active co-operation between clubs and district high schools in the laying down of trials under the scheme.

Election of Officers

The election of officers was as follows:—

Grand Patron: Sir Andrew Russell.

Patrons: Sir Robert Anderson, Sir Heaton Rhodes, Sir Wm. Perry, Sir Theodore Rigg, Sir Albert Ellis, the Minister of Agriculture, the Dominion President of the N.Z. Farmers' Union, the President of the Royal Agricultural Society, Mr. William Goodfellow, Professor E. R. Hudson (Lincoln College), Professor G. S. Peren (Massey College).

Dominion President: Mr. D. S. Ross (Chairman, Auckland Council).

Dominion Vice-President: Mr. W. R. Harris (Chairman, Otago-Southland Council).

Hon. Treasurer: Mr. C. H. Schwass.

Hon. Auditor: Mr. A. P. O'Shea.

Mr. W. F. McLaren was re-elected as the Y.F.C. representative on the National Council of Primary Production.

On the motion of the Canterbury Council, a resolution was passed amending clause C section (b) of the Constitution, to permit that, in the election of Dominion President and Vice-President, any member of the four Councils be eligible. A resolution embodying representation of the fruitgrowing industry on the Y.F.C. Dominion Executive Committee was lost, the meeting considering that the purpose could best be served by representation on Councils where needed.

Y.F.C. Policy

The policy of the Federation was discussed at length, and it was decided to reaffirm the policy laid down by the Federation at the previous annual meeting, as follows:—

"That every effort be made to maintain the Y.F.C. organisation, and that to that end an appeal be made to individual members (1) to attend as many club meetings as possible; (2) to strive to acquire knowledge at club meetings and field days in order to fit them to assist materially in increasing production; (3) to assist all other bodies possible in the furtherance of the war effort; and (4) that it be urged upon all clubs the absolute necessity to enrol younger members."

In addition, it was resolved that all Councils, District Committees, and Clubs should be urged to co-operate more fully with secondary schools, district high schools, and rural schools generally in their activities as they relate to agricultural education, as it was realised that these institutions are the natural recruiting ground of the Y.F.C.

Remits

The following motions arising out of remits were carried:—

That the "Journal of Agriculture" continue to publish rainfall records for the various districts. As this feature was greatly appreciated when it was included previously, it was considered that farmers would still find the information useful (Auckland Council).

That clubs going into recess for the war period should hand over all books, funds, and vouchers to their district committee, to be held in trust until such time as the clubs are resuscitated; that the affiliation fees of all such clubs be held in abeyance; and that members of such clubs wishing to retain full privileges of membership should pay their club membership subscriptions to their district committee, the balance, after "Journal" subscriptions have been deducted, to be placed to the credit of club funds so held in trust. (Auckland.)

That it be a recommendation to clubs to keep a roll of all members, similar to a school roll, together with a record of attendances. (Auckland.)

That clubs be urged to arrange club and inter-club debates for members under the age of 19 years. (Auckland.)

That it be recommended to district committees and clubs that all clubs shall at their next meeting and at all subsequent annual meetings appoint "road organisers" to be responsible for the attendance at all meetings of the members along their road, and to arrange transport facilities, such "road organisers" to be responsible also for contacting all young men eligible for enrolment as club members. (Wellington.)

That cyclostyled forms be made available by headquarters to clubs for notifying members of their subscriptions due. (Wellington.)

That a Roll of Honour be published in the Y.F.C. section of the "Journal of Agriculture," giving the names of members killed or wounded, as well as those who have been decorated. (Otago-Southland.)

Remits from Auckland, Wellington, and Otago-Southland Councils dealing with the much-debated question of "girl members" were discussed together, and the following resolution was carried:—"That the principle of having some form of Women's Auxiliary be approved by the Y.F.C. Movement."

A remit from the Otago-Southland Council was passed, dealing with Y.F.C. representation on senior rural organisations and bodies such as the National, Provincial, and District Councils of Primary Production, the N.Z. Farmers' Union, N.Z. Sheepowners' Federation, the Royal Agricultural Society, the Metropolitan and District A. and P. Societies, the Provincial Pig Councils, etc.

A motion was also passed recommending councils to appoint a member to act as publicity officer, to collect material for the "Journal" and to co-ordinate radio talks. A motion of sympathy to the relatives of all Y.F.C. members who had been killed overseas was also carried, and it was arranged that a message of greeting be sent to members overseas.

New Dominion President

MR. D. S. ROSS, Te Puke, Bay of Plenty, who has been elected Dominion President, has been associated with the Young Farmers' Clubs movement since its inception in the Bay of Plenty district. He is Chairman of the Auckland Y.F.C. Council, Immediate Past Chairman of the Western Bay of Plenty District Y.F.C. Executive Committee, and Advisory President of the Te Puke Young Farmers' Club.

Mr. Ross is also a member of the Northern District Council of the Royal Agricultural Society of New Zealand, a Past President of the Te Puke Agricultural and Pastoral Association, and a member of the Executive.

He is President of the Te Puke Boys' and Girls' Agricultural Clubs, and has taken an interest in that movement since its inception. He is a member of the Executive Committee of the National Pig Industry Council, and President of the Bay of Plenty Pig Council, and also Chairman of the Tauranga Primary Production Council.

Mr. D. S. Ross, who has been elected Dominion President of the New the N.Z Federation of Young Farmers' Clubs.

[Tornquist, photo.

Y.F.C. Visit to Ruakura Animal Research Station

ONE of the high-lights of the annual general meeting and conference of the Federation at Hamilton was the entertainment provided by the Auckland Council for the visiting delegates on Thursday, August 31, the day following the meeting. The party left Hamilton by bus at 9 a.m. for the Ruakura Animal Research Station, where they were met by the Superintendent, Mr. P. W. Smallfield, who extended a welcome to the visitors.

The laboratories were first inspected, and then the quarters where young farmers' attending short courses are accommodated. The visitors were shown a flock of Southdown sheep on which trial work is being conducted on hereditary tendencies towards facial eczema. The piggeries were then visited, where Mr. J. Hitchcock conducted the party over the area, and described the various experiments that had been completed and those which were still under way. Mr. J. P. James described the work being carried out in connection with artificial insemination, and also gave an actual demonstration of the work.

Mr. Smallfield then conducted the visitors to the grass-drier and explained the various points of the machine. He pointed out that the drier had been installed in order that certain important experimental work in connection with facial eczema might be carried out. Mr. Smallfield and the members of his staff were thanked for the trouble they had taken and for the information they had given.

The party returned to Hamilton for lunch, and then proceeded to the New Zealand Co-operative Dairy Co.'s factory at Frankton. After extending a welcome, Mr. Cague conducted the visitors over the butter factory, the box factory, and the factory where the tins and containers for dried milk are made.

A short tour was then made through some of the dairying country of the Waikato, a stop being made at Cambridge for afternoon tea. At several points along the route the bus was stopped and Mr. J. F. Shepherd, Fields Instructor of the Department of Agriculture, pointed out items of interest regarding the topography, soil types, farming, etc., of the different areas. The party returned to Hamilton at about 5.15 p.m. after having spent a most interesting and instructive day.

Address on Youth Movements Overseas

ONE of the features of the annual general meeting and conference held at Hamilton was an address during the evening by Mr. L. W. McCaskill, entitled "Youth Movements Overseas: Some Lessons for New Zealand." Mr. McCaskill is one of the foundation members of the Y.F.C. in Canterbury, and recently visited America and Great Britain in connection with the study of adult education.

Mr. McCaskill dealt graphically with the work of the various youth movements which he had investigated during his tour, and gave the following information, which was of particular interest to his audience:—

(1) Young Farmers' Clubs in England and Scotland.—These are two distinct organisations, working under their own national associations, and each having its own organising secretary. The age of the members is from 10 to 21 years in both cases. While open to both sexes, the membership is predominantly male. The activities are very similar to those of the Y.F.C. in New Zealand, stock judging being one of the important features.

(2) 4-H Clubs in U.S.A.—These clubs are a part of the national agricultural extension system, and are organised from the State agricultural colleges. The age is from 10 to 20 years, and the movement is open to both sexes. Membership involves the carrying out of one or more projects each year. The projects vary from canning vegetables to dressmaking, building in concrete, planting trees, raising corn, etc. The emblem of the clubs is a four-leaf clover with the letter H on each leaf, the device standing for the motto "Head, Hands, Heart, and Health."

(3) The Future Farmers of America.—This movement is open to boys attending vocational agriculture classes at rural high schools. Members must carry out some crop-growing or stock-raising project on a farm. Motto: "Learning to Do; Doing to Earn; Earning to Live." The general work and organisation is similar to our own Y.F.C., except that certain grades of office are recognised as in a lodge, achievement of the individual being the basis of advancement from rank to rank.

(4) Young Farmers' Associations.—These are American associations which cater for boys on farms who have left school, the age limit being from 19 to about 30 years.

(5) C.C.C.—This is the American Civilian Conservation Corps, which was started in 1933 by President Roosevelt in the depths of the depression in an attempt to save the unemployed youths of America by placing them in camps and giving them work connected with the conservation of soil and forests. They were well paid, but had to send the greater part of their wages home. They were fed and clothed free of charge, and were encouraged to join all kinds of educational classes, also provided free. The camps are now a permanent feature, with a normal population of 300,000 youths, each working at a job and being educated at the same time.

The outstanding conclusions that could be drawn from Mr. McCaskill's address were, firstly, that in spite of depression in agriculture both in Great Britain and America, rural youth organisations had faith in the future and faith in the land as a way of life. Secondly, that the virility of youth organisations appeared to depend on the quality of their educational programmes, and that this quality depended rather on the amount of "study" than on the number of lectures. And finally, that an essential part of youth's education is working at a job.

The speaker answered a number of questions at the conclusion of his address, and was accorded a very hearty vote of thanks. The Dominion Y.F.C. President, Mr. D. S. Ross, presided.

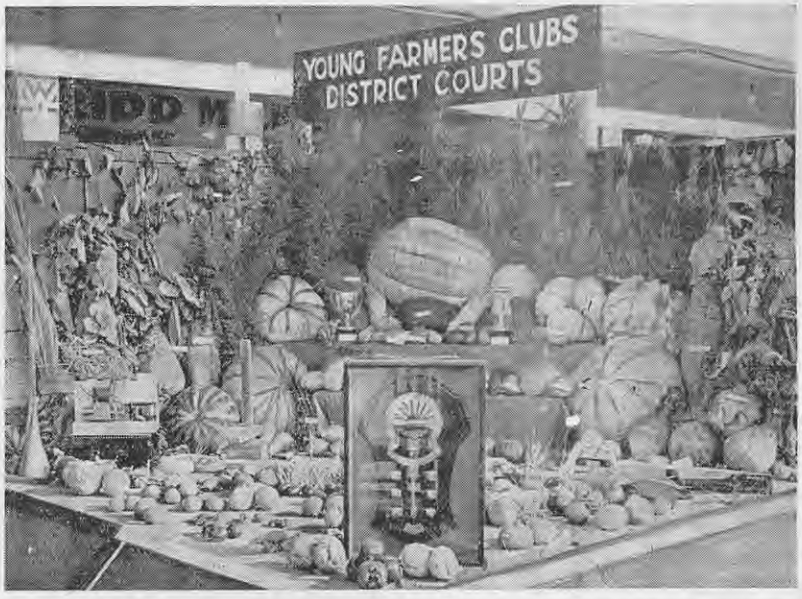
Auckland Y.F.C. District Courts Competition

— By —

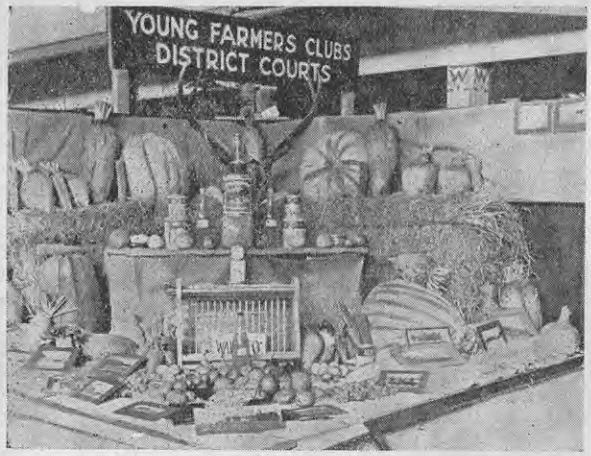
J. G. RICHARDS,
Hon. Secretary,
Auckland Y.F.C. Council.

THE annual district court competition for the Kempthorne Prosser Challenge Shield was again held at the Waikato Winter Show, and despite many obvious drawbacks to such activities at the present time, four districts were able to stage displays. The districts were Western Bay of Plenty, Auckland, Waikato, and Northern King Country.

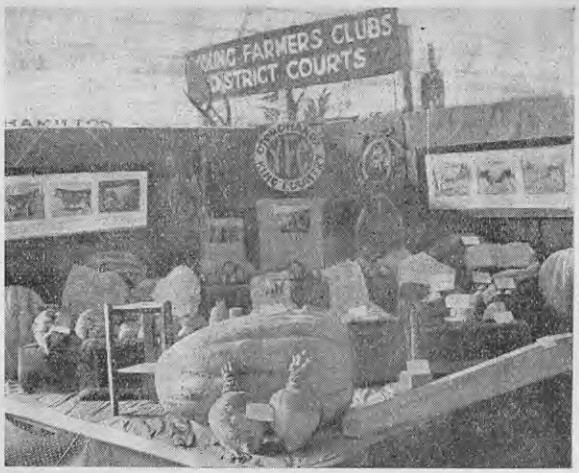
The courts, as the points indicate (see "Journal" for October, 1940, for previous year's results), showed an improvement on those previously staged, and were very favourably commented upon by the general public. We were fortunate this year in obtaining a position for the courts on the ground floor and near the centre of the Bledisloe Hall. This allowed club members to use their initiative to greater advantage, and focused the attention of the public on the display. Nevertheless,



The winning court staged by the Western Bay of Plenty which was awarded 210 points.



The Waikato Court.



The Northern King Country Court.

position alone does not make a display, and the club members who were associated with the courts are to be congratulated on their efforts.

The judges, Messrs. J. Ballard and D. E. Waide, took some time to analyse the various features of the courts and to make their decisions, and although there would appear to be a big disparity between the courts judging by the figures awarded, the actual differences to the casual observer not analysing them under the score card were not very great. The Western Bay of Plenty were again the winners, with Waikato and Northern King Country equal second, and Auckland fourth. This was Auckland's first attempt, and although beaten they were by no means disgraced.

Details of awards are as follows:—

	Agric. Products (80)	Farm Crops (50)	Originality of Design (30)	Attractiveness (70)	Repres. of other District Activities (20)	Total.
Western Bay of Plenty ..	70	40	30	60	10	210
Waikato ..	40	10	20	30	5	105
Northern King Country ..	20	20	15	30	20	105
Auckland ..	40	0	20	25	5	90

Methven Club Dog Trials

By C. A. WATSON, Hon. Secretary, Methven Y.F.C.

METHVEN Club held their dog trials recently on Mr. Low's property. There was a good attendance of 23 members, besides other spectators. Fifteen members entered dogs in the competition, which was run in two classes, (a) long head and pull, and (b) driving.

The results were as follows:—

Class (a).—D. McLaughlin's "Mick," 44 points, 1; C. Wightman's "Nip," 43 points, 2; H. Poff's "Glen," 42 points, 3.

Class (b).—C. Wightman's "Nip," 21 points, 1; A. Molloy's "Tip," 19 points, 2; C. Wright's "Mac," 14 points, 3.

Among the Clubs: Reports on Activities

WESTERN SOUTHLAND.

Drummond.—Talk by Mr. G. R. Herron, on "Tractors and Trailers," illustrated by films.

Thornbury.—Lantern lecture by Mr. W. R. Harris, Chairman Otago-Southland Y.F.C. Council.

Woodlands.—Selection of teams for debating contest:—A team, K. Hargest, W. Barron, A. S. Trotter; B team, A. Campbell, M. Barron, J. Findlay. Mr. W. R. Harris, Chairman Otago-Southland Council, addressed the meeting on the annual Y.F.C. conference held recently at Hamilton. At the previous meeting prepared papers were read by the following:—Hugh McKenzie, L. Middlemiss, H. Clay, A. Campbell, Ken Hargest, and A. S. Trotter.

Wyndham.—Arrangements for attendance at field day at Winton. Three members to prepare and give radio broadcast.

SOUTH OTAGO.

Clinton.—Lecture by Mr. J. McHaffie on "The Evolution of the Horse." The club held a successful community sing on July 19, led by Messrs. Dreaver and Laing, the proceeds being devoted to patriotic purposes. At the previous meeting impromptu speeches were given by members.

Clutha Valley.—Talk by Mr. J. G. Richards, Department of Agriculture, on the Y.F.C. experimental scheme.

Lawrence.—Address by Mr. C. A. Greig, Manager Bank of New South Wales, Lawrence, on "The Business Side of Banking."

Warepa.—Arrangements for annual ball. Messrs. Hill and Passmore, of the Otago A.A.,

addressed the meeting. Mr. Hill drew attention to the fine points of driving in his talk "Rules of the Road"; a discussion followed. At other previously unreported meetings Mr. Reid (Department of Agriculture) spoke on "Strangles in Horses" and "Red Water in Cattle," and Mr. S. Mosley, of Clydevale, spoke on "Sheep," and demonstrated on a Border Leicester ram belonging to Mr. L. Christie.

CENTRAL OTAGO.

Upper Clutha.—Talk by Mr. W. A. Scaife on "Minerals and Their Importance in Animal Nutrition." At the previous meeting impromptu speeches were given by members.

DUNEDIN.

Palmerston.—Election of new chairman. Mr. S. H. Saxby, Department of Agriculture, explained the Y.F.C. experimental scheme.

South Taieri.—Arrangements for future lectures as follows:—"Drains and Draining," "Stock Ailments at Breeding Time," and "Oil Boring in New Zealand." Mr. S. H. Saxby, Department of Agriculture, explained the Y.F.C. experimental scheme. Club members undertook to lay down 14 trials.

NORTH OTAGO.

Enfield.—Talk by Rev. J. Fordyce on "Printing." The speaker illustrated his talk with a display of printing materials, which were closely examined by members.

SOUTH CANTERBURY.

Arno.—Debate to be held with Waihaorunga Club. Address by Mr. C. C. Leitch, Department of Agriculture, on the Y.F.C. experimental scheme. At the previous meeting a lecture on "Stud Sheep of N.Z." was given by Mr. Alan Grant, Waimate.

Geraldine.—Presentation of stock judging cup by Mr. Crotty, advisory president, to G. Speed. The cup is open for competition among clubs in the Geraldine County. Arrangements for debate with Cannington-Cave Y.F.C. Club debate held, "That the Tendency towards Mechanised Farming tends to affect adversely the position of the Farm Labourer."

Milford.—Inter-club debate with Geraldine Y.F.C. Subject: "That Grassland Farming Pays Better than Ploughing and Cropping." Speakers: Geraldine (negative), J. Thatcher, C. Kedman, H. Hibbs; Milford (affirmative), N. Palmer, G. Dale, R. Palmer. The judge, Mr. C. Deeming, of Temuka, gave the decision to Geraldine, with 245 points, as against Milford, with 220 points, and named C. Kelman (Geraldine) as the best speaker. The judge gave some very helpful criticism of each speaker, and stated that he considered the subject to be rather ambiguous, placing the affirmative side at a disadvantage. The debate was well attended, 32 being present.

Pleasant Point.—Parcels to be sent to members serving overseas. Talk on "Russia" by Mr. D. W. Osenam, B.A.

MID-CANTERBURY.

Ashburton.—Debate with Catholic Club team, the subject being "That the Irrigation of Mid-Canterbury is in the best interests of the Farmer." Speakers: Catholic Club (affirmative), M. Brennan, J. McDonnell, L. Fox; Ashburton Y.F.C. (negative), S. Watson, E. McLelland, A. Davidson. The judge, Mr. Werry, gave the decision to the Ashburton team. A talk on "River Control" was given by J. Cairns.

Hinds.—Discussion on Y.F.C. experimental scheme; three members decided to undertake trials. Address by Mr. C. H. Signal on "Farm Dairy Construction."

Methven.—Discussion on Y.F.C. experimental scheme. Talk by Mr. D. Moore, Ashburton, on "The Wheat Industry."

CHRISTCHURCH.

Darfield.—Arrangements for annual ball. Meeting to be called for co-operation with agricultural clubs.

Ellesmere.—Donation of £1 1s to A. and P. Association. Lecture by Prof. McMeekin, Lincoln College, on "Farming Overseas," illustrated by movie films.

Springston.—Lecture on "Fertilisers," by Dr. Burns, of Lincoln College.

NORTH CANTERBURY.

Amuri.—Arrangements for annual ball. Short talks by club members.

Cheviot.—Report on annual ball. Arrangements for future lectures. Two club debates held: (1) "That the present-day Farmer has greater opportunities than his Grandfather," and (2) "Tractors v. Horses."

Cust.—Proceeds from hare shoot £6 10s donated to Red Cross Fund. Films exhibited by Massey Harris Co. Members of Farmers' Union and Women's Divisions were present by Invitation.

Scargill-Omihi.—Arrangements for annual ball. Presentation of wedding gift to club chairman, I. F. Munro. Club debate, "That Large-scale Co-operative Farming is in the Best Interests of the Country."

MARLBOROUGH.

Blenheim.—Address by Mr. D. R. Wilkie, Department of Agriculture, on "The Position Regarding the Manure Situation." At the previous meeting the chairman arranged a "knowledge quiz," dealing with prominent people and events of the day; this was carried out as a competition, which was won by F. Lucas. Congratulations were extended to Pilot Officer W. G. D. Thurston (a club member) on gaining his commission in the R.N.Z.A.F. Another member, Campbell Murray, leaving for England to train for the Fleet Air Arm, was farewelled and presented with a money belt. Movie pictures were exhibited by Ross Payne (club member) and included war in France, Dunkirk, King and Queen's visit to Canada, and also some local features.

Flaxbourne.—Impromptu speech contest: J. Parsons, first; G. McNab, second. At the previous meeting a lecture on "Stud Sheep Breeding and the Points of Sheep in General" was given by Mr. B. S. Trolove.

NELSON.

Dovedale.—Club debate, "That Women Should be Allowed to Join the Y.F.C." W. Kenyon and I. S. Win were leaders for the affirmative and negative respectively. The negative team won by a narrow margin. At the previous meeting lectures were given by club members —C. Davies ("Training and Care of Sheep Dogs"), C. Burnett ("Pig Breeding").

Moutere.—Business meeting. Arrangements for debate, the subject to be "Is Motor Traction an Advantage over Horses for Agricultural Purposes?"

Murchison.—Discussion on Y.F.C. experimental scheme. Arrangements for calf competition.

WAIRARAPA.

Alfredton.—Lecture by Mr. J. E. Duncan, Department of Agriculture, on "Wool," illustrated by sound films.

Masterton.—Discussion on annual dance. Final results of efficiency contest announced. Certificates for stock judging presented to the various class winners. Talk on "Mole Draining" by Mr. N. Blatchford; the speaker dealt with the work of a mole-drain and methods of using a mole-plough.

HOROWHENUA.

Levin.—Two new members elected. Discussion on interclub debating. Lecture by Mr. G. S. Robinson, Department of Agriculture, on "The Utilisation of Farmyard Manure." At the previous meeting a club debate was held, "That America should Enter the War on the Side of the Allies."

MANAWATU.

Apiti.—Discussion on Y.F.C. experimental scheme; decided that members would co-operate. Arrangements for annual dance. Decided to inaugurate a one-minute silence before each meeting in commemoration of Y.F.C. members who have fallen on active service.

Feilding.—Three new members elected. Discussion on proposed Y.F.C. stock show in November; committee set up to confer with Feilding A. and P. Association. Trophies presented to winners of stock judging competition in each section as follows:—N. Pedersen (dairy cattle), E. Beazer (pigs), D. G. Colquhoun (Romneys), L. Hansen (Southdowns), N. Pedersen (points prize). Lecture by Mr. J. Hill-Motion on "Milking Machines in Relation to Mammitis."

Kairanga.—Report on annual dance, showing profit of £7 5s 6d. Combined meeting with Kairanga Bull Circle; lecture on "Sterility" by Mr. M. Webster, Massey College.

Waituna.—Two debates (1) "That the Tractor Economically Supersedes the Horse for Farm Work," was won by the negative by a small margin of eight points. (2) "That the Development of New Zealand's Virgin Wastes is of more importance than the Improvement and Regeneration of Land at present being Farmed," won by the affirmative. Mr. T. L. Seddon acted as adjudicator. A successful dance was held recently, resulting in the sum of £8 10s being handed over to the local Patriotic Committee.

WANGANUI.

Mangaweka.—Business meeting and practice debate. A field day was held on Mr. Harding's property, and took the form of a pruning demonstration by Mr. F. M. Talbot, Orchard Instructor, Department of Agriculture.

SOUTH TARANAKI.

Alton.—Balance-sheet of dance presented. Lecture on "Stock Diseases" by Mr. Stewart, Veterinarian.

NORTH TARANAKI.

Inglewood.—General discussion on the feeding of calves and pigs on whey.

SOUTHERN HAWKE'S BAY.

Mangatainoka.—Arrangements for dance. Decided that at each club meeting a small donation will be made, the proceeds to purchase Xmas gifts for members overseas. Mr. H. de O. Chamberlain, Department of Agriculture, exhibited sound films of agricultural and general interest.

Woodville.—Two new members elected. General discussion in connection with mole-draining.

CENTRAL HAWKE'S BAY.

Onga Onga.—Club debate, "That the Present Time Offers a Better Opportunity or a Successful Career in Farming." Speakers: E. S. Bibby, W. Malcolm, K. Halliwell (affirmative), C. Masters, O. Bloomfield (negative). The debate was won by the negative supporters.

NORTHERN HAWKE'S BAY.

Meeanee.—Discussion re Y.F.C. experimental scheme. Address by Mr. Pease, of the N.Z. Loan and Mercantile Agency, Hastings, on "Wool." The speaker dealt with wool in its different stages, the breeding of a class of sheep to obtain the best quality wool; wool-classing in both shed and store, and appraisement and subsequent export overseas. He continued with the arrival of the wool at Bradford, dealing with the scouring, dyeing, tops and yarns, etc., and the manufacture of the various goods. At the previous meeting, Mr. W. White gave a lecture on "The Trial Dog," using his dog Rob for demonstration purposes.

POVERTY BAY.

Gisborne.—Two new members elected. Decided that the competition for Mr. R. W. Pilmer's trophy for the best individual debater be conducted over three sections, comprising an open debate, an impromptu speech, and a prepared speech. Address by Mr. T. C. Thompson, Health Inspector, on "Milk—It's Importance and Care." The speaker dealt with the handling of milk in Europe, the United States of America, and New Zealand.

Te Karaka.—Lectures by Mr. R. E. Alexander, Government Veterinarian, on "Horses and their Ailments" and "Parasites."

TE KUITI.

Mokauiti.—Report on annual ball; sum of £3 10s from profits, handed over to Farewell Fund. Talks by members as follows: "The Junior Farm Course at Ruakura" (W. Tatham), "Saddles" (J. W. Law), "A Cycle Tour from Hamilton to Wellington (D. Kirk). The last-named speaker very graphically described his journey via Taupo, Napier, and Palmerston North, and the return via Raetihi, where snow compelled him to take the train to Taumarunui; he covered 708 miles at an average speed of 9¾ miles per hour.

Otorohanga.—Arrangements for a social. Two club debates held:—(1) "That a College Education is of More Value than Practical Farming Experience"; speakers, J. McDowell, S. Smith, D. Robertson (affirmative), D. Brightwell, H. Murphy, W. McCormick (negative); affirmative won by a small margin. (2) "That an Immigration Scheme Would Benefit New Zealand," speakers, S. Tye, H. Rothery, M. Shields (affirmative); C. Murphy, T. Shields, T. Jones (negative); was won by the affirmative.

WAIKATO.

Cambridge.—Two new members enrolled. Arrangements for a field day at Ruakura. Sum of £8 2s 6d raised for Red Cross funds by means of club dance. Gifts to be purchased for members going overseas. Club debate: "Should Women be Allowed to Join the Y.F.C."; speakers, M. Priebe, J. Dunning, P. Shaw (affirmative), G. Goodwin, R. Lang, N. Graney (negative). Mr. G. Walsh (advisory member) acted as judge, awarding the decision to the negative supporters. Mr. Walsh gave some valuable advice on debating and the presentation of the subject for discussion.

Kakapuku.—Club debate, "That Young Women Should Not be Admitted to Young Farmers' Clubs"; speakers, A. McLeay, M. Neill, M. Haigh (affirmative), M. Hughes, F. Turner, T. Smart (negative). The judge, Mr. A. H. Smith, decided in favour of the negative team.

Te Awamutu.—Club debate, "Should Capital Punishment be Abolished?" Speakers, D. Harrison, B. Pattison, D. Hope, K. Allcock (affirmative), A. Lashey, M. Kay, K. Fraser, J. Fitzpatrick (negative). The affirmative team won by 14 points.

WESTERN BAY OF PLENTY.

Kati Kati.—Lecture on "Silage" by Mr. A. V. Allo, Department of Agriculture.

Paengaroa.—Field day on Mr. W. T. Black's property, Paengaroa. The field day took the form of a practical demonstration of fruit tree pruning by Mr. Hand, Department of Agriculture. There was a total attendance of 37, including four visiting members of the Te Puke Club and 15 farmers.

Te Puke.—New member enrolled. Final of the "under 19 years" speech contest. Awards: Two best speeches, K. Petch; most improved speaker, T. Melton. The winners each received a book donated by Mr. D. S. Ross. Competitors in the final: K. Petch (calf-rearing), S. Caldwell (photography), D. Caldwell (lime), T. Melton (maize-growing).

EASTERN BAY OF PLENTY.

Edgecumbe.—Talk by Mr. I. B. Gow on "Women's Part in Farming Today." At the previous meeting a discussion took place on the question of women being admitted as club members, which was approved.

AUCKLAND.

Hunua.—General discussion "That Young Ladies be Allowed to Attend Y.F.C. Meetings." The meeting was not in favour of this, but decided that the matter be reconsidered at a more opportune time.

WARKWORTH.

Kaukapakapa.—Field day at the Nikau Bacon Factory, Auckland. The party was conducted over the factory by the manager, Mr. Cory; all stages of bacon-curing were fully explained. The sausage-making plant was also inspected. The party numbered 22, and included eight visiting club members.

Health Notes for the Farm

Infectious Diseases Are Enemies of the Young

Contributed by the
DEPARTMENT OF HEALTH

THE detection and early exclusion from contact with others of children suffering from infectious diseases is very necessary for the preservation of a high standard of health among the child community. The future of our race largely depends upon defence against such enemies of youth as well as success in the struggle against Nazi autocracy abroad. The importance of parents and teachers knowing the early signs and symptoms of such epidemic ailments is therefore obvious.

The following is a brief survey of the early signs to be looked for. They are, of course, of special significance during an epidemic of the particular disease, and the provisional exclusion from school of any even mildly suspicious case is a wise precaution. The incubation period is not necessarily always the same, and therefore the periods shown must only be taken as the average.

Most infectious diseases begin with a rise in temperature. Although the feverishness may be slight, the child should be put to bed and isolated from the rest of the family, especially from other children, until it is decided from what the child is suffering. The diet should be light.

Any infectious disease in a child can be ushered in by headache. fever, and vomiting. Running at the nose and eyes, and signs of a cold in the head, are also the alarm symptoms of the various infectious troubles. During an epidemic, therefore, any child exhibiting such should be excluded immediately and kept separate until a definite diagnosis is made.

A wise mother will rely on the skill of a qualified nurse whenever she has the slightest doubt as to the nature and proper treatment of her child's ill health. She will not risk his immediate future health by experimenting with quackery remedies. When in doubt send for your doctor.

Infectious diseases must always be treated with great care and attention in order to guard against after-effects, which may prove more serious than the disease itself.

The period of exclusion from school of children suffering from any infectious disease or in contact with such a disease was published in the November, 1940, issue of the "Journal."

Common Diseases

The most common of these diseases are:—

Chickenpox.—Incubation period (that is, the time between exposure to infection and first appearance of symptoms) about 21 days. Sudden onset. Fever, but this may be entirely absent in mild cases. The rash appears on the second day, and may be the only symptom present. The spots are scattered, at first red, and then clear blebs form.

Measles.—This disease is a nuisance. It seriously interferes with school life, and causes much trouble in the family. It is important that children are protected from all chances of infection. This done, the amount of unhappy consequences from measles will be greatly avoided. There are two types:

German Measles.—Incubation period about 21 days. Slight fever, which may be entirely absent; enlarged and tender glands of both sides of the neck; the rash appears suddenly, and may be the first and only symptom.

Measles.—Incubation period about 14 days. Onset with symptoms resembling cold in the head, running nose, inflamed eyes, sneezing, and coughing. The rash appears on the third day, dull red, slightly raised spots occurring in groups, first behind the ears and on the forehead and face, and then spreading over the body. The most infectious period of the disease is in the early stages of nasal discharge, etc.

Mumps.—Incubation period about seven days. Sudden onset, with slight fever. Pain and swelling in front of and below the ear, often one-sided, but the infection may spread later to the other side.

Whooping Cough.—Incubation period about seven days. Rather gradual onset of symptoms, suggesting a cold in

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"Heco" Modern Milkers	223	Free details.
Triumph Topdresser	226	Free booklet.
Dettol	232	Free booklet, "Dettol in Veterinary Practice."
Eartags, Earmarks, Brands, etc.	234	Free literature.
Speedway Cooler	235	Free booklet.
Carbo-Lastic	237	Free Carbo-Lastic booklet.
Hydro-Electric Power Plants, Water-Power Machinery, Pumps, etc.	238	Free illustrated literature.
Radio Operators' Course	251	Free literature and details of Special Training Course.
Farm Accounting	255	Free brochure and details of Home Study Course.
Hayman Electric Washer-Boiler	260	Free illustrated literature.
Gibraltar Board	263	Free booklet of novel and modern interiors, etc.
Elastic Stockings	265	Free particulars.

NAME .....

ADDRESS .....

the head. A persistent, short, sharp cough develops. The characteristic cough, with whoop and vomiting, may appear at any stage, but it is often delayed.

Scarlet Fever.—Incubation period about five days. Sudden onset, with sore throat, headache, and fever; glands are enlarged. The rash appears within 24 hours, first on the neck and upper part of chest; it is a fine pinpoint, bright red rash.

The Common Cold.—A most prevalent source of infection is the common cold. During summer months this affliction is less in evidence, but as winter approaches, through living in stuffy, overheated rooms without adequate ventilation, the so-called "cold" begins to be common indeed. The familiar symptoms of sneezing, running noses, tickling sensation in the throat, with later some cough, are set up by a number of causative agents. Colds should be taken seriously, first, because many of the serious diseases, especially of childhood, are ushered in by what appears to be a common cold; second, because they are at times very infectious and frequently sweep through a household, a schoolroom, and in their course some of the cases develop into serious conditions; and, third, because they directly and indirectly cause great discomfort and even suffering and economic loss.

Diphtheria.—Incubation period from two to five days, occasionally longer. Onset may be gradual or rapid. The child feels and looks ill. Has a sore throat with greyish patches on the surface of the throat, palate, and tonsils; these patches may be absent and the sore throat the only symptom present.

Prevention of Diphtheria.—Diphtheria is a serious disease. Even mild attacks of this disease may result in serious complications and permanent damage to one's health.

Immunity

An individual who, in spite of frequent exposures to an infectious disease, does not contract the disease is said to have a natural immunity to that particular disease. An immunity or protection from an infectious disease may be acquired; such an acquired immunity is possible by giving the individual injections of a specially-prepared substance, and after such treatment the body is protected from that particular disease.

It has been proved that diphtheria, one of the most serious diseases of children, can be prevented by such injections. The Department of Health is now offering these injections to preschool and school children of the Dominion. Further information can be obtained from the Medical Officer of Health or School Medical Officer for the district.

THE Good Neighbour

BY MARY

From Me To You

"FRIENDSHIP is the greatest thing in the world." I don't know just who it is who said that, but I had it sent to me one Christmas in beautiful lettering on a card, and I have treasured the card from that day to this.

Friendship—it is indeed a beautiful thing. Last month, you will remember, I was telling you how the thoughts of my friends lived forever in my garden of memories, and this month I want to tell you how grateful I am for the richness I have in so many true friends. The safest basis for a true and lasting friendship is a desire for the same pursuits, and the sharing of the same dislikes. There is no room in true friendship for jealousy or petty suspicions. Friendship trusts always, and is usually rewarded for that trust by a deep and lasting bond that will not break. A friend is always ready to help in a time of trouble, and needs not to be asked to assist when sorrow comes, nor does she need thanks when the deed is done.

Do you know ONE person like this? Yes, even to have one person among all those you know who is always there, always ready and waiting to be at your service, is to be rich indeed. I am fortunate—among those I know I have many who are ready to help when things go wrong, and to rejoice when things go right. Yet I feel that to have a few true friends is infinitely better than to have many acquaintances who are "fair-weather" friends.

Choosing friends is a difficult matter—like many other things in life, friends come along uninvited, and unasked, and it is often quite a while after they have become true friends before you realise their true value. But, if you are choosing your friends, be careful in the choice, for a man is often judged by the company he keeps. By this I do not mean that you should be snobbish in your friendships—on the contrary, I have known friendships to exist between people who have been rich and poor—but the quality of friendship has not been lessened in any degree by the difference in their stations; perhaps, on the other hand, it has been strengthened.

A friend is one who knows all about you, and loves you just the same, and it is a grand thing to know that there is always someone ready to share your moods with you. But do not forget that you grow out of some friendships. When the time comes to discard these friends, discard them as you would an old frock which you have outgrown, and cherish only the memories which they gave you in happier days.

Byron wrote: "Friendship is love without his wings," and those friends who were meant to be your friends through sunny days and grey will be with you always, whether they are by your side, or many miles away.

Mary

Mary's "At Home"

I WAS so interested in your "Care of the Hands." I have always been interested in nice hands, although I am not as careful of my own as I should be. Once when my husband and I were on holiday, staying at a hotel, I was talking with some other women who were staying there, and one asked me if I had much trouble getting help. When I said I did my own housework, etc., she said, "Oh! I thought from looking at your hands that you must keep help." So much for that, but it was not just after fruit picking and jam-making time, or she would have thought differently!—**Laurel, Feilding.**

I LOVED your letter "mother-wise." What a blank there is when any mother is incapacitated for a time, and how she yearns to be at her usual work again. The whole house is disorganised if Mother is absent, and how disgruntled everyone gets. Often these days we are called on to give a sudden word of encouragement, even to strangers. Yesterday I sat

next to a mother in a bus, strangers, yet we felt urged to converse. "I've two over there," she said, in tears, "one a prisoner of war." "Well," was all I could reply, "yesterday a man said that to be a prisoner was good news, for they've a chance to return." And she smiled, and said she had never thought of it like that before.—**Mrs. Vee, Waikato.**

MY PEN-NAME I chose because of its musical sound, not because I admire the Assyrians, many of whose most famous relics were found at Khorasbad. I think Eastern names are more musical sounding than many European ones. I had thought of using "Shalimar" as a pen-name—it's a lovely name, isn't it?—but I find there is a well-known nautical writer of that name.—**Khorasbad, Marlborough.**

I HAVE just come back from a holiday spent at a wee bay that so far is untouched by the hand of the Public Works Camps. Of course, I know these people have to live and follow the rail as it forges its way north, but still it is nice to find a spot where there are not dozens of tent-houses. The house where I stayed sits on a hill and looks out to the sea, and at the back, dense bush looms up to the sky. As it was wet on and off I could not wander at will through the bush, but I spent long hours on the beach. For several days there was a high sea runing, and I love nothing better than to sit on the beach, and watch the waves dashing against the rocks. One wonders just how the rocks stand it, but, as in life's battles, the storm leaves its mark behind, as one can see when one climbs over the rocks and sees the deep crevices and scars left by the waves. I had such a lazy time on wet days—I just sat in front of a huge log fire, and read and read.

My ducks decided that as I was on holiday they would go on strike, and they have not laid for four days. However, I scolded them today, and so I hope they take notice of what I said, and start again.—**Biddi-Jan, Redcliffs.**

Sunshine is coming again, and Rose-Lane, under contract to Columbia, models a snappy brown and green cotton play frock. The blouse is apple green, and large green flowers pattern the brown skirt which has wide unpressed pleat centre, back, and front.

"AND HOW does your garden grow?" Doesn't this time of the year make you think of only the glories of your spring garden? Up here the first bulbs were one day proudly blooming in the sun, but by night many were beaten down and mudded. A sudden fall of snow, followed by heavy rain, had come on, but before the rain started a different sort of nature beauty had been presented. This was the first fall of snow this season which had come as low down as here, and it wasn't welcomed by the other little "spring arrivals"—the lambs and calves. This year the wallflower has burst into bloom in an amazing paintbox of colour, and the scent is spreading all over the garden.—**M., Feilding.**

USUALLY, I enjoy a ride home at night by starlight and moonlight, but I had a different experience one night when it was raining. At first I was full of confidence and courage, and assured my host and hostess that I was quite capable of finding the way home on my own in spite of the dark night and pouring rain. But as I proceeded further along the rough bridle track, and the rushing sound of the river seemed ever nearer and louder above the sound of the rain, fears and forebodings began to cross my mind. How swiftly that river seemed to be flowing! It must have risen considerably with all the recent rain—and I had soon to cross it. The thought was not a pleasant one. I should now be near where the track goes between two patches of bush. There was no moon, not even a star to twinkle in friendliness—just inky blackness, making it impossible to distinguish darker shadows to indicate the bush. The next moment my horse seemed to be going down, down, down. Where was I? Was I near the river bank? And I knew that river was swift and treacherous except at the one safe crossing place. My horse stumbled, almost pitching me off. It was too terrible. I could not go on, but could I even go back? All confidence was gone, replaced by a fear that was almost a panic. However, comforting myself with the thought that I had less distance to go back than to go forward, and had already traversed that distance safely, I turned my horse, and somehow found my way back to the cottage I had recently left.—**Jewel, Tokomaru Bay.**

THE other night we went to see the musical comedy "Rose Marie," which was put on by local people. And did we enjoy it? We loved every minute of it, from start to finish. There is something appealing about "real" people after so much of the films. There was colour and comedy, romance and music, all combining together to lift us, for a short while, out of the world of everyday into the magic realm of make-believe. As we came home singing the old songs we have known and loved for years, we felt we owed a debt of thanks to those folk who had worked so hard to make the evening's entertainment such a thrill for us.—**Pigtails, Wellington.**

Here's an Idea for Furnishing

SOME of us are luckier than others—we have a flair for furnishing, and whatever we do, wherever we place our furniture, it just seems right. We all know people like that—the minute we go into their home it just reaches out to welcome us with its inviting air. But you can have a furnishing flair, too, if you like to go to a little trouble to study your house, and its rooms.

If you have a room that is inclined to be dark and a little on the small side, have you ever thought of making a mirror window? This is not hard, and it transforms the room for you. You will need a fairly large-sized mirror, which you must fix above a chest of drawers. Perhaps you have an old sideboard—that would serve admirably. Now, with your mirror hanging on the wall, just imagine it is a window, and curtain it accordingly. With a pelmet across the top, and curtains down each side, it looks for all the world like a window. A bowl of fruit placed on the sideboard, and a lamp, with perhaps a vase of flowers, and your room looks twice as big as before, and very much prettier. Do try it.

Are you one of those women who have longed always for a dressing table, with a low stool, so that you can sit in front of it and attend to your beauty needs? Don't despair—take a look at our picture, and you will see that although pennies may not permit of a new low dressing table, you can still have your low stool. The small cupboard on the left is useful for keeping shoes, or even hats, while the chest of drawers is just your old dressing table minus the mirror and attachments. You may not be lucky enough to possess a long mirror, in which case you will have to buy one to use between the two tables, but just imagine your thrill when you can at long last sit in front of your own mirror.

Have you ever wanted a writing table? I saw a novel idea the other day. My friend had a kidney-shaped table which she didn't like, so she painted it a pretty pink, and used it in her bedroom as a writing table. Now she loves her little table, and spends many a pleasant hour at it.

There's night and day, brother, both sweet things; sun, moon and stars, brother, all sweet things; there's likewise a wind on the heath. Life is very sweet, brother—who would wish to die?

—George Borrow

You too can acquire a flair for furnishing if you keep your eyes open wherever you go, and whenever you can. It is amazing how many bright ideas you can glean from the homes of your friends when you are visiting.

Helpful Hannah Says . . .

If you press men's trousers with a sheet of brown paper, instead of a wet cloth, it will make a much better job, and all grease marks will disappear.

* * *

If a cork has broken off in the neck of your bottle, insert the blades of two pen-knives on opposite sides of the cork. Pull the handles towards one another, slowly twist round, and then pull. Your cork will fly out!

* * *

To remove a tight lid from a bottle or jar, hold a piece of sandpaper in your hand.

* * *

After peeling onions, rub your hands with salt when you are washing them, instead of using soap. Fingers won't discolour then.

* * *

If your bread crumbles when you are making sandwiches, dip your knife into boiling water. With a hot, wet knife, your bread will cut like wafers.

* * *

When your clothes pegs are new, boil them in clean water for an hour, and you will find they don't split.

* * *

Painting? Then use a brown paper bag as a glove, and you will keep your hands clean. Brown paper "gloves" are easy to replace, and save so much paint from your hands.

* * *

Stand your jar of peanut butter upside down when not in use. This prevents the oil from settling on the top, thus leaving the end of the jar of butter almost dry.

* * *

When frying onions, add a pinch of sugar, and there will be no fear of indigestion then.

* * *

Damp your silk shoelaces with water before tying, and you'll find they don't slip.

Our Competition

"What Is The Secret Of A Successful Marriage?"

OPINIONS varied considerably on this debatable question, but I think you all agreed on three things: the secret of success in marriage lies in the ability to give-and-take, respect for one another, and the possession of a sense of humour.

First prize this month to "Fairfield," Hamilton, and second to "A.M.D.," Inglewood. Close behind comes "Sally" of Otago, and "Civis," Gisborne. Successfully married? I do hope so, but in any case, here's how our wives are making a success of the most important business of their lives.

First Prize

HOW tragic it is that so often the happy experience of the uniting of two lives should be followed by disillusionment, broken hearts, and broken homes. And yet it is too often so. Why is not every marriage a success, we wonder? Perhaps the fault lies partly in the haste with which this important step is taken. Frequently, in the glamour of romance, the future is hardly considered, neither is mere fleeting passion discerned from true and lasting love, which alone will stand the test of time. Real love is based upon an appreciation of each other's characters, and it is as well that these characters be thoroughly known and their compatability tested before this solemn step is taken. It is not necessary to harmony that colours be of the same hue, but they must be of the same tone to blend successfully. Thus it is with human lives—there must be things in common, even if all tastes are not identical. Especially is this necessary in things of the spirit, wherein lies the true depth of life, and the rock foundation of human love.

After marriage, it is sometimes found that the "vision splendid" has faded, and in the humdrum round of daily life petty irritations and grievances

Happy childhood—happy because her parents have found the secret of a successful marriage.

spoil the harmony of the home, and love begins to wilt. Wherein lies the secret of continuity of love that will lighten the home, and make it a precious sanctuary? As far as the wife is concerned, as the home-maker, it is her privilege to set the standard high, and guard the ideals with which they first commenced married life. A man appreciates a home where he finds brightness, sympathy, and understanding love, where he finds relief and recreation from cares and worries, and where he sees in his wife a real helpmeet, ready to share his interests, and show by her thoughtful unselfishness the depth of the unfailing love she has for him. This will draw from him the best, too, and he will share the burdens, joys, and trials of home life. Above all, trust each other implicitly. Remember that trustful love springs from respect and honour, and is something which nothing can crush or diminish through all the events of life, helping a man and a woman to be not only husband and wife but lovers always and forever.—**"Fairfield," Hamilton.**

Second Prize

TO MY mind, the real foundation of a successful marriage is give-and-take on both sides. Selfishness on the part of either husband or wife is sure to lead to squabbles and dissatisfaction. Children are another important factor in married life. It is a well-known fact that the divorce court deals with nearly three times as many divorces of couples without children as of those with children. A child is the strongest link in the family. If one is unable to have children, then the next strongest tie is the joint ownership of something, whether it be a farm, a house, or even a pet canary —something really shared.

A great stumbling-block in the path of married happiness today is the independence of the modern woman. Very few wives care to be dominated by their husbands, and yet the average man expects his wife to live practically for the home alone. Happy the wife who can do this, but how many of us can? We feel we must have outside interests or stifle. It is said that the modern craze for twin beds is merely a sign of woman's independence, but it is the forerunner of the severing of the nuptial knot in more cases than any woman would admit. I think the ideal marriage consists of a democratic partnership, and this is what most of us must aim for if we are to have any kind of happiness and security in our married life.—**A.M.D., Inglewood.**

Christmas Is Coming

I KNOW you'll probably think, "Only seems the other day since last Christmas," when you read this, but Christmas is not far away now. What are you going to make this year for gifts? Economy in giving is going to be a big problem this year. What is your way of making a Christmas gift? We all have our own pet ideas of what to make.

"How I make my Christmas Gifts"

is our competition subject this month.

So send me your entries before October 20th, and you may win one of the two prizes: First 10/-, and second 5/-.

"Mary"

C/o. "Journal of Agriculture,"
P.O. Box 3004, Wellington.

Closing date: October 20th, 1941.

Highly Commended

THE ability to give and take, and a sense of humour—these two things I would certainly place first in the necessities of a successful marriage. Much depends, of course, on what people consider the success of a marriage, but I cannot believe that there would be any success without these two. Others are needed too—good health, similarity of tastes, some children, and love and understanding of each other. So long as people retain a sense of humour it will carry them over many a dark place, and if they are willing to give way to each other in little things, then they can be depended upon to stand together when the big things of life have to be faced.—**Sally, Otago.**

IN MY opinion, compatability is the secret of a successful marriage. To look at things in the same light, and above all to laugh at the same things, is a very great help towards getting on together. To be pals in the true sense of the word is the most desirable state for married happiness. To be relaxed in each other's company quite naturally and without effort makes for recuperation of bodily and mental powers. Compatability ensures peace in the home, similar aims and aspirations, a united front in relation to outside affairs, and the same ideas on bringing up a family.—**Civis, Gisborne.**

TEAMWORK is the pivot on which the success of connubial bliss, and its rise or fall, depends. Each must pull their weight in "double harness," and be dependable. Service is a much better word than duty, and in the act of doing anything worth while we learn the true meaning of the word. Each partner should know his or her obligations, and in all honesty do their share cheerfully. I sometimes question if there is such a thing as love. Many intelligent and sane-living people could be just as happy with someone else. After all, honest dependability is the keynote.—**Mrs. Vee, Waikato.**

FRIENDSHIP TODAY

Friendship may be the only lamp left burning,
In days when we must black out every light.
Friendship may be a signpost at each turning,
When not a place-name may be left in sight.

Friendship may be a luxury still left us,
When to spend money is not right or wise:
Friendship is gladness, laughter, song and sunshine,
When overhead are dark and threatening skies.

Whatever else we give or lose or lessen,
Let's hold our friendships sacred, in an hour
When life needs all the beauty we can bring it,
Growing at our heart's doors, in radiant flower.

HYACINTHS

HAVE you ever looked carefully at the leaves of a hyacinth, and seen the marking resembling Y on them? The ancient Greeks used to worship Hyacinth, and have a great festival, Hyacinthus, every year in his honour; do you remember that Hyacinth was the beautiful boy who was killed by the jealous god, Apollo? From the blood of the youth sprang the beautiful flower we call hyacinth, and ever since that day there has appeared on the leaf of the hyacinth a curious letter-shaped mark that stands for AI or "Alas" in the Greek tongue. Thus does the flower eternally bewail the death of the beautiful youth.

I Saw These Novelties About Town

DESPITE the war—or shall I say because of the war?—the city shops are showing some delightfully fascinating novelties. Perhaps the newest novelty on the market is the "Victory" brooch. All the shops have these brooches, made with the big V, mostly in scarlet and grey. But there are ever so many variations of the victory brooch—you need only to walk down the street and see them being worn to know that! Victory! How we are all hoping and praying for it! Surely then it is not to be wondered at that so many of us have taken to wearing these brooches with our spring costumes!

The shops are showing fascinating arrays of new goods—surprising though it may seem. Some of the new colours intrigue me—Indian Penny, a lovely coppery shade, is ideal for the young girl who wants to look really smart, while if you are a little older try Grecian Grape! As its name implies, it is a rich purplish shade. But I have noticed a lot of Air Force blue being worn, and it is not uncommon to see a lass, walking alongside a lad in Air Force uniform, who is clad in almost the same colour. Grey, too, is very popular—I have never seen so much of it being worn.

And everyone has scarlet accessories—scarlet handbag, scarlet gloves, a scarlet feather athwart a grey felt hat, and even—if the wearer is particularly dashing—scarlet shoes. Grey is a very useful colour, and lends itself admirably to many changes. Try a purple scarf and a purple feather with your grey coat, and keep to grey gloves and handbag—this is a change from the scarlet accessories.

Frocks are going to be even shorter this summer—is this a wartime economy measure? And talking of economy measures, if we went without silk stockings last summer, and liked it, then I am afraid we will all have to go without silk stockings this summer, whether we like it or not! A pair of new silk stockings today is treated with greater appreciation than a bag of gold!

Do you remember those long shell necklaces which were so popular many years ago? Well, they are quite the latest once again—wear them in a three-deep tier against your high-necked spring jumper, and see how smart they look.

And finally, if you want to be the very acme of smartness and novelty, try this idea next time you are going to a dance—it is the latest in America! Fingernails are being painted in red, white, and blue to match our Union Jack! Just imagine the furore you would cause if you walked in with your thumb and little finger nails scarlet, the next two nails left white, and the middle one blue! I dare you!

THE LILAC TREE

NOW it was over. They had all gone—the guests, the bridesmaids, and the bride herself. No more fuss and bother, no more frantic wonderings if everything would go off all right—no more—no more living? Martha, feeling all of her forty years, dismally turned the situation over in her mind as she lay in bed the morning after the wedding. It had been so beautiful—Pauline in her exquisite bridal gown, with Betty as bridesmaid, and small Starr as flower-girl—all so beautiful, but now it was over. Her little Pauline had gone . . . and she hadn't imagined she would feel so lonely. The day outside was sparkling with springtime, and Martha could see the sun dancing over the blue waters of the harbour. And here was the postman coming up the steps—perhaps there would be something for her?

The letters fell on the hall floor, and Martha slipped on her dressing gown as she pattered out to collect them. Three for Pauline, and one for herself. She wondered what her sister Jenny wanted now? The delicately-perfumed lavender notepaper was balm in itself to Martha's heartsore feelings, and Jenny had written:

"Now that your only girl has married her Jim, why not come back to your home again? The farm is leased, but the cottage is empty. There is your garden waiting for you still, the lilac is in flower again, there is still a larks' nest out in the paddock, and a lark in the sky to sing to you the whole day through. And we are waiting for your coming, Martha. . . . You'll miss your loved David, I know—you and he belonged to this place. But he is sleeping peacefully in the churchyard, and we have kept the flowers blooming bright above his head. I feel that he longs for his wife to come back to her home. Now that Pauline is married, the city will hold little interest for you. Here we are waiting to welcome you, and the cottage is waiting too, so lonely."

Tears welled up in Martha's eyes—Jenny was right. There was nothing now to keep her in the city. Pauline had her Jim, and when they returned from the honeymoon they would be glad to find she had gone.

Yet it would be strange, her country cottage, without David, for she had come to the city immediately after he had died, and devoted herself to her daughter. Well, she would go back again, now.

* * *

"The lilac is in flower again."

How the words hummed through Martha's mind as the train sped through the open spaces. The lilac—how sweet and heavy had been its perfume that day when David had brought her home as his bride. It didn't seem so long ago; they had been so happy. Then Pauline had come along, and the days had seemed even shorter than before. Life had been very good. . . .

There was the old windmill! Martha excitedly craned her head round to see it as the train flashed by. Home was near now.

The station had not changed. Old Ben came out and greeted her as though she had only been on a day's trip to town, instead of seven years. Yes, he said, the cottage was empty again, the last tenant had left three weeks ago.

Martha hurried down the country road. She would go back to the cottage alone, before she went to Jenny. A spring shower had left the tall grasses fresh and sweet-smelling—she breathed deeply of their fragrance, and her heart asked her how she had stayed away so long.

In through the little wicket gate, it still creaked slightly, and over the wooden bridge that was as strong as the day David had made it. Home! Martha went up the path eagerly, and tried the door of the house. Locked! After the first shock she realised of course that no one knew she was coming. So she peeped through the window: there was the sitting-room, with the faded rosebud paper still on the walls. How proud she had been when that was first hung! And here was the bedroom: its walls had been pink, but now they were patterned with some sunshiny gold and green paper that sang of springtime. Oh! They had not covered the wooden boards on the kitchen floor. How white they still were.

Jenny had written that the lilac was in flower again, but she hadn't told her that the banks of the creek were a delight of daffodils, with buttercups running riot everywhere; she hadn't told her that the small, blue hyacinths still guarded the pathway; and she hadn't told her that the kowhai was in flower.

It was all so wonderful—home! Here she would be happy. She knew in her heart she had been hungering for this through the years away from it, and she lifted her eyes to the blue heavens

above to thank Him for bringing her back again.

* * *

"Oh, it's not empty at all! There are curtains at the windows, and the door is open wide. Aunt Jenny must have been mistaken."

Disappointment clouded the girl's face, but the boy at her side said "Let's go in—I would like to see the house now we have come so far. Perhaps they wouldn't mind, if we explained."

She nodded, so together they crossed the bridge, and walked up to the door.

"Better knock," he suggested, so she tapped gently. But there was no answering sound from within—only the liquid notes of a skylark floating down from the blue skies.

"Everyone must be out," said the girl. "But let's explore—I would like to see how the lilac tree is."

Martha was out in the garden, gathering the lilac's fragrance, when the travellers came upon her.

"Why—Mother"

The woman turned quickly.

"Pauline! However did you know I was here?"

"Oh, but we didn't! Aunt Jenny wrote to us that the cottage was empty, so we decided to buy it, and keep it as a weekend house. It's only two hours from town in the car. We thought it would be such a surprise for you."

The latest in hats! Here is a model worn by a star from the studio of Metro-Goldwyn-Mayer, and comes straight from Hollywood.

"My dears—" Somehow Martha's eyes felt wet.

"And to think you have beaten us at our own game," laughed Jim.

Martha laughed too.

"The kettle's on," she said shortly. "Will you have afternoon tea with me, or will you be weekending? There is still enough room for three."

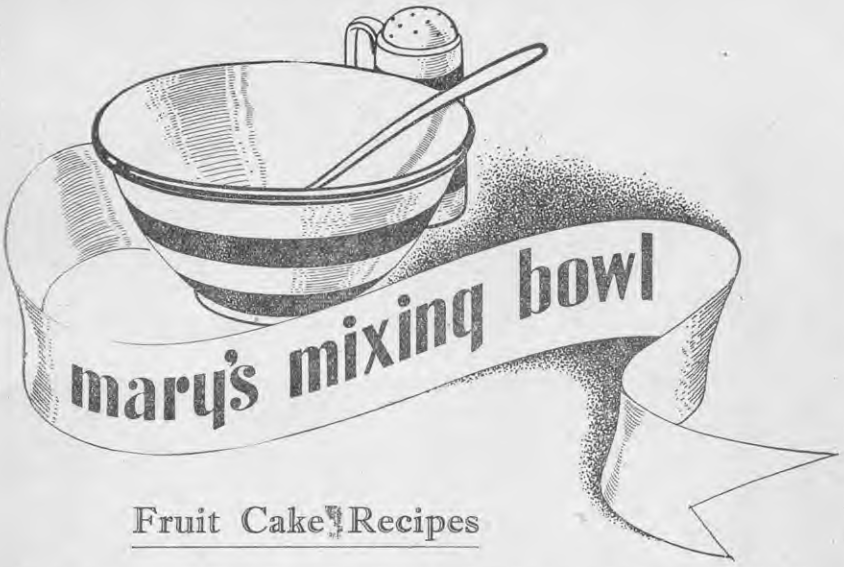
"Weekending?" said Pauline. "No, we have another week's holiday, so we'll stay, if you'll have us on our honeymoon."

And as Martha led the way to the house her mind went back to that happy day when David had brought her home, just as Jim was now bringing Pauline. The lilac tree—it was her emblem of happiness, and she knew the other two would love it as she did.

Beauty

MARIE DRESSLER once said that every woman has the right to feel beautiful, no matter how scrambled her features, or how indifferent her figure. She needs this inward assurance to give her serenity, poise, and power. It is her birthright.

To all of you, whether you are eighteen or eighty, who want to grow in beauty, here is my advice: Forget what your mirror tells you, and instead, say to yourself a dozen times a day "I am beloved." No woman who really believes that she is precious in the eyes of some loved person can walk ungracefully, or live without charm. And who ever you are, wherever you are, surely there is **someone** to whom you are precious indeed?



Fruit Cake Recipes

1 lb. butter, ½ lb. brown sugar, ½ lb. white sugar, 1 tablespoon golden syrup, 1 teaspoon grated nutmeg, 1 teaspoon cinnamon, 1 teaspoon mixed spice, 1 teaspoon ground ginger, 9 eggs, 1½ lb. flour, ¼ lb. dates, 1 lb. sultanas, ½ lb. currants, 1½ lb. raisins, ¼ lb. preserved ginger, ½ lb. peel, essence to taste.

Beat butter, sugar, and golden syrup to a cream; add eggs (beaten) gradually, then flour, spices and lastly fruit; beat well. Bake in moderate oven about 4 hours.—**Mrs. A. Phillips, Douglas.**

1 lb. butter, 1 lb. brown sugar, 10 eggs, 3 lb. fruit, ¼ lb. peel, 4 breakfastcups flour, 1 teaspoon vanilla, 1 teaspoon lemon, 1 teaspoon almond essence.

Beat butter to cream; add sugar, then eggs, one at a time; then essence and flour; lastly fruit, dredged with flour. Bake about 4 hours in moderate oven. I have sent both these cakes overseas and find they keep very well, so hope they may be some use to some other boys over there.—**Mrs. A. Phillips, Douglas.**

2 cups flour, 1 heaped teaspoon baking powder, 1 teaspoon spice, 1 tablespoon treacle, 1 teacup sugar, ½ lb. butter, 2 eggs, ½ lb. sultanas.

Mix flour, baking powder, and spice by putting through the sifter together. Then cream butter and sugar; add beaten eggs; mix in treacle; add wet to dry ingredients, and this will make a firm mixture. Mix in fruit, and bake 2 hours in medium oven. This recipe is original, and is in constant use.—**Mrs. H. Holmes, Palmerston North.**

1 lb. butter, 2 breakfastcups sugar, 4 breakfastcups flour, 2 teaspoons baking powder, 4 eggs, ¾ breakfastcup boiling water, 1 lb. raisins, ½ lb. sultanas, ½ lb. currants, ¼ lb. mixed peel, ¼ lb. cherries. (This, of course, can be varied according to taste.)

Pour water into cup and leave to cool. Cream butter and sugar; add eggs and beat again; then add flour and baking powder, and the fruit. By this time the water will be just warm; then add to cake mixture. Bake moderate oven about 2 hours. I bake mine in a tin 9 in. square. I have always found this reliable and not too expensive. The men, on the whole, I think, prefer the plainer cake to the very rich one. (This, like all other fruit cake, improves very much with keeping.)—**Mrs. Laurie M. Perry, Pio Pio.**

Beat ½ lb. butter and 1 cup sugar until perfectly white and light; add 3 eggs, beating in one at a time. Mix 1 small teaspoon baking powder in 1½ cups flour; add it to the eggs, butter, and sugar; then add 1 lb. fruit and a little peel. (The cake I send my boy overseas.)—**Mrs. Sanderson, North Auckland.**

12 oz. flour, 8 oz. brown sugar, 8 oz. butter (very fresh), 4 eggs, ¼ lb. chopped almonds, 1½ lb. mixed currants and sultanas, 2 teaspoons cinnamon, 1 tablespoon glycerine (to keep cake in good order), ½ cup very strong coffee (cold), 2 teaspoons baking powder, 1 teaspoon vanilla, a pinch of salt.

Cream butter and sugar very well; add glycerine; add eggs singly and beat smooth. Add coffee and then flour mixed with the fruit, cinnamon, and powder. Some of the almonds can be put on top before baking, if fancied, but put plenty inside, too. Bake 3 hours in moderate oven. This cake has a flavour all its own, and surpassed by none.—**R.L.V., Waikato.**

¾ lb. flour, ½ lb. sugar, ½ lb. butter, ½ lb. raisins, ½ lb. sultanas, ¼ lb. currants, 4 eggs, 1 tablespoon golden syrup, 1 teaspoon mixed spice, 1 teaspoon ground cinnamon, 1 teaspoon baking powder, 2 oz. mixed peel, pinch of salt, a little milk to mix.

Cream butter and sugar; add eggs, one at a time. Add sifted dry ingredients and mix. Add floured fruit. Mix thoroughly. Add a little milk if it is too stiff. Bake for 2 hours.—**Mrs. J. Fergusson, Epsom, Auckland.**

1 lb. flour, ½ lb. sugar, ½ lb. butter, 2 lb. fruit, 4 eggs, ¼ cup warm water, 1 teaspoon baking powder, 1 tablespoon plum jam.

Beat butter and sugar to a cream; add eggs, one at a time (unbeaten); then flour, fruit, water, jam, and **lastly** the baking powder. Bake 3 hours.—**Mrs. I. M. Quinlan, Matamata.**

½ lb. butter, 1 cup fruit juice (pineapple or orange), 1½ cups sultanas, 1½ cups currants, 1 cup raisins, 1½ cups brown sugar, 4 eggs, ½ cup shredded peel, small teaspoon salt, 1 teaspoon baking

Best Fruit Cake Recipe

The prize of 2/6 for the best fruit cake recipe is awarded to Mrs. E., Belmont, for the following recipe:—

ECONOMICAL FRUIT CAKE.

1¼lb. flour, ¾lb. butter, ½lb. currants, ½lb. sultanas, 6 eggs, 1½ teaspoons baking powder, ½ lb. sugar, 2 tablespoons golden syrup, 1 teaspoon grated nutmeg, ¼lb. peel.

***Method.*—Beat butter and sugar to a cream, add the eggs (beaten separately) and then the golden syrup. Mix in flour and baking powder, and fruit last. Cook in steady oven about two hours.**

(This recipe has been made in my "Mixing Bowl," and I can tell you it *is* scrumptious. Do use it next time you are cooking for your boys overseas.—Mary.)

Decorating The Christmas Cake

THE usual Christmas cake decorations have disappeared from our shops—no more cheeky robins to adorn our cakes, no more Father Christmases made in celluloid. But perhaps you have ideas on novel decorations for Christmas cakes?

Send your method to the "Mixing Bowl." A prize of 2/6 is offered for the best idea received by October 20 for decorating a Christmas cake.

spoon ground cloves, 3 cups flour. powder, 2 teaspoons ground cinnamon, 2 teaspoons spice, 1 tea-

Mix butter, sugar, and egg yolks, and beat 2 minutes. Sift 2 cups flour, spices, salt, baking powder, and add alternately with fruit juice to first mixture. Then add fruit previously mixed with the other cup of flour. Fold in stiffly-beaten whites of eggs; put in prepared tin and bake in very slow oven about 3 hours. These quantities make a large and deliciously flavoured cake which keeps moist for a long time.—**Mrs. M. Brookes, Matamata.**

½ lb. butter, 1 lb. white sugar, 5 eggs, ½ teaspoon each lemon and vanilla essence, 1 tablespoon brandy, 1 lb. sultanas, ½ lb. currants, ¼ lb. mixed peel, 1 oz. crystallized cherries, 1 lb. flour, 1 heaped teaspoon baking powder.

Cream butter and sugar; drop eggs in one at a time, beating well; add essence and brandy. Have fruit prepared and floured and add with dry ingredients. Cook in hot oven in prepared tin until risen and pale brown; then cook for 2 hours in cooling oven. —**M., Feilding.**

APPLE SHORTCAKE.

½ lb. flour, 1 teaspoon Edmonds baking powder, 4 oz. butter, 1 egg, 1 dessertspoon sugar, 3 apples, milk.

Rub butter into sifted flour and baking powder. Beat egg and sugar together; mix into flour to a light paste. Cut in half, roll out one piece and place on tray. Cover with sliced apples, sprinkle with sugar, place other half on top, cover and brush over with milk. Bake 20 to 30 minutes in moderate oven (350 deg. F.). Sprinkle with icing sugar and cut while hot.

FISH CUSTARD.

1lb. smoked fish, 2 eggs, 2 large onions, ¾ pint milk, 1lb. potatoes, seasoning.

Fill a casserole with alternate layers of onion, flaked fish, and thinly-sliced potato. Beat eggs and add hot milk and seasoning, and cook slowly until mixture is very hot, but not boiling. Pour over fish. Cover, and cook in a very moderate oven for 1 hour. Do not allow to boil.

CARROT RICE RING.

Take 1 cup shredded carrots (parboiled), 1 tablespoon minced onion, 1½ cups cooked rice, 1½ teaspoons prepared mustard, 1 egg, well beaten, ½ teaspoon salt, dash of pepper, 1 cup grated cheese. Mix all the ingredients, turn into a well-greased ring mould or casserole, and bake ½ hour.

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SUBSCRIPTION RATES.

The *Journal* is issued monthly. The subscription within New Zealand, which is payable in advance and includes postage, is 2s. 6d. a year. The overseas subscription is 5s. Subscriptions should be forwarded or paid direct to any office of the Department of Agriculture in the Dominion. Single copies, price 6d., are available from the Department of Agriculture, Box 3004, Wellington.

VANILLA DROPS.

10oz. flour, 1 teaspoon baking powder, ¼lb. sugar, ¼lb. butter, 2 tablespoons milk, a few drops vanilla, 2 eggs (or 1 egg, and extra milk).

Cream the butter and sugar, beat eggs well, sift flour and baking powder, then add flour and egg and milk alternatively to butter and sugar, flavour with vanilla. Drop teaspoons of the mixture, well apart, on to a buttered baking tin, and sprinkle with castor sugar. Bake in a quick oven for 10 minutes.

FUDGE CAKE.

One packet wine biscuits, ¼ lb. butter, ¼ lb. sugar, 1½ tablespoons cocoa, vanilla essence, 1 teaspoon coffee essence, 1 egg.

Beat the egg, add to sugar, etc., heating in a basin. Stir two minutes, add broken biscuit, and essence when taken off the fire. Set in buttered tin.

EDMONDS COOKERY BOOK.

Recipes to suit every occasion are to be found in the seventh edition of T. J. Edmonds Ltd.'s "Sure to Rise" cookery book, which I have just received. No matter how discriminating you may be, you are bound to find something new and something enticing in the wide range of recipes provided—and every one has been tested and proved reliable.

You will find everything in this book from bread and cakes to jams, meat, puddings and savouries, not to mention a host of other succulent dishes. In addition, there are cooking hints, an oven temperature chart and weights and measures.

No kitchen should be without this book. Would you like one? Drop me a note and I will arrange for one to be sent to you.—**Mary.**