The Proceedings of the Lincoln College Farmers' Conference

1952
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LINCOLN COLLEGE FARMERS' CONFERENCE, 1952

COMMITTEE:

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J. H. Grigg, Longbeach, Ashburton.

A. Henderson, South Hillend R.D., Gore.

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M. B. Turton, Ashburton Forks.

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Hon. Secretary,

L. W. McCaskill,
Lincoln College P.B.,
Christchurch.
"If I have an apple and you have an apple and we exchange apples, then we each have one apple, but if I have an idea and you have an idea and we exchange ideas, then we each have two ideas."

—Chinese Proverb.
### PROGRAMME

**Wednesday, May 28**

**WHITHER ARABLE FARMING?**

- Cropping and its Effect on Soil Fertility:
  - (A) A. H. Flay
  - (B) G. S. Slater

- Wheat and Arable Farming:
  - i. International Aspects, A. J. Danks
  - ii. N.Z. Production, Requirements and Marketing, L. C. Dunshea
  - iii. Wheat in N.Z. Farming, W. W. Mulholland

- Intensive Grassland Farming compared with Arable-Cum-Grassland:
  - (A) C. S. Hardy
  - (B) A. Henderson

**Thursday, May 29**

**FARM TAXATION AND PRODUCTION**

- Farm Taxation—Theory and Practice, I. W. Weston
- Review of Current Farm Taxation, N. A. Rowntree
- Taxation and Its Effect on Production, A. B. Struthers
- Taxation and Its Effect on Production from the Farmer's Point of View, T. A. McKellar
- How to Alleviate the High Cost of Dying, N. M. Peryman

**Friday, May 30**

**FODDER CONSERVATION**

- Seasonal Productivity and Stock Feed Requirements, I. E. Coop
- Mechanisation and Use of Silage, Baker Bros.
- Fodder Crops and their Utilisation, S. C. Bowmar
- Dry-land Farming and the Feed Supply:
  - (A) P. P. L. Dillon
  - (B) H. M. Copeland
- Planning the Feeding Programme, H. E. Garrett

**ANNUAL MEETING**

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OPENING REMARKS BY THE CHAIRMAN

"It is grand to see a full house at the beginning of the Second Annual Conference of South Island farmers, and to see people here from as far away as Nelson, Marlborough and Southland. There will be some of you here who were not here last year so I would like to mention the role this Conference is intended to fill. If we go right back to the early days we find settlers growing wool and not very much else and doing a lot of pioneering work. There was no room for science then. With the freezing industry starting in the early 80's the whole of farming in the South Island changed. The principles of good farming then laid down remained static for a long time, why, I don't know. Probably it was because scientific farming had not really started. The College here was doing fine spade work, but it was a voice crying in the wilderness as far as the farmers were concerned. Then a few years before the war, the picture seemed to change. You might say that the oldest science in the world become overnight the youngest. The work of the College and of Professor Hudson during the years that followed were a big factor in the changes in farming methods which took place. Everything seemed to happen in a short time. We had lime and topdressing and certified seeds and irrigation and veterinary work on sheep, and now we have trace elements and new ideas like feeding sheep on silage . . . .

"It seemed that there was a need for an interchange of ideas between the scientists and the farmers and between farmers themselves, so the Conference was planned and here we are. The main idea is to get those farmers who are just one step ahead of the others to tell us what they are doing . . . .

"We are very grateful to the Board of Governors for allowing us to hold our meeting at the College and I will ask Professor Hudson to extend a word of welcome to you."

Professor Hudson briefly welcomed all present on behalf of the College and the Board of Governors, and expressed his pleasure that farmers should want to come to the College to discuss their problems among themselves and with members of his staff.

Mr J. H. Grigg. "I have been asked on behalf of this gathering of farmers from all parts of the South Island to endorse the remarks of the Chairman and to express our gratitude to Professor Hudson for his work among us for the past fifteen years. I say 'work among us' because he has always attempted to keep science practical and he has achieved that in a way that farmers will always appreciate and remember. It has been said that in British communities we never praise anybody until they die but we would like Professor Hudson to know that we really do appreciate his work among us and are sincerely grateful to him."
WHITHER ARABLE FARMING?

CROPPING AND ITS EFFECT ON SOIL FERTILITY (A)

A. H. Flay, Lincoln College.

This title brings to mind grain production. To some, cropping would mean the production of any crop: grain, small seeds and perhaps roots, or even greenfeed fodder crops. Whatever the thought, all crop production requires one thing—cultivation of the soil—the preparation of a tilth into which the seed may be sown and the removal or temporary control of the growth of all other plants which would compete for moisture, plant nutrients and sunlight. Cultivation of the soil itself, although it may build up, temporarily, the supply of available plant food, is responsible basically for breaking down the organic matter. Discussion of these processes is beyond the scope of this paper. At the moment our thoughts must be directed towards grain production.

Grain-Producing Areas and New Zealand Requirements

Grain crops deplete soil fertility; pastures, fodder and leguminous crops restore fertility. Mixed farming consists of balancing the depletive and restorative crops. The balance should be such that maximum net returns are obtained while at the same time maintaining the fertility status of the farm unit.

The main grain-producing areas of New Zealand are Canterbury, Marlborough and North Otago. The remarks in this paper are, therefore, made with these areas in mind. However, it should not be thought that grain—wheat, for instance—could not and should not be grown in many other areas of New Zealand. Parts of Southland and large areas of the North Island could well grow wheat and other grain crops. The cultivation and harvesting climate in these other areas is less severe than that of much of England where 6,000,000 acres of grain including 2,000,000 acres of wheat are grown annually.

New Zealand requires annually the production of some 360,000 acres of wheat, 60,000 acres of barley and 170,000 acres of oats and chaff—a total grain area of 590,000 acres. The interesting question today is: Can New Zealand grow this area of grain and maintain her soil fertility? With world population constantly pressing on food supplies this could be an important issue. Since 1920 only on six occasions has the total area of wheat, oats and barley exceeded 590,000 acres, but from 1900 to 1920 when oats and chaff approached 500,000 acres annually the total average grain area exceeded this figure and averaged almost 850,000 acres.

Canterbury is the "granary of New Zealand" and perhaps we might restrict further examination of the situation to this province. The production figures for Canterbury show that for the 11-year period 1939-49 grain production totalled almost 270,000 acres; wheat 155,300 acres, oats and chaff 90,000 acres and barley 24,300 acres. If we allocate the New Zealand requirements given above to Canterbury and the rest of New Zealand on a proportional basis in accordance with past production acreages the figures are:
Canterbury Rest of N.Z. Total

<table>
<thead>
<tr>
<th></th>
<th>Canterbury</th>
<th>Rest of N.Z.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>270,000</td>
<td>90,000</td>
<td>360,000</td>
</tr>
<tr>
<td>Oats and Chaff</td>
<td>90,000</td>
<td>80,000</td>
<td>170,000</td>
</tr>
<tr>
<td>Barley</td>
<td>40,000</td>
<td>20,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Total</td>
<td>400,000</td>
<td>190,000</td>
<td>590,000</td>
</tr>
</tbody>
</table>

The requirements from Canterbury are 400,000 acres of grain annually. This area is only a 48 per cent increase on the 1939-49 average and the question now becomes: Can Canterbury produce this area of grain and maintain her soil fertility?

Fertility Maintenance and Grain Production

In the short term the production of such an area is mainly a matter of price, labour and the returns from alternative sources of income. It could not possibly be claimed that a 48 per cent increase over a short period would have any significant effect on soil fertility. Over a long period, however, the question of the maintenance of soil fertility is important, for not only does continuous grain production reduce soil fertility but it also allows an increase of weeds — twitches, wild oats and Californian thistle are the worst — and on the best soils these will handicap and perhaps prevent continued and heavy grain production long before reduced soil fertility becomes a factor.

Grain crops occupy the land for a full season. Spring-sown oats and barley are less exacting in this respect than autumn-sown oats and wheat. These latter enable weeds to become well grown before further attention can be given. With spring oats and barley there are several months between harvest and winter when cultivation can be exceedingly effective. Twitch and Californian thistle eradication usually requires a full summer fallow which is expensive, amounting on heavy land today to £8 or £12 per acre. In addition there is no income from the area for the season. Further, a summer fallow will not eradicate wild oats. Control here requires the production of fodder crops and sowing the land to pasture. It is well established, however, that on cropping farms, soil fertility can be maintained and weed control carried out by recognised practices.

These are:

1. Sowing the land to first-class clover pasture,
2. liming and topdressing this pasture,
3. using a cropping rotation embodying the production of preparatory and restorative crops.

Cropping farmers apply these practices in various ways. Pasture may be allowed to stay down two years, four years, or much longer. The rotations in use are many. The general principle is that pasture of several years' standing is ploughed and sown to preparatory crops of rape, lupins, peas or potatoes, to be followed by a grain crop, usually wheat. According to the quality of the land, one, two or three grain crops may be taken in succession, following the preparatory crop. On some soils after one wheat crop, oats or barley may be grown as a second grain crop. Sometimes on medium-light soil the area is sown to pasture with the first and only wheat crop. On the better soils a second wheat crop or the barley that follows the wheat may be under-sown with pasture. In other cases the grain crop is followed by restorative crops. Such crops are oats and lupins, lupins alone, or peas, according to the quality of the soil. Again, the restorative crops of lupins or peas may be followed by another grain or wheat crop and the area then sown to pasture with this grain crop. A more recent development is to follow the last grain crop in the rotation with greenfeed oats and...
lupins, or lupins alone, this crop being grazed off in the spring when it is usually greatly needed. This grazing off permits a summer fallow before sowing the pasture in the early autumn. In the interests of weed control nearly all cropping farmers are forced to summer-fallow an area annually. Some farmers do this when taking land out of pasture. The land is skim-ploughed in October, November or December. It is worked during the summer and autumn and sown to wheat in April-May. There is no preparatory crop grown when this method is followed. Others prefer to grow a preparatory crop and fallow at the end of the rotation in preparation for pasture. Pasture is the most valuable of all restorative crops.

The point that must be remembered is that in New Zealand economical grain production cannot be carried out alone. It requires, for the maintenance of soil fertility, the cultivation and production of a large complement of other cash and fodder crops as well as the regular sowing of new pasture. The area ploughed from old pasture must equal that sown to new. The area of the farm in pasture will vary from almost two-thirds on the medium-light soils to less than one-half on the heavy soils.

Although there is ample evidence to show that grain production reduces soil fertility there is also adequate evidence to show that the lost fertility can be restored in a practical manner. Over the years many cropping farmers have employed the rotations just discussed and today, with a higher annual acreage in grain than is usual, their farms are in a good state of fertility. In other words, some farmers grow larger areas in grain than their neighbours do without reducing the fertility of their land. These neighbours grow a limited area of grain, an area that fits in readily with their other crop production such as wheat after rape or after peas. Such crops represent “cheap or one furrow” grain. An increase in the grain area on these farms requires an enlarged cropping programme, fallows, weed control, and fertility building pastures and crops as already mentioned. Such an increase is often attractive on account of labour and other difficulties.

Canterbury arable-farming lands may be divided into four main classes: light, medium-light, medium-heavy and heavy. Grain crops are grown on all but the light, where oats only may be grown. On many successfully-managed medium-light-land farms the complement of crops and pastures has included wheat and oats. Examination of the figures for these well-managed properties (see appendix) show that the grain area is one-sixth of the entire farm, the wheat area being one-eighth. A similar examination of the position on successfully managed medium-heavy soils producing large areas of grain crops gives a figure of one-quarter of the farm in grain and for heavy soils, one third of the farm in grain. A further examination of these farms will show that where the recommended methods for maintenance of soil fertility are followed, the farms are in as high a state of fertility as they were 15 and 20 years ago. Cropping farmers, then, can maintain soil fertility and produce these areas of grain. Farmers themselves have demonstrated this adequately. (See Appendix).

Summarised, the position concerning grain production in Canterbury, while at the same time maintaining soil fertility, is that each soil type can grow grain as follows:

- Medium-light land: One-sixth area in grain.
- Medium-heavy land: One-fourth area in grain.
- Heavy land: One-third area in grain.

It is true that in recent years only a few farms have produced 9
these areas in grain crops. The fact remains, however, that in the past these production figures have been common on a number of farms and have even been exceeded. It must be recognised, too, that some Canterbury farms, when producing large areas of grain, have omitted to incorporate adequate preparatory and restorative crops or high-quality, topdressed and limed pastures. The results after a few years have been only too obvious—cropped out fields and cropped out farms. Today there is no need for over-cropping. Fertility-maintenance knowledge and methods are available to all. It is significant that during the past decade farmers have adopted these methods with increasing enthusiasm and vigour with the result that it is rare to see a mixed Canterbury farm that shows evidence of over-cropping. That cropping farmers, have, on average, increased the productive capacity of their farms is further supported by recent crop yields. In 1935 one medium-heavy cropped-out farm, well known to me, yielded 35 bushels of wheat. Today, after the adoption of the recognised fertility-maintenance methods, with one-quarter of the farm in grain the average wheat yield is 52 bushels.

How Much Grain Can Canterbury Grow?

In order to determine how much grain Canterbury can grow while at the same time maintaining soil fertility, one must take advantage of the recent soil surveys and using one's general knowledge of the province, place the many classes into the four main soil types, as follows:

- Light land (little oat growing) 565,000 acres
- Medium-light land (wheat and oats) 1,020,000 acres
- Medium-heavy land (wheat, oats and barley) 350,000 acres
- Heavy land (wheat and barley mainly) 590,000 acres

By taking one-sixth of the medium-light, one-fourth of the medium-heavy and one-third of the heavy land the following areas are available for grain production:

- Medium-light land 170,000 acres
- Medium-heavy land 90,000 acres
- Heavy land 197,000 acres

Total 457,000 acres

To this figure of 457,000 acres must be added oats grown on light land, estimated at 20,000 acres, giving a total of almost 480,000 acres in grain. It is suggested that by the use of crop rotations Canterbury can maintain her soil fertility and produce annually this area of grain. The remainder of New Zealand can readily produce 200,000 acres of grain and if a real need arose, a great deal more.

Thus, should circumstances require it, New Zealand could produce her total grain requirements and at the same time maintain her soil fertility. Following upon this statement there are some significant questions I would put to you. They are:—(1) To what extent can all cropping farmers approach the standards of the most progressive? (2) How much more fertile would the soils of those cropping farmers be had they not grown these large areas of grain during the past 10 or 15 years? Even though the fertility status has been maintained by the adoption of recognised and approved methods, how much more would their pastures and restorative crops have yielded had no grain crops been grown? (3) Does not grain production carry with it a "cost of production" factor which may be called "loss of fertility"? (4) How are farmers to know the best ratio of grain to restorative and pasture crops that will, on the
average of years, give maximum net returns? (5) And looking beyond the farm gate, what of storage and transport facilities?

Conclusion

The main title of these discussions is “Whither Arable Farming in the South Island?” It has even been suggested that arable farm lands are declining in productive capacity, and from some quarters with alarm. Statistics no doubt support lower acreage of grain crops and in 1952 the lowest for some 40 or 50 years. But one wonders if statistics always tell the whole story, or even sometimes the truth. I would like to suggest that in recent years there has been a substantial build-up of soil fertility. How often nowadays does one see cropped out farms? What of sowings of clover, of liming and of topdressing in recent years? May I suggest that a valuable potential is being built up in our arable farming areas. It only requires some stimulus, a price incentive or a significant fall in the price of wool and meat products, to bring about an appreciable increase in production. Meanwhile arable farming is doing what the statistician cannot show, resting the soil and building up a reserve of fertility. If you like, it is putting back what has been taken out in the past.

Unlike dairying and fat-lamb production on the purely pastoral lands, where fertility building requires methods of farming that can only result in greater stock carrying, mixed arable farming in good times permits a reduction in grain production with beneficial effects on the fertility status of the soil. As far as the individual farmer is concerned, such a policy cannot be criticised. All that can be said is that, if the average farmer adopted the methods of a few, soil fertility could be maintained and perhaps increased while growing our full grain and other crop requirements.

APPENDIX

MIXED-FARMING SOIL TYPES IN CANTERBURY

The mixed-farming lands of Canterbury may be classified for the purposes of this article into four main groups, viz., light, medium-light, medium-heavy and heavy. As far as grain production is concerned for all practical purposes we may omit the light soils. In general, then, the mixed farming grain production lands of Canterbury embrace medium-light soils of £5-£15 per acre, medium-heavy soils of £15-£25 per acre and heavy soils above £25 per acre. (1942 basis of value; for 1952 add 40-60 per cent). Each of these three main grain-growing soil types will be taken in turn and examined from a soil fertility maintenance view point.

Although there is ample evidence to show that grain production reduces fertility, there is also adequate evidence to show that this lost fertility can be restored in a practical manner by adopting the practices already mentioned, while at the same time maintaining the annual area in grain at a higher acreage than is usual. In other words, some farmers grow larger areas of wheat, oats and barley than their neighbours without reducing the fertility of their land. It is now necessary to enquire into the methods of these farmers and at the same time to discover the proportion of the farm that is annually producing grain.

Medium-light Soils

It is generally accepted that on this class of land only one grain crop will be grown in the rotation. What then would be a suitable rotation? The suggestion, based on observation and experiences of progressive farmers, is that the main rotation is:—
Old grass to rape and/or lupins to wheat or oats to greenfeed oats and/or lupins (spring and/or summer fallow) to new grass (and rape, or turnips, or lupins, or oats).

Some farmers precede the rape and lupins with turnips and lupins out of old grass.

On a farm of, say, 600 acres, the areas in each crop would be on an average 70 acres, thus:

<table>
<thead>
<tr>
<th>Preparatory crops:</th>
<th>Rape and lupins</th>
<th>70 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain crop:</td>
<td>Wheat and/or oats</td>
<td>70 acres</td>
</tr>
<tr>
<td>Restorative crops:</td>
<td>Greenfeed oats and lupins</td>
<td>70 acres</td>
</tr>
<tr>
<td></td>
<td>New grass</td>
<td>70 acres</td>
</tr>
</tbody>
</table>

It is recognised by farmers on this class of land that 70 acres of new pasture annually on 600 acres is insufficient to maintain pastures of useful quality in the face of drought and grass grub damage, so that a further area is ploughed and cropped irregularly and might be represented once in every seven years as follows:

| Old grass to lupins and turnips or rape | to wheat and grass down | and/or oats | 70 acres |

On this class of soil, then, the annual area in grain is 80 acres and with this area of grain, the rotation adopted, the sowing of pastures containing red, white and sub. clover, as well as some liming and topdressing, fertility can be maintained and weeds kept under control.

The rape and lupins (sometimes preceded by turnips and lupins) prepare the soil, the lupins and greenfeed oats restore fertility, the fallow controls the twitch and weeds and ensures a good establishment of the pasture, and 4-5 years in grass (and clover), limed and topdressed at least once in the early stage of this period, builds up fertility prior to the sowing of the next preparatory crop in readiness for grain again.

A number of actual experiences of farmers can be given to support the above, but one example should suffice. The land is valued at £10 per acre (1942 basis). The crop and cultivation performance adjusted to a 600 acre unit gives for the past 14 years the average annual figures as follows:

<table>
<thead>
<tr>
<th>Preparatory crop</th>
<th>Area (acres)</th>
<th>% of Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rape and lupins</td>
<td>63</td>
<td>10.5</td>
</tr>
<tr>
<td>Wheat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheat and sown new grass</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>Oats</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Barley and sown new grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rape for seed</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Ryecorn</td>
<td>104</td>
<td>17.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Restorative crop, lucerne and grass: Area (acres)</th>
<th>% of Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenfeed oats and lupins to fallow and new grass</td>
<td>54</td>
</tr>
<tr>
<td>Lucerne</td>
<td>22</td>
</tr>
<tr>
<td>Grazing and small seeds area including homestead and yards</td>
<td>357 433 72.2</td>
</tr>
<tr>
<td>Total</td>
<td>600 acres</td>
</tr>
</tbody>
</table>

The average yield of wheat was 29½ bushels per acre, that for the first 10 years being 28 bushels and for the last 4 years 33 bushels. The annual area of wheat, oats and barley represents one-sixth of the farm. The farm today is in better heart and has a
higher fertility-status than 14 years ago. It therefore seems reason-
able to contend that, on this class of land, at least one-sixth of the
farm area can be grown in grain annually, while at the same time
maintaining soil fertility.

Medium-Heavy Soils

On this class of land three grain crops may be grown in suc-
cession. Often in actual practice the first crop is wheat and the
second and third crops oats or barley, thus giving rotations on a
farm of, say, 400 acres, as follows:—

40 acres  40 acres  40 acres  20 acres
Old grass to Peas to wheat to barley and grass down
Potatoes  20 acres
Rape and
Lupins  Oats or wheat to green feed and
(Summer fallow)  lupins to new grass (rape, lupins).

The areas in crops on this farm would be:—

Preparatory crops
Peas, Potatoes, Rape and Lupins  ...  40 acres

Grain crops
Wheat and Oats  60 acres
Barley and Grass down 20 acres  ...  80 acres

Restorative crops
Greenfeed and Lupins  ...  20 acres
New Grass  ...  20 acres

On this class of land pastures are renewed more frequently than
the above rotation permits, this being done by the inclusion of an
additional rotation irregularly practised, and giving an average
annual production as follows:

Old grass (summer fallow) to wheat to barley and grass down
10 acres  10 acres  10 acres
The total annual cropping then is:—
Preparatory Crops  ...  40 acres
Wheat and Oats  70 acres
Barley and Grass down 30 acres  ...  100 acres
Green Oats and Lupins  ...  20 acres
New Grass  ...  20 acres

In this combination of crops with 100 acres of grain it is recog-
nised that oats and barley may sometimes be grown to give a total
of more than 100 acres of grain. Fallowing of 30 acres per year
(20 acres before new grass and 10 acres before wheat) is practised
and liming and topdressing on good clover pastures is a feature of
the farm economy. Progressive and successful farmers on this
class of land are approximating the above grain production, while at
the same time maintaining soil fertility and controlling weeds. One
example will suffice. The farm is valued at £21 per acre (1942
basis). The average annual crop and cultivation programme adjusted
to a 400 acre unit, over a recent 10-year period has been:—
Preparatory crops

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (acres)</th>
<th>% of Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rape</td>
<td>16</td>
<td>37</td>
</tr>
<tr>
<td>Rape and lupins</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Lupins</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Summer fallow out of old grass</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

Grain Crops

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (acres)</th>
<th>% of Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>51</td>
<td>plus grass 109</td>
</tr>
<tr>
<td>Oats</td>
<td>17</td>
<td>27.10</td>
</tr>
<tr>
<td>barley</td>
<td>41</td>
<td>down 3 ac.</td>
</tr>
</tbody>
</table>

Restorative crops

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (acres)</th>
<th>% of Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenfeed oats (and lupins)</td>
<td>34</td>
<td>63.65</td>
</tr>
<tr>
<td>and stubble to fallow and new grass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasture, grazing, hay and small seeds including homestead, yards</td>
<td>100 ac.</td>
<td></td>
</tr>
</tbody>
</table>

Total 400 acres 100%

This farm is situated in a barley-growing district.

The annual area in grain crops is 109 acres or 27 per cent of the farm, and that in wheat 51 acres. Prior to the high prices of small seeds, this farm grew annually, for many years, 120-150 acres in total grain crops. The farm was in a better and higher fertility status at the end of 10 years than at the beginning and therefore it seems reasonable to contend that, on this class of soil, at least one-fourth of the farm area can be grown in grain annually, while at the same time maintaining soil fertility and controlling weeds.

Heavy Soils.

On this class of land three wheat or grain crops are often grown in succession. Also restorative crops other than pasture are grown in between grain crops. These crops may be presented for a farm of, say, 200 acres, as follows:

A. Old grass to Peas to Wheat to Wheat to Barley and grass down 10 ac. Potatoes 10 ac. 10 ac. Rape 10 ac.

B. Old grass to summer fallow to Wheat to Wheat to Peas, Potatoes, Rape 10 ac. 10 ac. 10 ac. 10 ac. to wheat to barley and new grass

On this 200-acre unit the areas in each crop may be summarised as follows:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (acres)</th>
<th>% of Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peas</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Potatoes</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Rape</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Fallow out of grass</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>
Grain Crops:
- Wheat 50
- Barley and grass 20

Restorative Crops:
- Peas and potatoes, rape between grain crops 10
- Pasture, lucerne, small seeds 110

Total 200

The above utilisation of land has been a feature of heavy-land cash-cropping methods for many years and can be readily supported by fact. It gives one-third or more of the land in grain crop annually. It would seem reasonable to contend that on heavy soil at least one-third of the farm area can be grown in grain annually. On heavy soils with this cropping the maintenance of soil fertility presents no difficulty and weeds are reasonably well controlled.

Mr C. Hilgendorf, Ashburton. I am farming near Ashburton on light land. I feel that on my particular type of land what we want to know is not whether we can maintain soil fertility but whether we can build it up by not growing wheat. All of you will agree that in many parts of New Zealand they have got a spectacular build-up over the last 20 years. In Canterbury we don't find that. Is it because even those of us who are not great grain growers still grow some grain?

Professor Flay. Grain production has not increased; it has gone down significantly but the fertility of the soil has been built up, waiting for an incentive to go back to cropping again.

Mr C. Pilbrow, Coldstream. Will the man who cashes in on this fertility by grain growing be as well off as the man who doesn't?

Professor Flay. If I might except the last two seasons, then the man who has the well-knit cropping programme has worked out better than the straight sheep farmer.

Mr Pilbrow. Would you go further and say that on the basis of the latest wool prices and the estimated prices for next year and for next year's lambs he would have a chance of doing it next year?

Professor Flay. I had better be honest—I don't know.

Mr M. B. Turton, Ashburton. I would congratulate Professor Flay on one remark he made—that is that he considered that there were other areas in New Zealand which should be growing grain apart from Canterbury. In plain words, we are mugs here growing grain and I feel that there are other parts in New Zealand where the fertility is a long way ahead of what it is in Canterbury. They should be pulling their weight instead of firing shots at Canterbury and telling us we should be growing the grain.

Mr C. S. Marshall, Timaru. What increase has the land carried in the way of stock?
Professor Flay. I did not check the figures on that. I can suggest that a good deal of the increased fertility has resulted in more small seeds and clovers. Some of the grass has not been utilised to the full.

Mr A. Grant, Waimate. Do you not think that the increased fertility you attribute to green-feed and preparatory crops has rather been brought about by the higher mechanisation of our farms? Has that not released more of the minerals from the "soil bank"? I think there is a good deal in that and I would not agree with you that the fertility of our Canterbury farms is increasing.

Professor Flay. I would say the answer to Mr Grant's question is that the most important soil-fertility crop is grass-clover pasture. I mentioned other crops, but pasture is the most important of our soil fertility crops. Cultivation releases the food built by pasture.

Mr C. R. Barnett, Winchester. I have a farm of medium-heavy land with one quarter in crops. Since the certification of small seeds my yields have increased from 38 to 60 bushels of wheat. I think it due to the pastures and the clovers. I am a believer in Montgomery clover. In spite of cropping carried out, I am still increasing sheep-carrying capacity due to the excellent type of clovers we have today.

CROPPING AND ITS EFFECT ON SOIL FERTILITY (B)

G. S. Slater, Hilton, South Canterbury

After five thousand years of world agriculture, we are still discussing the effects of cropping on fertility. In effect we still are not sure whether we are living off our land, or living with our land. We know of course that in New Zealand the larger proportion of our farmers believe that our country is best suited for the production of animal products derived solely from grassland farming. For the larger part of our country this cannot be denied if one believes that the land should be used for the common good in the manner best suited by its soil, climate and contour.

In Canterbury there is however, an attempt to use this grassland farming complex as a justification for a low cropping programme which undoubtedly is, if continued, going to put the whole population into a very serious condition.

There is no doubt that the swing to grassland farming in Canterbury was, and still is, influenced by the happenings of the 1910's and 20's, when cropping was overdone and when suitable strains of grasses and clovers were unknown. Today, the situation is totally different. Let us look at the conditions in the major portion of the South Island with open unbiased eyes.

We have, of necessity to grow fodder crops for winter keep and periods of drought. These conditions also affect the usefulness and the life of permanent grass.
To the wide-awake commercial man, the agricultural instructors and scientists and the farmers with a proper rotation, a great part of the arable area of our country must look a sorry sight, but there are many more bright spots than there were twenty years ago.

Let us have a look at what brought us to the state of affairs that existed in the late 1920's:

1. Lack of ways of cheaply and efficiently replacing the depleted nitrogen.
2. Poor demand for the produce of some crops that are a necessary part of a sound rotation, such as linseed, linen flax, peas and barley.
3. Unstable market conditions for our main agricultural products.
4. Poor strains of grasses and clovers and insufficient preparation and consolidation of seed bed for establishment of pasture.
5. The slow acceptance of the importance of lime, phosphates, nitrogen and potash in the establishment and maintenance of a vigorous and balanced pasture.

It is only too apparent that on farms where a haphazard, poorly-balanced system of handling crops, pasture and stock is adopted, that poor crops and expensive cultivation occur. The causes and effects are many and varied. The main breakdown is the result of lack of policy through having no set rotation. Therefore the farmer is forced to make snap decisions that, through procrastination, are often too late. Therefore, under preparation results in a poor, dirty seed bed and low crop yield. There remains a weed-infested area that is expensive to clean up and by the time it has been cleared the farmer is again forced to grow a cash crop. So the cycle of fertility depletion goes on, until economic circumstances may force that farmer to mend his ways, or forfeit his holding.

With our present population and for a gradual expansion I would say that it is well within our ability to supply the cereal, meat, dairy produce, fruit and vegetable requirements of the nation until the population is double or treble, without impairing the fertility of the country, and if handled properly, the land would be in much better shape.

How then are we going to do all the necessary cropping and build soil fertility and maintain it?

The answer seems simple enough. A proper rotation of crops, adequate cultivation and a reasoned use of lime, phosphates, nitrogen and potash, the maintenance of vigorous pasture and high stocking rates to complete the fertility cycle.

Maybe the answer sounds simple, but the execution of this policy if carried out to the letter will tax the ability and industry of any worthwhile agriculturalist. Every operation must be carried out at the proper time. There will be few idle moments and those that are constantly dragging the chain will sooner or later fall by the wayside.

There is this basic factor, we are at best only assisting nature, and nature's work is constant, planned and unerring. We must try to emulate nature to the best of our human frailty and understanding.
My answers to the question of “cropping and its effect on soil fertility” is to give an outline of a programme of rotation of crops that I have adopted. It is a ten year plan. One tenth of the area of farm is ploughed out of lea each year. First essential of that one tenth is the growing of roots for winter keep of stock. The balance of this one tenth goes to linen flax or linseed. In other areas, peas or potatoes could be used. Rape for lamb fattening follows roots, wheat follows rape and linseed, so that one tenth of the farm is in cereal crop each year. The area in cereal is followed by a fallow for new grass sown in summer or autumn. This operation of sowing of new grass is the key item and is done very thoroughly. Lime is applied at from one to two tons per acre and the grass seed mixture is drilled in 3½ inch drills with three hundredweight of “one in six” ammoniated super. This means that each acre is under cultivated crops up to four years and down to grass six years.

The aim is to build all the fertility possible whilst under pasture, keeping the pasture vigorous and carrying all the stock possible to get the maximum return of animal droppings and also maximum root development of grass and clover. We want to cash in on all the built up fertility possible.

The result is that wheat on this medium clay land would at the beginning of this rotation barely grow 30 bushels of wheat per acre, but on the second round of the rotation grows 50 to 60 bushels per acre.

We have got the “know how” of building soil fertility and of what use is that build up of fertility unless it is cashed at the prime moment before the vigour of youth in our pasture passes. There is some evidence of such a build up of fertility noticeable on the south approaches to Timaru on the Kingsdown, where in most seasons lately, lodging of crops has been much more noticeable.

On arable land this build up of fertility can without any fear be cashed up for the good of the nation generally and the individual farmer in particular.

We can with confidence have a look at the remarkable feat of our Mother Land, where after centuries of arable farming, they have been able to intensify their production of arable crops to meet the dire need of the present economic stress of practical blockade during the war, and at the present time are having a fresh look at the prospects of a further substantial increase in home grown foods. There is no doubt they will succeed.

Mr V. Wilson, St. Andrews. Does Mr Slater sow the lime when he sows the grass or does he sow the grass first and sow the lime after?

Mr Slater. I have invariably put the lime on fallow ground prior to sowing.

Mr A. Hurst. What mixture do you sow?

Mr Slater. Up till the last couple of years I had been sowing the very simple mixture of 1½ bushels perennial ryegrass, 3lb. white clover, and 3lb. dogstail, or H1, white clover and dogstail. I feel
seed production is slipping a little, so I now sow some cocksfoot and
timothy and I should sow 2-3lb. of Montgomery red. We have got
too pure in our pastures for the health of our stock. We get too
much clover in the second or third year and as you all know, that is
one of the drawbacks to keeping stock healthy. I think we could go
further with the use of nitrogen in improving the grasses and check­
ing the prolific growth of clover.

Mr J. H. Grigg, Longbeach. I am glad to hear that Mr Slater in­
cludes the old-fashioned dogstail. I think the fact that his pastures
are down for six years is the secret of his great increase in fertility.
Except in a few favoured places too much increase in agriculture
leads to "dust-bowl" conditions.

Mr Murray. How do you get consolidation after ploughing?

Mr Slater. I will admit consolidation is a factor, and I get it
naturally by fallowing for 8 or 9 months. Under this system you
store sufficient moisture to get consolidation easily. You will also
get a build-up of nitrogen. If you use the shorter method, that is
sowing after a grain crop in the autumn, it is difficult to get consoli­
dation, especially in a year like this.

Mr Metherell, Loburn. What is your topdressing programme for
the six years the land is in pasture?

Mr Slater. The annual rate is 1-1/2 cwt. of phosphate. If I take
a seed crop I apply nitrogen at closing up or afterwards and I put
down one ton of lime some time in the six-year period.

Chairman. Do you have a grass grub problem?

Mr Slater. On my clay land in a normal rainfall year, grass grub
is not a severe enemy. This dry year it is taking toll and this is the
first time I have applied gammexane or D.D.T.

General Barker. What is the effect of D.D.T. on bees?

A speaker. It should not be put on when the clover is in flower
and the bees are working.

Mr N. H. Hayman, Waimate. As regards sowing wheat, I have
had better results sowing X7 in August.

Mr Slater. Once I plough I am never satisfied until the wheat is
in the ground. If I waited till August I would rarely get a crop.

Mr Grigg. Do you get better results from drilling pasture in 3½
inch rows than you would by broadcasting?

Mr Slater. I have no doubt that on my country my success is due
to 3½ inch rows. I am able to graze it in 4 to 6 weeks even in this
last dry autumn.

Mr G. Baker, Levels. Do you think it is necessary to use such a
heavy seeding in 3½ inch rows?

Mr Slater. You're probably right. We're bound by convention in
these things. If I get stock seed then I stretch it a little, but I
haven't seen much difference.

Mr H. Jones, Ealing. Mr Slater is concerned about the health of
his stock with his rising fertility. We have to learn in Canterbury
how to handle the two.
Mr Slater. No other problem gives me so much concern. I know cattle is the answer, but I have never had the capital nor the courage necessary.

Mr Baker. Silage making has given us the necessary control of pasture.

Mr M. B. Turton. I had a paddock of government-stock ryegrass and pedigree white clover on good land. After the seed crop I stocked heavily with cattle. I then put on half a cattle beast and 5½ two-tooth ewes to the acre. They gave me 120 per cent. of lambs. I drafted just after Christmas 107 per cent. off the mothers at just under 36lb.

Chairman. What does Professor Flay think is the limit of lightness of land on which you can build up fertility and then take a grain crop? Is it £6 an acre?

Professor Flay. On £5 an acre land (1942 valuation) I would take not more than an occasional oat crop. Above £5 an acre land I might take a crop of wheat but on the second round a crop of oats might follow the wheat.

Professor Calder. We attempted to grow wheat at Ashley Dene but were not very successful. I am not sure that it is associated with the fertility of the soil so much as the dryness of the land. We got 30 bushels per acre but it was not a good milling sample. I'd grow wheat on this type of land wherever you can get a decent sample—in two years or so you can get your fertility back when you use sub. clover pastures and lime. I think an increase in yield of wheat from 38-60 bushels is a phenomenal one. Remember that fertiliser gives us only 2, 3 or 4 bushels. It is the improved pasture which gives us the fertility. It is a revolution in our farming system.

WHEAT AND ARABLE FARMING
(1) INTERNATIONAL ASPECTS
A. J. Danks, Canterbury University College, Christchurch
(An abstract)

1. World Supply.

The export trade in wheat is in the hands of four important producers: U.S.A., Canada, Argentine and Australia. World wheat supply is currently above pre-war levels, the general pattern being roughly that the United States and Canadian outputs show heavy increases, Argentine and Australia show heavy falls, with the rest of the world more or less constant.

In spite of the over-all increase from North America, world supplies are on the short side. Doubtless the increase in world population is making itself felt on the consumption side and reduction in the Asian rice production must press heavily upon world wheat supplies.

It is characteristic of the market for wheat that glut and scarcity are never far separated. Demand for wheat is relatively
inelastic. Supply may show little flexibility too, although farming prosperity enables bigger switches in crops than depressed conditions.

In general then, world wheat supply can be termed scarce, relative to demand, with, however, some relief in sight from currently-heavy crops in the northern hemisphere. Another feature of marked importance is the undue concentration of exportable surpluses in North America.


The importance of wheat in the economies of both exporters and importers and the risks of price swings owing to the narrow range between scarcity and plenty, contributed to the launching of IWA some three years ago. Some four exporters and 38 importers worked out a quota and price-control scheme on the following lines:

Exporters agreed to allocate part of their exports as IWA quotas. Importers shared out their quotas among themselves so that sales and purchases of these agreed amounts were, in effect, guaranteed. No single price was fixed; instead a range was agreed on with a maximum and minimum. The scheme would work in times of scarcity at maximum price, with "non-quota" or "free" wheat selling outside the scheme at higher than quota prices. (1952 prices in Australia: maximum quota—16½ per bushel; free wheat—22½ per bushel). A swing back of price, arising out of plentiful supplies, would presumably force prices to the minimum of the range with free prices below that again. It appears unlikely that "mid-range" prices would ever hold for long, nor does it appear probable that "free" prices would coincide with IWA quota prices though they would run together fairly closely.

The advantage of IWA, which is a notable contribution to the development of price stabilization on an international basis for a great staple, is that it assures buyers and sellers of substantial trading at reasonably-predictable prices. It further allows crops to be disposed of at a low figure without ruinous average prices. And it prevents exploitation of scarcity by producers while still allowing prices to average upwards. The weakness of the IWA is its undue dependence upon one source of supply, the U.S.A., and difficulties arising out of domestic price policies for wheat in producing and consuming countries. The renewal of IWA next year is now the subject of discussions about price and the fear is that the domestic United States support price (above the IWA maximum) may lever up the new quota price. In a sense, the United States farmers get too much for growing wheat; the Argentine and Australian farmers get too little. The Australian is tied to domestic stabilization plans and gets less, on average, than the IWA maximum. This disturbs world supplies and puts too much power in the hands of "high-cost" American negotiators.

The IWA, since its inception, has favoured the buyers of wheat. Maximum prices have been characteristic and "free" wheat dearer than "quota." Perhaps this is just as well; very expensive wheat may carry heavy social and economic problems in its train. At the present it looks as though the Agreement will continue to favour buyers, but perhaps less so than formerly. There is a distinct possibility that the maximum quota price may rise from one dollar eighty cents to two dollars or thereabouts.

It should be noted that wheat, a basic and necessary foodstuff, is a target for decisions of government policy, especially in welfare states. A rise in wheat prices affects cost-of-living indices all too intimately. For that reason, stability in prices and resistance to heavy rises are likely to be characteristic of much import policy. Nothing very general can be said about this. There is a tug-of-war between price incentives to get more wheat and the cost of living. It is a contest many countries will witness including this one. And it will be solved only by wise opportunism and moderation of viewpoints on both sides. Both consumers and producers can be all too easily exploited over this very necessary product.

APPENDIX

Statistical Summary

WORLD WHEAT SITUATION

Table I. Estimated World Production by Continents
(millions of bushels)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nth. America</td>
<td>1,086</td>
<td>1,531</td>
<td>1,509</td>
<td>1,596</td>
<td>147</td>
<td>106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td>1,599</td>
<td>1,505</td>
<td>1,520</td>
<td>1,565</td>
<td>98</td>
<td>103</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soviet Union</td>
<td>1,240</td>
<td>1,100</td>
<td>1,110</td>
<td>1,292</td>
<td>(est)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td>1,498</td>
<td>1,475</td>
<td>1,535</td>
<td>1,610</td>
<td>107</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>143</td>
<td>158</td>
<td>165</td>
<td>159</td>
<td>111</td>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sth. America</td>
<td>281</td>
<td>279</td>
<td>290</td>
<td>258</td>
<td>92</td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceania</td>
<td>177</td>
<td>222</td>
<td>190</td>
<td>170</td>
<td>96</td>
<td>89</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,024</td>
<td>6,270</td>
<td>6,319</td>
<td>6,650</td>
<td>110</td>
<td>105</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The extent to which world import requirements of wheat can be met depends mainly upon the surpluses available for export of the four chief exporting countries, viz., Australia, Argentine, Canada and U.S.A.

Table II. Net Exports of Wheat: Major Exporting Countries.
(Millions of bushels)

<table>
<thead>
<tr>
<th>Year (Aug.-July)</th>
<th>U.S.A.</th>
<th>Canada</th>
<th>Argentine</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. 1935-36 to 1939-40</td>
<td>43</td>
<td>179</td>
<td>121</td>
<td>102</td>
</tr>
<tr>
<td>1948-49</td>
<td>482</td>
<td>232</td>
<td>63</td>
<td>119</td>
</tr>
<tr>
<td>1949-50</td>
<td>287</td>
<td>225</td>
<td>91</td>
<td>111</td>
</tr>
<tr>
<td>1950-51</td>
<td>359</td>
<td>242</td>
<td>94</td>
<td>134</td>
</tr>
<tr>
<td>1951-52 (est.)</td>
<td>370</td>
<td>330</td>
<td>60</td>
<td>85</td>
</tr>
</tbody>
</table>

The supply of wheat in Australia is of particular interest to us in New Zealand. Here is the latest statistical summary available:
Table III. Australian Wheat Statistics (thousands of bushels)
Season, August 1-July 31.

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry over, August 1, 1951</td>
<td>58,000</td>
</tr>
<tr>
<td>Crop, 1951</td>
<td>161,360</td>
</tr>
<tr>
<td>Total Supply, 1951/52</td>
<td>219,360</td>
</tr>
<tr>
<td>Less Home Requirements</td>
<td>80,000</td>
</tr>
<tr>
<td>Available for export and carry over</td>
<td>139,360</td>
</tr>
<tr>
<td>Of which shipped to 29.3.52</td>
<td>63,660</td>
</tr>
<tr>
<td>Remaining for export and carry over, March 29</td>
<td>75,700</td>
</tr>
<tr>
<td>Allowance for carry over July 31, 1952</td>
<td>55,000</td>
</tr>
<tr>
<td>Available for export, March 29 to July 31</td>
<td>20,700</td>
</tr>
</tbody>
</table>

Table IV. International Wheat Agreement.
Guaranteed Sales and Purchases for 1950-51.

<table>
<thead>
<tr>
<th>Exporting Countries</th>
<th>Actual</th>
<th>I.W.A. Sales</th>
<th>Importing Countries</th>
<th>Quota</th>
<th>I.W.A. Purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.A.</td>
<td>248.1</td>
<td>249.1</td>
<td>Untd. Kingdom</td>
<td>177.1</td>
<td>177.1</td>
</tr>
<tr>
<td>Canada</td>
<td>221.6</td>
<td>191.0</td>
<td>Germany</td>
<td>66.1</td>
<td>59.4</td>
</tr>
<tr>
<td>Australia</td>
<td>88.7</td>
<td>87.3</td>
<td>Italy</td>
<td>40.4</td>
<td>30</td>
</tr>
<tr>
<td>France</td>
<td>4.1</td>
<td>3.9</td>
<td>India</td>
<td>33.3</td>
<td>55.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Netherlands</td>
<td>27.6</td>
<td>23.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Belgium</td>
<td>20.2</td>
<td>20.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Un. of S. Africa</td>
<td>11.0</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other</td>
<td>181.8</td>
<td>158.0</td>
</tr>
<tr>
<td>Total</td>
<td>562.5</td>
<td>531.3</td>
<td>Total</td>
<td>562.5</td>
<td>531.3</td>
</tr>
</tbody>
</table>

Notes: (a) New Zealand is a participant in the agreement with a quota of rather more than 4,000,000 bushels.
(b) Australia's quota has very recently been reduced to 73,000,000 bushels for this season.

Mr O. Wheeler, Windsor. I can remember when we exported wheat and potatoes to Australia. Now the position is reversed. How long would it take to reverse it again?

Mr Danks. When the next slump comes. Wheat is characteristically a depression crop.

Mr Wheeler. Is it true that if the New Zealand farmer got the world price of wheat today it would make a difference of only 3d extra per week in the family budget?

Mr Danks. I haven't the faintest idea, but I'm willing to believe it.
Mr J. R. Little, Hui Hui. The farmer seems to be the only section of the community who must be patriotic, such as growing wheat and losing money and having his wool commandeered in war time. Where did this idea originate?

Mr Danks. That's a moral problem, and the economist cannot comment. Among Western peoples we look on the production of food from the soil as something beyond economics. The accepting of this responsibility makes farming surely a better and more worthwhile occupation. Stick to your last—farming has a moral responsibility.

Mr Little. I agree, but a high moral code won't buy a new tractor.

Mr Danks. I say primary production in New Zealand should be encouraged. I don't know quite how the problem can be tackled. We have no statistical evidence regarding the effect of incentives. Does prosperity make farmers produce more? It may be that it could be done by other things such as different forms of credit, pest control and placing young and vigorous men on the land. Sitting back and crying out "More!" will not place more food on the British breakfast table.

Mr W. F. Mulligan, Ashburton. Do you mean that prices will tend to keep on rising? Is stability an impossible ideal?

Mr Danks. The pressure will continue for full employment under the welfare state. A seller's market for labour means a price rise. A little inflation such as one to two per cent, per annum constantly would be a good thing. There is no need to worry about inflation provided it is gentle. Stabilisation will continue to be with us.

Will there ever be a real over-production of wheat to force prices down?

Mr Danks. There is no immediate threat. We have the increase in the world population and the fall in the rice crop to give us a seller's market for some time to come. I have no fear of over-production in New Zealand in wheat, meat or dairy produce for the next ten years.

Mr Wheeler. What effect does the Colombo plan have upon the world supply of rice and wheat?

Mr Danks. That's too tough for me but the effects must be small in relation to the whole situation in Asia within the forseeable future.

Mr W. C. Miller, Motukarara. Do you think paying 14/- a bushel to New Zealand farmers would be detrimental to the economy of this country? If so, how can we afford to pay it for foreign wheat?

Mr Danks. I think we could carry 14/-, but we would have an increase in taxes to keep up the subsidy. There would be a slight rise in the cost of living which would be a weapon in the debate for a wage rise. That would mean inflation. But it wouldn't be fatal.

Mr Hilgendorf. In other spheres you do seem to get more production by paying more.

Mr Danks. It works if you put up the price of only one product.
In the very early days of New Zealand’s history wheat was extensively grown in many places in both Islands. Several parts of the North Island, at one time agricultural areas, have long since turned to dairying.

Production of wheat became concentrated in Canterbury, where the open plains and climatic conditions were especially favourable, Canterbury before long taking pride of place as the wheat-producing area of New Zealand, and today produces about three-quarters of the total wheat crop.

Before the development of the freezing industry, New Zealand was a wheat exporter and at that time exported both wheat and flour to Australia. In the 15 years from 1879 to 1894 yearly exports averaged more than two million bushels. The peak year was 1883 when more than five million bushels were exported in wheat and flour.

Wheat production was at its highest during the decade from 1881 to 1890, when an average of 8,059,292 bushels yearly were produced.

A change in farming methods came about with the advent of freezing and the production of lamb and dairy produce began to take the place of wheat. Nevertheless, exports of wheat continued in considerable quantity until 1911, after which there was a drop to half a million bushels in 1912 and from then on New Zealand became an importer and has remained so ever since, with the exception that in 1922 and 1933 exports totalling 1,212,830 and 1,005,718 bushels respectively were made.

The average yields by decades since 1910 are as follows:—

<table>
<thead>
<tr>
<th>Decade</th>
<th>Yield</th>
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<tbody>
<tr>
<td>1911-1920</td>
<td>6,270,170 bushels</td>
</tr>
<tr>
<td>1921-1930</td>
<td>7,363,520 bushels</td>
</tr>
<tr>
<td>1931-1940</td>
<td>7,588,148 bushels</td>
</tr>
<tr>
<td>1941-1950</td>
<td>6,719,895 bushels</td>
</tr>
</tbody>
</table>

Continuing the comparison, the yield in 1951 was estimated at 6,271,928 bushels, and the expected yield in 1952 is 4,000,000 bushels.

In the war harvests over the years 1940 to 1945 an average of 243,900 acres was planted, but since then the area has fallen greatly.

A check on the position shows that some of our largest areas have been sown during periods when prices have been depressed, but in those years other farming produce was also depressed in price and wheat was the best cash crop. Weather and the degree of competition from other products appear to play a very important role in determining wheat production. In recent years wheat has had to meet very heavy competition from lamb, wool, dairy produce and such crops as peas and small seeds.

Now let us look at the other side of the picture—our requirements in wheat.
Before World War II, New Zealand’s annual consumption of wheat for all purposes was not more than 9½ million bushels, of which 1½ million to two million bushels were consumed by the poultry industry. At that time about seven million bushels were required for the manufacture of flour. Today, New Zealand needs 12 million bushels annually, and the overall increase of about three million bushels on the pre-war level can be accounted for in two ways. First, the wheat requirements of the poultry industry have at least doubled. The poultry population appears to have increased greatly, besides which such items of feed as barley, maize, bran and pollard which prior to the war were freely imported from Australia, became unobtainable during early war years, and were replaced by wheat. The demand for wheat by the poultry industry has never since showed any sign of abating. Second, the consumption of flour and wheaten breakfast foods has grown with the increase in population over the years.

Today’s annual requirements may be set down at the round figure of 12 million bushels of wheat per annum, accounted for as under:

<table>
<thead>
<tr>
<th>Description</th>
<th>Bushels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flour</td>
<td>7,500,000</td>
</tr>
<tr>
<td>Other wheaten products</td>
<td>400,000</td>
</tr>
<tr>
<td>For feed and seed</td>
<td>4,100,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12,000,000</td>
</tr>
</tbody>
</table>

To put it another way, we need six bushels annually per head of the population.

It is not generally appreciated that we require for all purposes almost 1,000 tons of wheat per day every day throughout the year. Of this we eat over 600 tons of flour a day, more than 3,000 sacks of wheat are fed to poultry daily, besides which hens eat 1,500 tons of mash each week.

To produce 12 million bushels, an area of 350,000 acres would require to be planted in wheat each year.

This year’s harvest is expected to yield 4,000,000 bushels from 95,000 acres, leaving 8,000,000 bushels of wheat to be imported from Australia during 1952.

It is crystal clear that the best safeguard to supplies in times of peace and war is to have our requirements grown in New Zealand. Our heavy dependence on an overseas source of supply for wheat places us in a weak position. After New Zealand, Australia is our logical source of supply, but because of declining wheat production in that country combined with the increasing demand arising from rapid growth in her population, it cannot be taken for granted that Australia will be able to continue to supply our needs in the years that lie ahead.

Over 200,000 tons of shipping space will be employed in bringing out 1952 requirements from Australia. These requirements are now being rapidly shipped. Looking back on the experiences during the post-war years, however, the difficulties of supplying the Dominion increased tremendously as we had to rely increasingly on shipping.
During last year and the immediately preceding years, vessels were at times badly delayed both in Australia and on the New Zealand coast, and on several occasions parts of New Zealand were so short of wheat that the flourmills had to stop gristing until the arrival of further wheat shipments.

There are, of course, other reasons which compel the thought that it is unsound for New Zealand to have to rely on wheat to such an extent from overseas.

It would, however, appear to be in the interests of farmers themselves that much more land than at present should be sown to wheat. Some of the reasons for growing wheat are connected with sound husbandry, and it is proposed to leave this rather technical question to be dealt with by others who are more competent to discuss the matter. The drop which has taken place in prices of wool and small seeds, suggests that farmers might consider the advantages of employing more land in the production of wheat, on the principle of having production spread, if for no other reason. The wheat price is a guaranteed price with a sure, protected market. Besides this, with wheat there is a compensation scheme of insurance against losses by hail, flood and frost, and this removes some of the principal hazards from wheatgrowing. The Fund in effect guarantees the farmer a 50 per cent crop.

One more point not generally understood is that New Zealand wheat is of better baking quality than Australian, and is sought after by both New Zealand millers and bakers. Years ago it was generally considered necessary to use Australian wheat in the grist to make a good flour. As a result of the introduction of Cross 7 and other new wheats bred by the Wheat Research Institute, New Zealand wheat surpasses Australian in bread baking quality.

A final word about the developments which preceded the present system of marketing wheat. The events of the 20 years before the establishment of the Wheat Committee in 1936 show that the position of New Zealand growers in those days was particularly vulnerable through fluctuating price changes from season to season, brought about by disorganised marketing, imports of wheat and flour, and other conditions. At various times during that period the wheat-growing industry was subjected to a good deal of control, both Government and voluntary, and measures aimed at protecting the wheat-growing industry were not always effective. Let me cite some instances very briefly to illustrate these points.

In 1916 the area harvested was 329,000 acres. Owing to a mistake the yield for that year had been estimated at five million bushels, but the actual yield was over seven million bushels and the extra quantity of wheat not bargained for, caused the price to fall from 7/6d in September, 1915, to 4/6d in 1916. In 1918 the Government took control of the wheat and a Wheat Board operated until 1922. In 1923 the industry came under voluntary control of the millers and growers, and this was done with government blessing, but nothing more. In 1924 all embargoes on wheat and flour were removed. In 1926, because of a shortage both in New Zealand and in Australia, the price was about 7/14d, but next year dropped back to 5/8d. In 1927 a sliding scale of wheat and flour duties was
devised with the intention that New Zealand growers should receive about 6/- f.o.b., but in practice this did not happen. In 1929 a voluntary pool of wheatgrowers was organised to maintain the price of wheat, but this was done only at the expense of its own growers. Many growers remained outside the pool and received better prices. These “free” growers had the goodwill of the merchants and millers, who looked askance at any attempt on the part of the growers to stabilise the product at the highest possible price. This system proved fairly expensive as large quantities had to be stored to maintain the price. The work of the pool had the effect of bringing together the merchants and millers and the growers who remained outside the pool at the commencement. In 1932 the scale of sliding duties was revised downwards, this time designed to protect New Zealand growers to the point where they would receive 4/6 f.o.b. for their wheat.

In 1932 a voluntary organisation, the Wheat Marketing Agency Company, was formed. In 1933 under Government regulations, the Wheat Purchase Board came into being. In this year there was a local surplus of two million bushels of wheat, one million bushels of which were placed in store and one million of which had to be exported because of lack of storage facilities and finance. The average price of that exported was 2/7d. per bushel f.o.b., while the average price paid to the grower for the whole crop worked out at 3/10 per bushel f.o.b. Now the extraordinary thing was that during the year, while one million bushels of the crop were being exported at 2/7d. per bushel, no less than 902,037 bushels of wheat (mostly in the form of flour) were imported. This provided a glaring example of the inadequacy of the sliding scale system as a method of protecting growers.

The 1934 crop was sufficient to supply our needs and the 1935 crop was low. During this year the carry-over from 1933 was finally consumed.

The Wheat Purchase Board was renamed the Wheat Committee in 1936, and this organisation took over the selling of flour, bran and pollard. It can be fairly claimed that with the advent of the Wheat Committee, orderly marketing of wheat and flour has resulted. The policy ever since has been to import only the quantity of wheat required to make up any deficiency in the New Zealand crop, even although until 1949 wheat could generally be bought at a price overseas considerably below that paid to the New Zealand grower. The Wheat Committee on its part, must purchase all the f.a.q. New Zealand wheat offered to it, so that growers have a protected market at a fixed price. The Wheat Committee has nothing to do with determining the price of wheat, but is charged with the responsibility of administering the price fixed. The Minister of Industries and Commerce is Chairman of the Wheat Committee, which comprises three wheatgrower representatives, two flourmillers, two bakers and one poultrykeeper, with an independent Government Deputy-Chairman, all appointed by the Minister. The Committee may thus be said to be truly representative of both growers and principal users of wheat.
Before we make any attempt to assess the future place of wheatgrowing in New Zealand farming it is necessary that we briefly examine the present position, whence we have come, and then try and determine where we are going. In doing so I may find myself trenching somewhat on the spheres of previous speakers and if so I offer my apologies to you and to them. I hope that the difference in outlook may justify some repetition if I am repeating some of their facts.

It has been the common assumption of the ordinary citizen for the last two generations that there was plenty of wheat in the world and if we did not grow our own requirements it was just a matter of getting it from somewhere else. You just brought in a shipload and wrote a cheque for it and there you were. The past tense is right. It is not where you are.

A recent mail brought me the I.F.A.P. News for March, 1952. This is the official newsletter of the International Federation of Agricultural Producers—the International Farmers' organisation—and here are some items culled from it.

**INDIA FACES ANOTHER FOOD CRISIS.**

Tentative plans have been made to import five million tons of food grains this year.

**ARGENTINE MAY IMPORT WHEAT.**

The Argentine will have no wheat for export this year if current crop estimates prove correct, and may have to import wheat.

**AUSTRALIA EXPECTS WHEAT REDUCTION**

Australia is expected to produce ten per cent. less wheat. So that is the supply position. But even if wheat is available to us there is the little question of getting it here. How many people realise that because of the difficulties of transport both local and trans-Tasman, districts in New Zealand were only saved from having no bread not once but a number of times during the last two years by the great ability with which Mr McPherson the General Manager of the Wheat Committee met crisis after crisis. It is necessary that we should grow enough wheat ourselves so that we could meet an emergency with our own resources. And this last harvest we harvested the smallest area since the dawn of agriculture in New Zealand!! Why?

Before we attempt to answer that question let us look back over the past and see if it may throw any light on the present.

For the first few decades of agriculture in New Zealand wheat and wool were the only exportable products of our farms and consequently wheat held a dominating position in arable farming. But two outstanding innovations have completely changed the pattern of New Zealand farming—refrigeration, which made possible the transport of perishable commodities for long distances; and top-
dressing with phosphatic fertilisers which enabled pasture production to be increased and greatly cheapened. The wide spread adoption of these laid greatly increased emphasis on grassland farming. It is not surprising therefore, to find that arable farming, not only wheatgrowing, lost its dominance and as the years passed receded to a comparatively minor position. It is, I think, important to realise that wheat has tended to maintain its area rather better than "Field Crops" generally. For instance "All Cash Crops" are given in a publication of the Department of Agriculture as 1935-39 average area 625,000 acres 1946 area 495,000 acres or a reduction of roughly 20 per cent. in that period. Oats over the same period also showed a substantial reduction, the figures being for the same periods 316,000 acres and 181,500 acres respectively.

From the Pocket Compendium of N.Z. Statistics I give the following table of area of "Field Crops".

<table>
<thead>
<tr>
<th>Year</th>
<th>Field Crops</th>
<th>Year</th>
<th>Field Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>1891</td>
<td>1,286,000</td>
<td>1938</td>
<td>1,222,000</td>
</tr>
<tr>
<td>1896</td>
<td>1,356,000</td>
<td>1939</td>
<td>1,142,000</td>
</tr>
<tr>
<td>1901</td>
<td>1,456,000</td>
<td>1940</td>
<td>1,250,000</td>
</tr>
<tr>
<td>1906</td>
<td>1,535,000</td>
<td>1941</td>
<td>1,322,000</td>
</tr>
<tr>
<td>1911</td>
<td>1,730,000</td>
<td>1942</td>
<td>1,300,000</td>
</tr>
<tr>
<td>1916</td>
<td>1,877,000</td>
<td>1943</td>
<td>1,282,000</td>
</tr>
<tr>
<td>1921</td>
<td>1,653,000</td>
<td>1945</td>
<td>1,232,000</td>
</tr>
<tr>
<td>1926</td>
<td>1,341,000</td>
<td>1946</td>
<td>1,131,000</td>
</tr>
<tr>
<td>1931</td>
<td>1,404,000</td>
<td>1947</td>
<td>1,147,000</td>
</tr>
<tr>
<td>1936</td>
<td>1,379,000</td>
<td>1948</td>
<td>1,156,000</td>
</tr>
<tr>
<td>1937</td>
<td>1,279,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A striking fact evidenced by this table is that the area in field crops since (and including) 1943 has been smaller than in 1891. This becomes more significant when it is related to the further fact that in the same period according to the same authority "Cultivated Land" increased from 8,500,000 acres to 20,000,000 acres.

These figures show that cultivated and particularly "Cash" crops have become increasingly unpopular with farmers and as returns from pasture farming have become sufficient to enable them to do so, farmers have turned away from cultivation. The reasons behind this movement are many and complex and we will not attempt to investigate them very fully but it is necessary for us to glance briefly at some of the main ones. It is true that many farmers prefer work among animals to other kinds of farm work, and if a comparable return is to be had will naturally turn to animal husbandry.

The increasingly high wages costs have had a severely deterrent effect on the employment of labour as the employment of another man required such a steep increase in the gross return that the farmer can not see much, if any, profit in it.

It may be coincidence but you will notice that the reduction of the area in "Field Crops" has a rough correspondence with the beginning of the taxation avalanche, about 1936. While I would not place undue stress on this coincidence, I know from other evidence that the feeling persists strongly that "if I do incur
greater expenditure and take on more worry and trouble, taxation will take most of the profits. So why worry?” Perhaps a more important effect of taxation including death duties, is that it is not allowing of enough remaining in the hands of the farmer to enable him to be boldly enterprising.

The easy attitude towards work and effort so characteristic of the whole community has undoubtedly also invaded the ranks of farmers. It is not to be expected that one section of the community is going to work hard while the rest take it easy or even deride the hard-working section for being so stupid.

Topdressing of grassland, particularly with phosphatic fertilisers, has enabled very satisfactory production to be maintained without the use of the plough. This has given a strong bias away from cultivated crops. It has probably gone too far but is undoubtedly one of the major reasons for the falling off in the area under “Field Crops”.

Lack of domestic help for farmers’ wives, and its high cost if available, is I think a greater cause for this situation than is ever realised. Farmers are not prepared to take on extra commitments when they know that it means added burdens for their wives. On the other hand, if help is available they have to take the cost of it into account if attempting to increase production means that more help in the house will be needed. Especially as the Commissioner of Taxes has his little joke—wages of domestic help are not deductible.

Well where does all this get us?

First that wheat does not stand alone in the fall in production. Indeed wheat maintained its area, on a long term view, and with considerable fluctuations it is true, fairly well. It is only since 1944-45 that there has been a real decline in the wheat area. Not that there have not been low areas recorded previously. There have. But previously there has been a quick recovery in the course of a year or two. But low acreages have persisted now for seven consecutive years with this last the worst ever.

Wheat is not being displaced, at least directly, by other crops to any marked extent. The main increases in “Cash” crops have been in barley, peas and linseed. Barley does not usually displace wheat being in the main grown on land that is particularly suited to the crop, but in the last year or two it has invaded what is normally wheat land. Peas are very frequently a preparatory crop for wheat. Linseed may have displaced some wheat but it is usually spring sown and does not normally take the place of wheat in a rotation. One is led to remark that there does not appear to be any compensating increase in production generally to balance the loss which the reduced area of wheat represents.

It will, I think, be useful to review the three “Cash Crops” that have made gains—quite notable gains—in the last few years. Remember this is the period of the debacle in wheat. The reasons for the increase in the barley area were largely the development of a type of barley that stood well for heading direct; in some degree weather conditions which favoured late spring sowing; and salesmanship on the part of interested firms.

For peas I would say that the main reason for the considerable increase in area was the price which has been as much as 300 per
cent. above normal pre-war prices. This has quite counterbalanced the greater risk and the unpleasant work usually associated with this crop.

The linseed area has increased through the price offered and good salesmanship, salesmanship being a very important element in obtaining the increase.

These are the only field crops that have shown increases in the last few years and I would commend a study of the reason why to the powers that be.

And what of the future?

I think that we have to return to the plough in considerable measure and that fact holds the key to the future in large part. Farming without cultivation on our good ploughable country is just as illogical as farming without grass. Ploughing and regrassing, particularly on much of our South Island eastern-districts farms requires a certain amount of wheat, and that amount is more than is being grown today.

How often one hears the statement that “It doesn’t pay to grow wheat”. Or the question “Does it pay to grow wheat?” It is an academic question with little bearing on practical farming but unfortunately the Government and the public in some degree and farmers too have got their minds fixed on the related and equally chimerical conception “The cost of production”. There are so many variables in farming that no one has been able to establish a “cost of production” for any commodity that was worth a tin of fish, and I include dairying in that statement. If a reasonably accurate “cost of production” were established it could only be for one particular farm on one particular occasion. And a change of weather—say, a nor'-wester—could blow the whole thing to blazes overnight.

The tragedy of it is that this chimera bids fair to put wheat-growing with its satellite industries out of business and to starve our people for bread. It is causing the Government to stubbornly hold to a policy in which in its innocence it believes it is justified by something that has no substance in fact. It is causing farmers to use an unsound measure in determining whether and to what extent to grow wheat. It is not important to the farmer what is the “Cost of Production”. What is important to him is what combination of crops and livestock will give him the best net return and on this basis the question will often be, not whether to grow wheat, but how much to grow. In deciding that question price is an important factor of course. Unfortunately the Government, with its eyes glued to the “cost of production” illusion cannot see this plainly evident fact.

The experience with those crops whose acreage has been extended emphasises the effect of maintaining the grain merchants’ interest. They complain, with some justification, I am afraid, that their treatment has not been any inducement to make any great effort to encourage the growing of more wheat.

I have shown that the fall in wheat acreage has, on a long-term view, been part of the contraction in arable farming that has been taking place. That, in fact, wheat-growing has not contracted to the same degree. That the heavy decline of late years has
been the result of special circumstances not all of which I have detailed, for instance, the extraordinary rise in the returns for pastoral products. These special circumstances will pass—are passing. I am sure that in spite of all that governments, officials or Fortune can do wheatgrowing is going to remain our major “Cash Crop”. It fits in so well in a well-planned rotation of arable farming that its position is assured wherever that type of farming is practised. Developments of the past 25 years have greatly reduced its demand on labour. The tractor and the header have not only reduced the arduousness of the work but have so reduced the number of men required at harvest that in many cases no extra men are required. The power of the tractor has done away with another drawback of wheatgrowing—the heavy demand on the teams during late autumn, resulting often in work being behind for a whole season if the weather were unkind or some other delay occurred. The greatest threat to the wheat industry—its heavy labour demand—has been dissipated by modern machines.

Bulk handling of the grain is the next step forward and it is already on the horizon. The limited experience with it this year was wholly satisfactory, and grain was transported in bulk from the field direct to the mill; also from the header in the field to the railway and by rail to the mill. The conditions, however, were perfect and difficulties which may be expected in a normal harvest were not encountered. Consequently there was no opportunity to observe them and study how they can be dealt with. With bulk handling in operation artificial drying becomes much nearer a practical proposition. The handling of wheat in sacks is too costly and would make drying uneconomic. With grain in bulk it is another story, for machinery can take over and the grain is moved about as desired at the flick of a switch. Bulk installations and artificial drying are now commonplaces in England.

If artificial drying becomes possible, the area available for wheat growing would be greatly extended into districts where very high yields are normally obtained but where the difficulty of harvesting it in good condition discourages production at present.

In conclusion I would reiterate my confidence that arable farming, which is so vital to a balanced agriculture, will halt its retrogressive movement and again take up its forward march. With it will be wheat and I think leading the van.

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Mr Hurst. I think salesmanship has a lot to do with it. Will you tell us how much the merchant gets out of a £25 crop of wheat and out of a £50 crop of linseed?

Mr Mulholland. The merchant gets slightly less than 2d a bushel for wheat. That would be about 8/4 on a £25 crop. I know linseed is a good deal more than that.

Mr J. C. Chaytor, Marlborough. It has been said that merchants have discouraged farmers from growing wheat in favour of other crops because of the differential commission they receive and also because they do not want to handle it.

Mr Mulholland. I know of no such instance.
Mr Grigg. Do you know of any scheme whereby the Government would put up kilns to dry wheat to encourage farmers in districts that produce a high yield per acre but the weather is against harvesting operations? England produces large amounts of wheat in a bad climate. Why do they hammer away at Canterbury expecting it to grow all the wheat just because we have a good harvesting climate?

Mr Mulholland. As a rule the driers are privately owned by farmers in England. The New Zealand Wheat Committee is investigating the matter here. It is tied up with bulk handling; if that comes in, drying almost automatically follows. I think a less expensive system would do here where our humidity is lower than in England. There they use hot air which needs an expensive installation and careful supervision. We may be able to use cold air here.

Mr Barnett, Winchester. I understand 60 bushels is the carrying capacity of a bulk handler. Won't that limit its use on heavy land?

Mr Mulholland. If it comes in it will go on to the most suitable land first. I hope people won't rush in to bulk handling because there are still many difficulties which have to be ironed out.

Mr Wheeler. When prices are fixed, is allowance made for wheat that has to be tied, led in and threshed as compared with that which is direct headed?

Mr Mulholland. No.

Mr Wheeler. Can you give us an indication of the saving in cost between bulk handling and bagging?

Mr Mulholland. I have no detailed figures, but this year the saving in bags alone was 6d a bushel. Two men headed and delivered to the rail. The saving will vary with the distance from rail and there will of course be some added capital cost on the farm.

Mr Chaytor. If we do grow the wheat required can the country handle and store it? Would you favour a price increase after harvest so that it would pay the farmer to store on his farm?

Mr Mulholland. I am expressing my own opinion only, not that of the Wheat Committee. I believe the present increase for storage is sufficient to pay charges on bulk handling and storage. We could handle the increased amount because we have the transport which would be sufficient if some of the regulations were untied.

Mr Hilgendorf. Drying could extend wheat growing to the North Island and Southland. That's what they ought to be doing. In England, platform drying in bags is popular and very cheap.

General Barker. We depend on contract headers. How would we get on if the contractor couldn't come?

Mr Mulholland. Put it in bags. I don't favour all farmers going out of bags. Much of the distributor's side wants bagged wheat. The small man and others where conditions don't suit bulk handling will always have to bag.

Chairman. To produce more wheat we need more men on the land. Thirty acres of wheat would pay the wages of one man, but we would need also more housing. The provision of cottages is one of the most important things facing the arable farmer today.
The title of my paper to you today “Intensive Grassland Farming compared with Arable-cum-Grassland as regards Animal Health and Productivity”—sounded rather formidable to me—an average farmer. I intend to tackle this mainly from the angle of what we have done at our own farm, “Waitui”, in Southland, and what others are doing with variations and modifications on good-average-fertility land in the south. We have departed from the generally-accepted practice of wintering ewes mainly on swedens or turnips with hay, and the three year rotation—swedens out of grass, cash crops, and rape and grass—in favour of special-purpose pastures. As a purely grassland farmer from Banks Peninsula I was immediately impressed with three facts on coming south:—

1. The higher mortality amongst breeding ewes on the heavy-carrying-capacity land.
2. The short economic life of the breeding ewe where ewes were heavily turniped.
3. The fact that the further south you go the more work has to be done to maintain high production.

Generally speaking, the carrying capacity of land throughout the full year is limited by the number of stock that can be carried in the winter and early spring. In Southland our long winter tends to accentuate this.

The fact that swedens can readily be grown here seemed to be the answer for winter carrying; but swede-crop failures are not uncommon and growing swedens means labour and work.

It was fairly obvious with these long winters, that we were suffering at least to some degree from protein starvation, due to a large extent to this type of feeding. This was reflected in the health of our stock, and the ten to twelve weeks’ feeding on swedens played havoc with the mouths of our ewes. In fact many had to be discarded as four shear.

We have a 300 acre farm close to the Oreti River. About half is gravel-bottom, free-draining, sharp land with the remainder having a clay subsoil requiring draining.

In 1939 our pastures were browntop predominant and the carrying capacity was about 500 ewes, but it was easy to increase this to a fairly constant level of 800 ewes by following the local practices of draining, liming, renewing our old pastures with certified seeds and topdressing with phosphates.

We found that extra proteins could be supplied by feeding concentrates during the last few weeks of pregnancy. These were not costly but the supplies were irregular.

Short-rotation ryegrass from all accounts showed possibilities.

In 1947 we sowed down 26 acres of pasture containing 20lb of short-rotation ryegrass with the idea of saving out-of-season grass to substitute for the concentrates. In the spring the result was rather disappointing owing to frost burn.
I was particularly interested in the experiments being carried out by the D.S.I.R. with the use of nitrates and on consultation with the local officer we decided to topdress 13 acres of this predominant—short-rotation pasture with sulphate of ammonia. The area had already been liberally limed and had had an application of 1½ cwt superphosphate in March. We topdressed this in mid-April with the sulphate at the rate of 2 cwt on one half and 1 cwt on the remainder. We had difficulty in spreading the fertiliser evenly but there was no doubt about the results. On the headlands which we had purposely missed we had grass three inches long, showing distinct signs of frost burn. On the 1 cwt area the result was patchy due to the uneven spread but on the whole was a big improvement on the headlands. We probably applied amounts varying from ½ to 1½ cwt on this area. On the 2 cwt area where the actual application varied from 3 cwt to 1½ cwt, we had an even lush growth six to eight inches in length, showing in July no signs of frost burn. This was only a rough guide, but a help.

We fed this off in August in four breaks, shifting the ewes at night to a bare paddock with plenty of hay accessible. It fed off at the rate of one day per acre for 1000 ewes.

We had solved our first problem—no more ante-partum paralysis. However, it was the following year that, more by accident than design, we arrived at wintering solely on grass. Our swede crop was a complete failure with club root. We had sown down another 17 acres of short rotation—this time with timothy and white clover. We grazed this together with the old area till the end of the first week in April, then topdressed the whole with equal quantities of super and sulphate of ammonia at 3 cwt per acre. By the end of June we had 17 acres of grass 12 to 16 inches long, and in the old area the grass was 8 to 10 inches long. We commenced feeding on the 12th July and soon discovered that the new area was feeding at the rate of two days per acre for 1000 ewes and in the old area 1½ days.

We were apprehensive as to the wastage by tramping and dirtying on the rank growth but discovered the best method of feeding was by the use of small breaks—enough to do three days. With the tramping even in fine weather, the grass appeared to wilt after the first day and by the end of the third day the grazing was past its best. As we progressed down the paddock we used these previous breaks for grazing on wet days; in fact two of the old breaks looked like quagmires. In the old area where the grass was shorter the field was fit for restocking in three weeks. The clover content was good; in fact we took a white clover and short-rotation ryegrass crop the following summer. In the new area the recovery was slower—about a month till restocking—but this fed at the rate of 50 per cent. more. Here the clover growth was poor but in six months recovered remarkably and although the field was grazed very unevenly earlier with the breaks, there was no apparent difference at the end of the summer. Last year we followed approximately the same programme.

Let us look at this system from a production point of view. We have increased our carrying from our static 800 to 1050 ewes plus 150 dry sheep, and 40 head of cattle. Our ewes last at least
one more year with no swedes, and our death rate has been reduced from 6 per cent. to 2½ per cent. With the use of short-rotation ryegrass for flushing our ewes we have increased our lambing percentages.

On the other side of the ledger I feel that the incidence of scald and footrot is greater as this system demands greater reserves of grass and grazing on longer pastures. The worm infestation is probably heavier but these factors naturally follow heavier stocking. We may have difficulty at times in controlling our pastures. The answer may be dry sheep, cattle or ensilage. Compared with the other type of farming there is far less risk of crop failure. The only risk is a very dry, late autumn and this is minimised by the use of the quicker acting and safer nitro-lime when available.

The method of renewing pastures must vary from district to district. In my own district it may well be, ridged rape out of grass, and down to grass the following year. As well as carrying 1200 sheep and 40 cattle, we grow 100 acres of crop consisting of about 30 acres of cash crops and the balance cocksfoot and small seeds, but in putting the case for intensive grassland farming I see no necessity for cash crops. Ethics may demand that we depart from this practice and grow wheat in rotation. Economics may—but it seems a sound financial policy, while we can afford it, to build up reserves of fertility just as, in the past we have built up reserves of calcium with our heavy liming. I see no other reason—may ethics win.

We aim to sow down 25 to 30 acres each year with short-rotation ryegrass, white clover, timothy, cocksfoot and Montgomery red clover. We have found that we still have short-rotation-dominant pastures after five years. How much longer this grass will hold remains to be seen, but with haying and a certain amount of small seed production the establishment of timothy, cocksfoot, and Montgomery red pastures for late spring and summer grazing, when the short rotation slumps, naturally follows on good fertility land.

In conclusion I submit to you that a wider use of special-purpose pastures, in conjunction with the judicious use of artificial nitrogen and phosphates will prolong the economic life of the ewe, will decrease the rate of mortality in our breeding flocks, and raise the carrying capacity of our land.

Gentlemen, I commend to you intensive grassland farming—builder of fertility and greater production.

Chairman. What is your rainfall?

Mr Hardy. About 35 inches. I don't think it is the amount but the even distribution that matters.

Mr Slater. I understand you are using nitrogen. Do you think using more nitrogen would be economic at the present price?

Mr Hardy. I haven't gone into costing. This year 33 acres cost £4 per acre for sulphate of ammonia and super mixed and applied. That compares with our normal topdressing of 1½ cwt. of super at 30/- a time. I just don't know how far we can go.
Mr Slater. Have you suppressed the clover at all?

Mr Hardy. Yes. The extra grass-growth did tend to smother the clover but it recovered.

Professor Flay. Have your lambs continued to thrive?

Mr Hardy. I'll give you my figures. I got 138 per cent on ewes put to the ram. The first draft of 642 early in January went 38.4 lb. The second draft in February went 37.8. The balance were fattened on rape and went off in May at 37.9 lb. There were 11 seconds.

Mr Wheeler. You carry 50 per cent more ewes than you used to. How do your lamb weights compare with your previous weights?

Mr Hardy. The individual lambs are not so good, but after all, it is pounds of meat per acre which really counts.

Mr B. S. Trollope, Marlborough. Did you use lime?

Mr Hardy. I have poured lime on in the past. We put one ton on when we plough, another ton at sowing and we put plenty on between ploughings. After all, we have plenty and it helps to reduce the income tax, but I wonder if we are not putting on too much.

Mr C. S. Marshall, Timaru. Do you think we could practice your system on the dry hillsides in Canterbury?

Mr Hardy. There would be a risk in Canterbury because of your dry autumns. To topdress with nitrogen you must have rain to get the lush growth.

Chairman. I am interested in the effects of your heavy stocking on the health of the sheep? How do you get on with your hoggets?

Mr Hardy. I don't carry hoggets. I buy two-tooths in the spring.

Chairman. Do you have any trouble with lambing due to frost on the grass?

Mr Hardy. I use a bare paddock as run-off where I feed the hay. I don't put the sheep on the short-rotation until the frost is thawed.

INTENSIVE GRASSLAND FARMING COMPARED WITH ARABLE-CUM-GRASSLAND (B)

A. Henderson, Winton

I should like first of all to give you a brief account of general farming practice in Southland and then a résumé of my own farm management which conforms fairly closely to the usual Southland farming practice.
In any discussion of Southland farming, the main thing to remember is that Southland is first and foremost a fat-lamb raising district, and any cereal cropping done is incidental to, and could almost be described as the result of, winter-feed growing.

While almost any crop grown in Canterbury can be seen in Southland, no one crop, with the exception of oats, has a wide general distribution. Almost all the wheat is grown in the area north of Winton with peas and barley in the drier inland districts. Most of the arable ground is producing swedes, chou moellier and kale, and white crops often follow after the land has been used for this purpose.

The present position is, however, a relatively recent one and 20 to 25 years ago large quantities of grain, mainly oats and seed, mainly ryegrass, were produced. Since then, however, draining, liming and regular topdressing with superphosphate and resulting improved pastures have combined to increase sheep numbers to such an extent that all other avenues of production are dwarfed.

Another very important factor contributing to this enormous increase is the Southland climate with its well distributed rainfall. This gives farmers almost a guarantee that they can stock to the full estimated capacity of the land, with little or no fear of sudden shortages of grass through drought. In effect we have the advantages of irrigation without the disadvantages.

The actual increase in ewe numbers in the years 1923-50 was 1,700,000—from 900,000 to 2,600,000. This represents an increase of over 60,000 ewes yearly and this rate is still being maintained. This intensive stocking has resulted in a very great build-up in fertility which is still increasing and which is not being tapped to any great extent in the production of cash crops.

There are probably two main reasons for this:
(a) Shortage of labour.
(b) The prices which have obtained for sheep products over the past 10 to 15 years. Farms are largely of the 200 to 300 acre variety, so it is possible for a farmer to do all the work incidental to fat lamb production himself, while the introduction during the last five years of such mechanical aids as bulk lime sowers and tile drainage machinery have to some extent overcome the necessity to employ labour, while the farmer concentrates on sheep. Labour is hard to get and in many cases the Southland farmer has adopted a type of farming which enables him to dispense with it.

On the other hand, it is open to question whether such continuous intensive stocking with sheep can continue. Some consider that it cannot, although to date there is really no widespread evidence to support this view. There is no doubt that on some of the most fertile and heavily stocked farms, individual lamb weights have fallen as stock numbers have increased, but in most, if not all cases, this has been more than counteracted by a greater weight of meat per acre, which after all is the only true yardstick by which production can be measured.

There is a school of thought which holds that the continuous heavy liming practised almost universally is tending to alter the balance of trace minerals so necessary for a healthy soil and healthy stock. I don’t pretend to know whether or not this is so,
but no doubt research work in the years ahead will establish or discredit this theory.

At the moment most farmers are in the dark as to the economic maintenance ration of lime required, and I am sure would welcome research along these lines.

It can, of course, be argued that this fertility that has been built up is largely wasted if it is not turned into food, and I think that the ability of sheep to make maximum use of it can certainly be questioned. I feel quite sure that much greater areas of cereal crops could be grown without in any way affecting sheep numbers. In fact, such a course with its more frequent renewal of pastures would probably result in even greater meat production, because even under conditions of high fertility, species changes in pastures and loss of vigour resulting from age do inhibit growth.

At the moment there appears to be no prospect that such an increase in arable land will occur, although changing economic conditions or an overwhelming demand for cereal crops could alter the present position.

From the foregoing you will see that fat-lamb production is the main preoccupation, and even in districts like my own, where fair areas of wheat, oats, linseed, grass-seed and clover crops are grown, cropping is still incidental to sheep. In fact, in no part, do sheep take second place.

I hope I haven’t enlarged too much on general farming practice in Southland, but it will give those of you who don’t know the province some idea of trends over the past decade or two.

In the description of my farming which follows, I have made no attempt to give a lot of detail about any particular operation, but rather in broad outline to mention various aspects of the farming programme.

The property is 300 acres in area and all the soil type could be described as an alluvial deposit. It is on the main Southland plain, 30 miles north of Invercargill, and has a rainfall of 32 to 36 inches.

I have a flock of Romney-cross ewes which are mated with the Southdown ram.

As a rule 100 to 120 acres is in crop, but of that area 60 acres is in cocksfoot for seed production and is never grazed. About 20 acres is the usual area in swedes for wintering sheep. Combined with hay, swede feeding represents the ideal way of wintering a lot of stock on a small area, with a minimum of labour. It also ensures that the whole farm, with the exception of a run-off paddock, is given a complete spell for six to eight weeks which, no doubt, accounts for the fact that even so far south, lambing is general on the plain in late August or early September. In effect, it means that the dormant period in pasture growth is taken care of by a crop occupying only 15 to 20 acres (in many cases even less) for 1000 ewes.

Almost invariably, wheat follows swedes, with occasionally a second crop of wheat, when the rotation would be wheat, swedes, wheat and back to grass. In future I hope to include linseed in the rotation: linseed, swedes, wheat, grass. Over a wider area oats would, of course, replace wheat.
New pasture is usually sown out with rape for lamb fattening, although of recent years the inclusion of H1 in the mixture has tended to encourage pure sowings, the reason being that the H1 tends to smoother the clover if left ungrazed till the rape is ready to feed.

As wheat is usually grown after swedes it is spring sown and is now always Cross 7. In many parts yields are high, 70 bushels being usual and 80 and even 90 not uncommon.

The point to note is that in very few cases does a Southland farmer plough up a paddock to grow a cereal crop. He ploughs it up to grow winter feed of one kind or another, and the grain crop is of secondary consideration.

As mentioned earlier, I have a fairly large part of my farm in cocksfoot for seed, and under our conditions it appears possible, with the liberal use of nitrogenous fertilisers, to maintain a stand over a fairly long period.

Experience of the use of sulphate of ammonia does, however, seem to indicate that here again even the application of increasing quantities is not sufficient to overcome the loss of vigour resulting from age, and I am of the opinion that, other things being equal, topdressing with nitrogenous fertilisers would show the greatest return when applied to a young stand.

In conclusion I refer briefly to the title of today's discussion. It is impossible to forecast with any certainty future trends in farming practice, but it does seem very likely that the demands made by an increasing population will, in the foreseeable future, impose on the farmers of New Zealand a type of agriculture very different from that of today and with a much greater arable bias.

Chairman: How long do you leave your grass down?

Mr Henderson: I plough less than 10 per cent. a year. I grow 20 acres of swedes so that it takes about 15 years to get round. I might plough a low-production pasture before its normal turn. We have so little grass grub that it does not upset the rotation.

Mr T. D. J. Holderness, Motukarara: Mr Hardy has told us of his "disappointing" lamb results. Would you give us your results and also your stock numbers?

Mr Henderson: I run 700 ewes, 300 ewe hoggets and 200 wethers and dry sheep. I drafted 70 per cent. off the mother in two drafts, one at 39.7 and one at 38. My percentages are a little lower than Mr Hardy's. In Central Southland we had last year drafts of 1500, 1600, 1700 and 1800 lambs at better than 40 lb.

Mr Hilgendorf: How do you cater for the critical time in early Spring? Do you rely on spelling grass paddocks?

Mr Henderson: Yes, but occasionally after an early harvest I sow rye or black barley or Italian ryegrass. It's not very satisfactory because it throws my rotation out of balance. I start lambing about September 1.

Mr C. E. Iversen, Lincoln College: Could you give us the details of the topdressing of your cocksfoot seed stand with nitrogen?
Mr Henderson: I first used sulphate of ammonia 4 years ago when the stand was 5 years old. I put on 13 cwt. and got a remarkable increase. The yield was 600 lb. M.D. so I doubled it next year but the 3 cwt. produced only 500 lb. The following year I gave it nearly 4 cwt. but it was a dry season and the yield was only 200 lb. Last year I gave it 3 cwt. in the autumn and 3 cwt. in the spring, getting only 300 lb. but I think the reason was that the vigour of the stand had gone. I think we get best results from treating a young and vigorous stand.

Professor Flay: Would you describe your winter feeding programme?

Mr Henderson: I winter on swedes and hay, putting the ewes on the swedes in July. It's only recently I've had hoggets which I fed on rape and put them on the swedes at the end of May.

Chairman: What about your stock health?

Mr Henderson: I have had a little ante-partum paralysis, but I do my best to avoid a check in feeding the ewes. I don't as a rule have hoggets because I buy two-tooth ewes.

Chairman: If all the good farmers buy two-tooths where do they come from?

Mr Henderson: In Central and Western Southland most of us just use the Southdown ram. In Northern and Eastern Southland they use the Romney and so breed more Romney ewes than they require.

Mr V. J. S. Verity, Orton: What part do cattle play in your fattening?

Mr Henderson: Every visitor asks that. The reason we don't carry more cattle is that we've got on fairly well without them. They are a lot of work especially in the winter. They are also hard on the ground in a wet winter and knock open ditches about.

What is your topdressing programme?

Mr Henderson: I try to sow about 1½-2 cwt. of super each year and about ½ ton of lime.

What is your experience of the effect of swedes on teeth?

Mr Henderson: Heavy swede feeding probably cuts down the life of the ewe, although on high fertility land, if the ewe never saw a swede, her teeth would still go for some reason or other.

Mr Murray: How do you harvest your cocksfoot seed under your Southland conditions?

Mr Henderson: Over a period of 9 years we've never taken more than 3½ weeks from cutting to bag. The reason is we don't get a great amount of rain at any one time and it's usually accompanied by wind. If we cut with the binder the sheaves seldom get soaked. We can even harvest from the windrow.
FARM TAXATION AND PRODUCTION

FARM TAXATION—THEORY AND PRACTICE

I. W. Weston, Lincoln College

(An abstract)

I propose to discuss the theory, while others will explain the law and discuss the practical aspects of taxation.

A. The taxes that farmers pay are (1) Social Security charges total £36 million for 1950-51. Some farmers object to being appointed compulsory but honorary security-charge collectors from their employees and some pay the tax themselves. Others wonder if they couldn't make a better arrangement with a benefit lodge or insurance company. Universal superannuation has long been a plank of the Farmers' Union and almost all agree that the young, old and unfortunate should be cared for and that as we can afford it we should endeavour to raise the real standard of living for all. (2) County rates £3.4 millions in 1948 and land tax, about one-half being farm land tax, £1 million. The amounts collected depend on the rate levied and the valuation used. The rate of land tax increases with valuation to a maximum of 2½ per cent, or 6d. in the £ of government improved valuation. (3) Customs and excise duties £29 million for 1950-51. Unless an equivalent excise duty is levied, customs duties tend to protect local industry and can help by assisting concentration in each area on what it is considered in the long run it can most efficiently produce. Apart from this aspect, customs duties on imports are protective to local industry and equally hinder export. (4) Sales tax, etc., £27 million for 1950-51. The main items here are sales tax, motor vehicles taxation and amusement taxation. (5) Controls and control of money. These concealed taxes cannot be measured but can be the largest source of revenue; e.g., a government can by legislation buy the farmers' produce at one price and sell it locally and for overseas funds at different prices, control imports, exchange funds and prices, tax licensed industries and perform all kinds of "good works" with the income so obtained. A recent article in the English "Economist" described this as a Peronistic disease which had spread from the Argentine and was now infecting Australia and New Zealand. However, a great deal depends on how the money so collected is respent and if it is spent on increasing the output of farm products for the United Kingdom, the Economist's grounds for criticism would be weakened. (6) Finally, income tax £60 million and death duties £7 millions for 1950-51. These are the taxes most of us have in mind as the subject of discussion, one section wishing they had the privilege of being in the position of having now and later to pay these taxes, others worrying about how they are going to be paid and still retain sufficient working capital to keep their farms on an efficient basis, and still others, having set aside the sums required in
advance, consider themselves fortunate and that the rest should play the game as they do, honestly, according to the rules, and without grumbling.

From the community and the farming viewpoint it is important that taxation, direct and indirect, should encourage good farming and that everyone should pay his fair share of taxation with certainty, equity, economy and without evasion. In the present overemployment period when farm exports are so urgently required it is also important that if a farmer can spend the money to better purpose by paying it out himself directly in farm production and development work and in employing labour, he should do so. This saves the cost of double handling and enables the spending to be done while the farmer is alive and able to supervise expenditure on sound lines.

B. Why do we pay taxes? When money was a scarce commodity, such as gold, taxation was a means of collecting money in order to spend it on the expenses of government—mainly for protective or aggressive war. Later, government business was also financed by debasing the currency by note issue, by the issue of bank credit, and by raising loans and levying taxes to pay interest on the loans. Nowadays with government control of the issue of money the chief reason for taxation is to guide the economic system along the lines which, presumably with one man one vote, the people require the economic system to work, e.g., in the modern welfare state this seems to imply attempts at higher money incomes for all, and greater equality of wealth and opportunity. It also implies limitation on the expenditure of these money incomes when, because of war preparation or welfare schemes, consumer expenditure exceeds productivity and inflation occurs. By taxation and various controls, the inflation is held in check or is concealed. The other side of the remedy is to increase production and the State still desires to expand production of necessaries. In New Zealand this means that farmers are expected, while playing the game according to the rules, to expand their output.

C. What the individual farmer can do. Some farmers have increased their output while apparently quite happily complying with the law. How does this last group get into such a happy position? Perhaps some farmers realise more clearly than others that the inevitable cycle of life and wealth applies to us all. Quite early they begin profit sharing, building up reserves and parting with some of their assets instead of waiting for the Government, through taxation, to do this for them. Various methods of profit sharing and transfer of property can be adopted provided the action taken is to increase the efficient working of the farm and not to dodge tax.

(Dr. Weston outlined various methods open to farmers, each of which is fully described by Mr Peryman in a subsequent paper.—Ed.)

D. Suggested amendments to the rules.

i. The £200 limit on farm housing and on farm-development tax-exemption expenditure is any one year might be removed.

ii. The voluntary payment of surplus income into a reserve account, somewhat as was done for wool, might be permitted, this
money being subject to taxation where, on withdrawal, it is not spent on farm housing, farm maintenance, or development.

iii. If farms could be treated as though they were public companies for transfer of ownership, tax and death duty, the maintenance of sufficient working cash for development work could be greatly facilitated.

iv. Standard forms enabling share farming, payment of annuities and transfer of shares in farms from older to younger members might be made available.

v. The costs of land transfer on sale or death are much higher than they need be.

vi. The legislation amalgamating husband's and wife's incomes where they both work, as on many farms, should be rescinded.

Mr R. Finch, Oamaru: In England I understand the practice is that with farm buildings, drainage, irrigation and so on, provision is that 10 per cent. is written off each year. If that were done here—if the development work were encouraged by a high rate of depreciation—that would definitely encourage such transactions. I think that the fundamental thing is that a higher rate of depreciation should be allowed on capital improvements.

Dr. Weston: At the moment we can spend up to £200. As regards buildings, if it is for other than a son, I think you can take 32½ per cent. for the first year almost off any improvement at the moment plus the normal depreciation, that is, tractor, 50 per cent., wood and iron farm building 32½ per cent.

Mr Little: I agree with Dr. Weston's objection to the limit of £200 on permitted development each year. The fact of having a limit means that if you have a 25-acre onion farm you could do the whole boundary fence on your £200 but if you have 20,000 acres of mountain tussock you get only a bit of boundary fence.

Chairman: Take houses and buildings on farms. Where does maintenance end and capital expenditure begin? There are a lot of old buildings in this country getting dilapidated. If you pull a building down and put up a new one, that is capital. If you pull down three-quarters and replace it and leave one-quarter, what is that?

Dr. Weston: I would say if it is replacing the original building it is maintenance. If a new building where that was before, it is capital.

General Barker: If you put a fence up to replace a fence they tell me it is maintenance. If you take it a yard away from the original land, it is a new fence. Is there any clear definition as to when a fence is new and when it is being maintained?

Dr. Weston: I would think that if you build a fence in order to keep out vermin you can get away with it under the new exemption but if you build a new fence where there was one before, it is a replacement of the original fence.

Mr. W. M. Cavanagh, Tuatapere: Perhaps Dr. Weston could give
us something on the American system of taxation. In America the total cost of the implements can be deducted as a farm expense, say, at the rate of 20 per cent. a year for 5 years. The 20 per cent. is not on the diminishing total but the original. If a farmer retains a tractor or implement for 10 years it is classed as obsolete and then he can sell it and recoup the whole of the price. Unfortunately here the 20 per cent. is on diminishing value. The result is that the total cost is never written off.

Dr. Weston: Depreciation, as far as the Commissioner of Taxes is concerned, is an estimate of loss of value due to lapse of time and in most cases farmers have found that their estimation has been a “profit” because of inflation. In a way we are being taxed on what is not really profit—it is inflation.

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REVIEW OF CURRENT FARM TAXATION

N. A. Rowntree, Land and Income Tax Department, Christchurch

Dr. Weston has given you some of the reasons why it is necessary for the Government of any country to levy income tax and has put forward some ideas by which the system may be altered or improved. As it is not possible in an address of this nature to cover the whole field of farm taxation, I propose to deal with some of the alterations which have been made in the taxation law in recent years in regard to income derived by farmers and which all tend to reduce the burden of taxation on farming income.

Income from Sales of Livestock.

As you are well aware, the income from the sales of livestock is assessable income in the year of sale and the value of stock on hand at the beginning and the end of each year is taken into consideration in ascertaining a farmer's income. Owing to the difficulty in determining the cost price or market values of livestock at the different balance dates adopted by farmers, and also owing to violent fluctuations in values which often occur, provision is made for a farmer to adopt standard values for his livestock. Such standard values may be altered by the taxpayer with the concurrence of the Commissioner or the Commissioner may at any time require the adoption of market values in place of standard values. In practice, the Department does not require the adoption of true values except in those cases where the stock is sold or otherwise disposed of, e.g., at death and transfer to trustees, or by gift. With the gradual rise in the market values of livestock over the past few years, the effect of using market instead of standard values at the termination of any income period, usually results in a substantial increase in the income for that year and the consequent payment of a substantial amount of additional tax.

In order to spread the effect of the increase in income in one year by the sale of a large portion of a farmer's livestock, Section 8 of the 1949 Amendment Act was passed and this section makes provision for relief in those cases where a farmer sells a substantial part
of his livestock and the income in the year of sale is unduly inflated due to the adoption of low standard values in past years. In such cases if the income is substantially more than the average income for the three previous years, the Commissioner may adjust the income for the year of sale and for one or more of the three previous years as he deems just and reasonable. Applications to have the provision applied must be made not later than 12 months after the date of sale or other disposition, or such extended date as the Commissioner may determine.

In order to obtain the benefit of this Section, it is necessary to satisfy the Department that the income in the year of sale is unduly inflated by reason of the adoption of a standard value which was less than the true value of the stock at the date of sale and the Commissioner is empowered, in such cases, to amend the standard value adopted by the taxpayer in respect of that livestock at the commencement of the income year in which the sale is made and at the end of any number of the earlier income years not exceeding three.

The purpose of the Section is to spread the additional income arising from the sale of livestock but not to spread back any income arising in the year of sale from the normal farming operations. The Section also provides that the Commissioners' decision in the matter is final and a taxpayer, therefore, cannot contest his decision on this particular matter in the Courts.

The following example will illustrate the position:

| Standard Value | £1 |
| Flock          | £3 |
| Incomes: 1949: | £2 |
| 1950:          | £2 |
| 1951:          | £2 |
| Average Income | £1 |
| Income for year 1952 including profit on sale of stock | £3450 |
| Excess income due to sale of stock, 1000 sheep at £2 per head | £2000 |

In such a case the Department may fix the standard value of the stock at the commencement of the year in which the stock is sold at, say, £2/10/- per head, and the standard values at the end of 1949, 1950 and 1951 at £1/10/-, £2 and £2/10/- respectively.

As a result the income of the year of sale would be reduced from £3450 — £1500 = £1950 and the incomes for the three earlier years increased by an amount of £500 each year.

This is given as an example of how the section operates but as the matter is one which is left to the discretion of the Commissioner, the position may alter in particular cases and no general rule can be laid down.

Initial Depreciation Allowance

Section 8, of the Land and Income Tax Amendment Act, No. 2, 1950, provides for an initial depreciation allowance of 30 per cent of the cost price of any plant, machinery or equipment used wholly in farming business, or on any building acquired or erected to provide accommodation for employees of a farming business. The allowance
applies to assets acquired, installed, erected or first used between the 1st April, 1950, and the 31st March, 1953, i.e., during the income years ended 31st March, 1951, 1952, and 1953. The initial depreciation allowance is in addition to any ordinary depreciation normally allowed but is not in addition to the special depreciation allowance provided for in Section 15 of the 1945 Amendment Act, although a farmer has the right to elect which 30 per cent allowance he desires to claim. There is also the further point, that the initial allowance may be made even though double-entry books are not kept, but in order to obtain a deduction of the special depreciation under Section 15, and the ordinary depreciation, the Commissioner requires that proper double-entry books must be kept. The allowance is restricted to assets employed wholly in the farming business and will not be extended to assets used partly for business and partly for private purposes. Therefore, the allowance does not apply to motor cars purchased by farmers and used partly for private purposes.

The allowance is applied to second-hand as well as new plant, provided purchase is bona fide and the cost bears a reasonable relationship to the market value. In cases where the claim is made in respect of second-hand plant or machinery, the full name and address of the vendor should be shown when making the claim.

The initial depreciation allowance will be allowed on buildings erected for relative employees provided that the Income Tax Superintendent of the district is satisfied that the relative is actively employed full time on the farm and that the cost of the dwelling is not exorbitant.

The Commissioner has the power to refuse the allowance in respect of small items of plant and as a matter of practice, the Department declines the initial allowance in respect of individual items of plant which cost less than £50.

It should be noted, however, that as the allowances under the Section are for depreciation, the Commissioner may recover any depreciation allowed under this Section in cases where the plant or other assets are sold for an amount which is greater than the figure to which the asset has been reduced by the allowance of depreciation. This is in accordance with the normal practice under which the Department assesses any depreciation previously allowed and recovered on sale.

I would point out that the allowance under this Section is applicable only to farmers and does not extend to taxpayers engaged in business incidental to farming and using farming machinery, such as an agricultural contractor.


This Section provides for the allowance to taxpayers engaged in farming of certain developmental expenditure as a deduction for income-tax purposes. Under the Section, the taxpayer is entitled to deduct any expenditure incurred in the eradication or extermination of animal or vegetable pests on the land, the clearing of bush and scrub, the destruction of weeds or plants or the preparation of the land for farming. Certain of this expenditure would normally be allowed as a deduction as a recurring expense but where land is newly acquired, or is being broken in for farming purposes, the law
previously regarded such expenditure as being of a capital nature and not deductible.

In addition, the Section authorises the Commissioner to allow the deduction of expenditure in any year amounting in the aggregate to not more than £200, expended on development improvements to the land in the nature of draining, earth works for irrigation, counter-erosion, and flood control, the construction of aeroplane-landing strips to facilitate aerial top-dressing, the sinking of wells and the erection and rabbit-proofing of fences. The Section provides that where land is acquired and developed and is sold at a profit within five years of the date of acquisition, the profit on the land up to an amount equal to the expenditure which may have been allowed under the Section as a special deduction, will be regarded as assessable income in the year in which the land is sold but if the taxpayer so elects, the Commissioner will issue amended assessments for the earlier years, disallowing the development expenditure which has contributed to the profit.

In order to obtain the benefit of a deduction, under the Section, it is necessary that a detailed statement in support of the claim should be furnished with the return.

Under the Section, the Commissioner is prepared to allow a deduction of up to £200 to farmers of any expenditure on the construction of and repairs or improvements to county roads made by way of voluntary contributions to the County Council in lieu of a special or separate rate which would normally be necessary to cover such expenditure by the County.

Farmers may deduct under the Section, expenditure incurred in the conserving or carrying of water for use on the land whether the expenditure is in connection with irrigation or the watering of livestock. The cost of sinking bores and wells or the laying of water pipes is, therefore, allowable under the Section. It is the intention to allow farmers to deduct such expenditure as results in permanent improvements incorporated in the land but not to allow expenditure on improvements which are severable from the land and therefore, costs of pumps, windmills and electric motors, although part of the watering system are severable from the land and no deduction is, therefore permissible under Section 9. Such assets are, of course, plant on which depreciation, both ordinary and initial, or special, may be claimed in the normal way.

**Deduction of Expenditure on trees planted for shelter or to prevent erosion.**

In Section 6 of the Land and Income Tax Amendment Act, 1949, provision is made for a deduction to be allowed to a farmer of any expenditure incurred in planting or maintaining trees planted to provide shelter or to prevent erosion and the deduction includes the cost of erecting or maintaining fences to protect any such trees. This allowance would not be extended to trees planted for sale for commercial purposes and in the event of any question arising as to whether any trees have been planted as shelter or control of erosion or for commercial purposes, a certificate of any officer of the Department of Agriculture or of the Forest Service as to the purposes for which the trees were planted, shall be final and conclusive for the purposes of this Section.
Spreading of Income from Sales of Timber from Farms.

In the 1939 Amendment Act, the income derived from the use or occupation of land included all profits or gains derived from the extraction, removal or sale of any timber from the land subject to a deduction of the cost of such timber. It was the practice to regard any such sales as income in the year in which the sale was made. As the timber had been growing for a long period of years, the Legislature recognised that it was unfair to assess the whole of such income in one year and by Section 7 of the 1949 Amendment Act, provision was made to spread the sale of timber from trees planted to provide shelter or to prevent erosion, upon application made in writing within 12 months of the end of the income year in which the sale was made.

The income may be spread over the year in which the sale is made and in subsequent years not exceeding four. The Section also provides that any apportionment so made may be cancelled by the Commissioner at any time and the balance of the amount not assessed, assessed as income in the year in which the cancellation was made. Apportionments would not be cancelled in the case of a farmer continuing in business but should the farm be sold, the balance of the income from the sale of trees would be treated as income of the year in which the farm was sold.

Wages Tax

Complaints were received by the Department from time to time that farmers found it difficult to keep up-to-date with their wages-tax payments. Although the regulations provide that wage tax deducted from wages paid, should be accounted for within a period of three days from the time the wages are paid, a general extension was granted to farmers enabling them to pay within 14 days of the date of payment of wages. Even with this extension, farmers maintained that a substantial amount of work was involved in the payment of wages tax. In order to obviate some of the detailed work necessary, the Department now permits farmers to lodge an advance payment for wages tax. The system briefly, is that the farmer calculates the amount of wages tax due for a given period and lodges a payment to cover the estimated amount of tax. At the end of the period, the farmer would ascertain the amount of wages tax due during the period and make payment in the ordinary course, the advance payment being retained by the Department to cover the tax due for the next period. Farmers desiring to take advantage of the scheme should make application to the Superintendent of the Branch in which their returns are filed. Such application should state the period for which it is desired to pay wages tax in advance and also the amount of wages that it is expected would be normally paid over those periods. Applications will not be approved for periods of less than three months and it is preferred that they should be at least six-monthly periods. On receipt of the application, the Superintendent will advise the farmer of the amount that will be expected as an advance payment and this amount should be forwarded to the local Branch of the Department together with Form No. 169 which is certificate of wages paid and he should mark the form "Advance Payment."

These are some recent alterations which have been made in the
law and the practice of the Department, with a view to easing the burden on the farmer taxpaying community.

In conclusion, I would suggest that if any of you have matters on which you are not clear, you should consult the taxation department officers in your districts, who, I am sure will be only too willing to give you any advice on taxation matters.

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Mr T. E. Rowlands, Ohoka: Is it possible to form our farms into a company?

Mr Rowntree: Any farmer can convert his business into a company. The company would have to be registered and the assets transferred. Transfer of stock would have to be at market value (the vendor may have to pay additional tax on this account). Annual accounts would have to be prepared. My advice would be to consult a solicitor, who would prepare a Memorandum of Association and also Articles of Association. I would point out that a farmer could also form a partnership, giving his sons a share.

(Full details of these methods will be found in Mr Peryman's paper.—Ed.)

Mr A. B. Struthers, Timaru: Who and who are not contractors when it comes to a question of paying wages tax?

Mr Rowntree: Normally the farmer is liable to deduct the wages tax, but if the contractor supplies labour and plant, the farmer would not be liable to deduct wages tax. A contractor may obtain from the Department a certificate indicating that he is declaring his income for social-security-charge purposes and production of such a certificate by a contractor would relieve the farmer from the liability to deduct wages tax.

Mr A. C. Hurst, Papakaio: Who pays in the case of a man contracting to cut firewood?

Mr Rowntree: If the contractor brings a power saw for which he would incur running expenses, we would regard him as a contractor and liable to pay the tax.

Mr Cavanagh: Would Smith and Jones, if they formed a partnership, have to pay on the total income or would they split up the income and pay individually?

Mr Rowntree: They would divide according to the agreement and their incomes would be assessed separately. The partnership would have to make returns but would not itself be liable for tax.

The Chairman: Would you say a word about shearers' wages?

Mr Rowntree: Shearers are allowed a deduction of 10 per cent. for shears, combs and cutters if such are supplied by the shearer. If food and lodging are provided by the farmer, the value thereof is also subject to wages tax.

Drovers are allowed a deduction of 33\(\frac{1}{3}\) per cent. for expenses while they are droving and farmers are required to deduct wages tax on only 66\(\frac{2}{3}\) per cent. of payments made to drovers. If employed on mustering for a period not exceeding fourteen days, a similar deduction would be allowed.
Musterers are allowed a deduction of 20 per cent. and drovers employed as musterers for periods of over fourteen days are allowed the same deduction in lieu of 33\% per cent. allowed when droving.

Mr Finch: A farmer has a flock on which the standard value is £1 per head. He buys a valuable ram. What is the Department's attitude to its value?

Mr Rowntree: If it is a valuable ram, say, 100 guineas, it should not be included with the flock sheep at £1. It should be included at its proper value and we would allow him to write it down each year.

Mr Cavanagh: Considering depreciation.—Suppose a tractor was bought 10 years ago for £500 and is now written down and sold for £500. What does the Department do?

Mr Rowntree: Normally we would assess the depreciation recovered in the year of sale, but if the taxpayer desired, we would go back and disallow the depreciation written off until the profit on the sale was extinguished.

Mr Finch: A tractor is purchased for £500, used for two years and sold for £700. I assume the £200 profit will be treated as capital and not subjected to tax.

Mr Rowntree: That is correct.

Mr Cavanagh: Couldn't a new tractor be considered as an expense item and the total amount deducted, as is the case with seeds and manure?

Mr Rowntree: I can't concede that it should be. Seeds and manure are used in one year—a tractor lasts for many years and depreciation is allowed.

Mr H. G. Pinckney, Invercargill: If a farmer bought a team of horses for £500 and sold later for £700, would that £200 profit not be capital?

Mr Rowntree: No. It would be assessable because livestock are stock in trade.

Mr Cavanagh: Has the farmer the right to alter his balance dates?

Mr Rowntree: We prefer dates as near March 31st as possible, but we will look carefully at any requests for a change.

?: I cleaned a drain and the total amount was deductible. I cleaned a creek and only £200 of the total was deductible. On what basis was the differentiation made?

Mr Rowntree: We'd come and have a look and decide on the spot.

Mr W. G. Lill, Loburn: Why is an agricultural contractor not allowed the initial depreciation of 30 per cent.?

Mr Rowntree: An agricultural contractor is not a farmer and the Act states that the allowance is limited to farmers.

Chairman: Regarding trees. I understand that if a man bought a farm ten years ago with trees ten years old and he now mills them, half the proceeds are classed as capital and half as income. Now, in one case I know, the trees are at least 50 years old, but it is not possible to prove when they were planted. Who makes the decision?
Mr Rowntree: The valuing of trees is arbitrary. We would accept an approximation. Assuming that the trees had been owned for ten years and were approximately 50 years old, it would not follow that only one fifth of the sale price would be considered as income; the increased value of timber would also have to be taken into account.

? : How about the dissolution of partnerships? Who pays the tax in the case of brothers just dividing the sheep and plant?

Mr Rowntree: On dissolution of a partnership, market values would be required. This is one of the occasions on which the Commissioner requires true values in terms of Sec. 16 (9), Land and Income Tax Amendment Act, 1939.

Formerly, assets other than stock could be transferred at book value, but since the passing of Sec. 10 of Finance Act (No. 2), 1948, the Commissioner may determine values of assets if he considers them inadequate and fix values at ruling market value.

Mr Cavanagh: All farmers should buy the "Guide to Taxation" produced by the Income Tax Department and obtainable from any bookshop for a few shillings. It would save a lot of time and money if the Department provided each farmer with a copy.

? : A farmer bought a tractor at £250 and spent £400 in repairing it. How would you regard that?

Mr Rowntree: The £400 would be capital expenditure.

Mr A. C. Hurst: Regarding deferred maintenance:—Supposing a man can't spend it now. How can he get his money out and yet avoid tax?

Mr Rowntree: I am not here to tell you how to avoid taxation. You can take a certain amount out each year but if the maintenance work cannot be done I am afraid you'll have to pay tax on the amount.

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TAXATION AND ITS EFFECT ON PRODUCTION

A. B. Struthers, Farm Accounting Association, Timaru

It is generally agreed that the standard of living of the people of New Zealand, which is recognised as one of the highest in the world, depends not only upon the maintenance but also the increase of our volume of production.

A great many factors influence production in New Zealand, particularly that of the farming industry, which is the subject of our discussion, and taxation is definitely one of them. To quote from the report of the Taxation Committee published this year: "Taxation shares so substantially the rewards of production that the extent and weight of such sharing can and does operate in many directions as a deterrent." I think we should accept this statement. Despite this, however, the volume of farm production in New Zealand has increased.
Now let us examine the factors which affect farm production, which are so inter-related that it is difficult to pin-point any one of them as the main factor in influencing production. These can be summarised as follows:

1. **Prices.** The steady increase of the prices of our main products, particularly meat and wool has made it possible for farmers to show, in the main, a substantial increase in net profit. As a result of the higher prices, taxation is a matter of greater concern to the individual.

   One of my farmer friends said to me recently that when his income was £200 per annum he had no worries over taxation, now that it was £2000 he found that he was spending sleepless nights worrying about his taxation obligations.

   With more money available farmers have been able to build up the fertility of their land by various means, which have had the effect of reducing their immediate taxation liabilities.

2. **By the use of fertiliser and lime.** The latest available figures show that there is a substantial increase in the acreage of grassland which has been top-dressed with fertiliser and lime.

<table>
<thead>
<tr>
<th>Year</th>
<th>Lime Production</th>
<th>Fertiliser Figures</th>
</tr>
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<tbody>
<tr>
<td>1947</td>
<td>4,260,000 acres</td>
<td>4,260,000 tons</td>
</tr>
<tr>
<td>1948</td>
<td>4,684,000</td>
<td>2,893,428 tons</td>
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<tr>
<td>1949</td>
<td>5,062,000</td>
<td>672,000 tons</td>
</tr>
<tr>
<td>1950</td>
<td>5,738,000</td>
<td>429,000 tons</td>
</tr>
</tbody>
</table>
Agricultural Tractors 1930 — 3,891  
1935 — 5,349  
1940 — 11,278  
1946 — 18,940  
1950 — 34,683  

Shearing Plants 1930 — 7,894  
1935 — 8,174  
1940 — 10,634  
1946 — 13,544  
1950 — 18,756  

Milking Machines 1948 — 33,461  
1949 — 34,114  
1950 — 36,316  

In the type of machines 1947 — 1,430  
for threshing wheat or oats, header harvesters 1949 — 1,839  
are quoted as  

Total header harvesters 1950 — 3,130  
Total haybalers and Pressers 1950 — 4,296  

These figures will demonstrate what you have been able to purchase out of your increased returns.

The third factor affecting production is the availability, the quality and the price of labour. Quoting again from the Taxation Committee’s Report: “Workers engaged on the land have been greatly reduced in number, they were in the vicinity of 10 per cent of the population in the decade 1926-1936 and now are about 7.5 per cent. There is no doubt that if more labour and materials were available farm production could be further increased. Another factor over which farmers have no control is of course, weather conditions. Another intangible factor is the human element and the will to produce, and it can be said with confidence that the increase in the overall volume of production of New Zealand proves that the majority of farmers are alive to their responsibilities.

Now let us link up these factors with taxation. I am quite sure that a purely academic discussion is not of very great interest to you and I intend first to discuss the ways and means by which farmers have, under existing rates of taxation, shall we say, postponed taxation and at the same time built up their assets and production to the advantage of themselves, in particular, and the nation in general.

First, by the use of fertilisers, lime, good quality seeds (both agricultural and pastoral), improvement of the quality of their stock, maintenance of fencing, buildings and modern plant, progressive farmers who are awake to the possibilities of the position have been enabled to build up a reserve in their farm, which, in effect, has become their bank and which will stand them in good stead in the event of any recession in prices.

Recent taxation amendments have also enabled farmers to hold a reserve in other ways. During recent years quite a number of farmers have taken advantage of the opportunity of setting aside a
tax-free reserve in a deferred maintenance account. While this is taxable as income, when it is brought back into the accounts if it is used with discretion it can prove to be a very valuable reserve.

As you are aware this deferred maintenance concession was introduced at a time when labour and materials were in very short supply. Because farmers were unable to spend the money on essential maintenance, their incomes were unduly inflated and their surplus was not a true surplus. The money for this account had to be lodged with the Government, free of interest, but should only be withdrawn when maintenance work is contemplated and the expenditure will then help to offset the income.

The Wool Retention Reserve is sound economics, both from a national and an individual point of view. In those cases where farmers have been contemplating selling and retiring I have strongly recommended the retention of the full 50 per cent in the Reserve Account which spread over five years is beneficial from the tax point of view when the incomes are reduced to interest and rent received from their savings.

During the last two years farmers purchasing new plant have been enabled to take advantage of initial depreciation of 30 per cent on new farm cottages and new plant. I am convinced that if our production is to be increased, the ultimate solution of our farm labour difficulties is the provision of good-standard accommodation for married men. This concession of the 30 per cent initial depreciation is being taken advantage of for this purpose and it should ultimately have a beneficial effect on production.

Farmers who have not taken advantage of this initial depreciation can claim special depreciation of 30 per cent spread over five years at the following rates, 10, 8, 6, 4 and 2 per cent in addition to normal depreciation.

As far as plant which may be sold at a later date is concerned, this depreciation should be used with discretion. In a year similar to the last where incomes were unduly inflated by the high price of wool, full advantage was, in most cases, taken of the initial depreciation.

Where plant was sold at above the written-down value, excess depreciation claimed has to be written back. This can be assessed to the years in which it has been claimed, so when the income is not unduly high where the plant has been substantially written down it would probably pay not to depreciate further in that year.

I have no doubt whatever that the taxation exemptions quoted have influenced farmers in building cottages and purchasing up-to-date plant.

High prices and consequent high taxation have had the effect also of inducing farmers to consider seriously the question of family arrangements with a view to reducing their taxes. This has been done in several ways:

1. By means of service agreements, whereby sons and/or trusted farm employees are taken in as partners on a profit-sharing basis.
2. By means of bonus and wage payments, based on net returns for the year.
3. By converting their holdings into private companies.
4. By the establishment of family trusts.
In these cases it can reasonably be assumed that with the additional incentive to production, the volume of production has been increased. Perhaps also the infusion of new blood into management has had a beneficial effect.

Finally the amendment to the Income Tax Act providing for an allowance for specified developmental expenditure up to £200 per annum for water supply of stock is a further inducement to farmers to improve their farms and increase their production, and in my experience this concession is being made use of.

Summing up this side of the case it has been proved that where those means have been pursued by farmers whose capital position has enabled them to adopt them, we have seen a substantial increase in the volume of production, a reserve created in the land and an increase in the real capital of the farmer, despite heavy taxation. There are farmers present today from South Canterbury who have proved this contention. Let me say again that this is a national gain.

So much for the credit side of the ledger. Now let us look at the debit side.

High Rate of Taxation. The London Economist recently made the following statement: "Every Economist—indeed every person of commonsense—knows that there is some fiscal plimsoll line beyond which the economy cannot safely be loaded and it cannot be far from 25 per cent." In 1949-50 the New Zealand total taxation, including local authority taxation, was 34 per cent of the national income. The high level of Government spending, with its resultant taxation and borrowing, has been the most important controllable factor. To spend and to tax even higher in peacetime is drawing away and consuming what should be used for strengthening and developing the economy.

While many farmers have done what they can under existing conditions, they feel that their efforts to improve their position could be naturally assisted by a reduced level of taxation. This would involve the Legislature in a critical review of the existing expenditure of Government funds, particularly a review of the ever-growing burden of social services. The position could easily be dangerous if a recession in our overseas prices occurred and this recession need not be very drastic. Perhaps the effect of this high taxation in limiting the purchase of capital improvements, thereby retarding production, is most obvious in those cases of farmers who have recently taken up farms, purchasing at a high price their land, stock and plant, and leaning heavily on some lending institution for the necessary finance. Their first concern is to reduce their liabilities to a safe level which in most cases is a slow process after taking into consideration their taxation liabilities. This tends to reduce their expenditure on essential development work and has the effect of curtailing a maximum effort of production. To illustrate my point, I discussed this question with a young farmer recently established, and he pointed out that if he could purchase certain essential plant, and erect further sub-division fences, his carrying capacity could be increased by 30 per cent but because his reserves were so slowly being built up after taxation, he could not see himself in the position to afford the money for a period of another five years. There must be quite a large number of farmers in this position.
The Question of Standard Value of Stock. Recent high prices for stock have paradoxically accentuated the problem of those older farmers who would normally retire, but owing to the incidence of taxation on the difference between the standard value of their stock and market values, and the fact that present prices allow them to continue to make a reasonable income without undue effort, they have naturally continued farming. Many of you must know of farms in your own district where such is the position and where production could be increased. This raises the very important question of dealing with farmers' permanent flocks as capital. This question was well ventilated by Federated Farmers and the Breed Societies when they presented evidence to the Committee of Investigation on Taxation. It has been stated that the 1949 amendment to tax law, allowing the excess amount shown on realisation or death to be spread back over three years, is merely a palliative and does not deal with the fundamental problem involved in the present taxing method.

It was made abundantly clear to the Committee that the present system has operated most harshly, particularly over the recent period of high prices. Where death occurs the situation has not been avoidable.

In the case of estates, the danger of crippling income tax, death and succession duties as far as production is concerned must be obvious particularly as it affects high country runs. I am aware of cases where properties of this type would have to sell their stock to pay the tax dues, and it could easily happen that such properties could be abandoned unless sufficient capital could be found (which is not easy) and farmers with the knowledge of high-country farming which is an essential. A combination of the two is still more difficult to find.

Where estates have to be carried on with little cash reserves, the same position regarding production would apply as with those farmers who today are under-capitalised.

The Taxation Committee's recommendation on the question of dealing with farmers' stock as capital is as follows:

"The Committee recommends the adoption of the principle that taxable income from livestock is the net annual production from that livestock, and accordingly that the basic flock or herd be treated as fixed capital. The basic flock or herd shall be that livestock which is normally wintered."

I have been advised that something will be done about this recommendation and also regarding the question of death and succession duties.

High-Country Production. One of the principal recommendations submitted in the report of the Sheep Farming Industry Commission regarding maintenance of production on high-country runs affected by snow losses was the provision of adequate reserves to meet snow losses. The taxation committee's recommendation is as follows:

"That legal provision be made to enable the Commissioner of Taxes on application by a high-country pastoralist involved in a heavy snow loss, to re-open assessments, write back the loss over the previous five years' incomes from the property and make a refund of tax or grant to the pastoralist so involved." If this proposal is adopted it should be of material assistance to the high-
country farmer to assist him to replace his stock losses and rebuild his production.

Lastly, but by no means least in the question of production we come to the question of the will to produce, and the psychological reaction of the farmer to high taxation. It would be unjust to suggest that farmers generally are deliberately "sitting back in the brickeien" because they can make a comfortable living the easy way without undue effort and because taxation makes it "not worth their while" to put in an extra effort. The increased volume of production is sufficient reply to this accusation. We would, however, be blinding our eyes to facts, if we did not recognise that a small proportion of farmers, because of taxation, are adopting this policy. We know of course, that this attitude is not confined to the farming community only. We have heard at question time over the radio, at meetings and in private conversations, this point of view expressed. What is our answer? Apart from the ethics of the case, from the individual's point of view, I consider it bad economics deliberately to restrict production. So many variable elements come into the production of farmers' incomes, some of which are beyond the control of the farmer, such as prices and weather and disease, that such a policy could be disastrous. In the last year we have seen a drop in wool prices and a reduction in the value of the lamb and sheep prices, coupled with a dry season which has naturally reduced farmers' incomes. Many farmers relied on current incomes to pay for last year's tax obligations which were substantial and today they are finding difficulty in meeting their taxes, even in some cases having to ask for postponement. If they had deliberately restricted their production the position could be worsened, and it is also a fact that it is usually a long-term policy to rebuild production. In this regard also I would ask you to note again the earlier part of this talk dealing with the building up of farm assets. From the national point of view, the policy is equally reprehensible. The high standard of living we enjoy is dependent on our production. As far as farm production is concerned, no one can deny that Britain badly needs our meat and dairy produce, and despite the recent criticism of the Meat Agreement, we should never lose sight of our obligations to her.

Lastly a policy of restricted production is contrary to the traditions of the true farmer. As the trustee of the land he occupies, he has an obligation to maintain the fertility and productivity of the land, and at the same time it is his job in life to produce to the maximum, consistant with this policy of conserving fertility, those essential foodstuffs which we as a nation require and which to an even greater degree our kith and kin in Britain require, more.

It is our duty to point out those factors which tend to restrict production to the authorities in power and endeavour to rectify them, but those are no excuses for deliberately restricting production.

Mr J. H. Grigg. The Prime Minister has appealed for more production. It seems from your paper that the two chief hindrances to this increased production are the standard value of stock and the sliding scale of taxation. Which would be the more important?

Mr Struthers: On recently-established farms, high taxation is detrimental to production in that it prevents the building up of the
capital so necessary for further development. As regards standard values these do not affect the production of a going concern but when a farmer dies, the liquid reserves may be exhausted to such an extent that further development is prevented.

Mr B. W. Mulligan, Clandeboye. Taxation is too complicated. Would there not be an over-all gain if all farm expenses were deductible? We can claim for hay covers indefinitely but not for a new hay barn. Why can't we claim also full tractor costs?

Mr Struthers. Farmers are only one group, but all sections of the community are subject to tax. I am not sure that it would be to your advantage to be able to claim the full value of the tractor. As regards buildings what about the manufacturer who goes in for a building programme? He'd want to claim it too.

Mr Little. Farmers are always being told they are custodians of the soil. They are also custodians of their industry. Taxation has gone too far on farms. The national asset is being milked dry to a greater extent than is safe and that is revenue that could have gone back into the land. We would prefer to be permitted to put up our own houses rather than have them built by the State Housing Department.

Mr Finch. As the occupier of a national asset, the soil, with a moral obligation to produce, I consider the farmer would be right in claiming differential taxation treatment. In England farm taxation has been raised above party politics. For instance death duties levied on farm assets are reduced by 45 per cent. I think the public should be educated in the idea that the farmer should be treated differently provided he lives up to his moral obligation to produce.

Mr Hilgendorf. We must be careful in this matter of differential taxation. If we have a good time under one government a different government may "soak us." I think the large increase in production in England is due to high prices. I don't think the concessions in tax there have been entirely to the good of the farmer. The rest of the population are against him because he is treated differently.

Mr V. W. Wilson, Taiko. Do you think that if the sliding scale were increased from £3800 to £6800 it would give increased production?

Mr Struthers. It may, but let's look at the figures for a normal year, 1950. Of 401,000 taxpayers, only 904 were above £4000, and these were not all farmers. Not much more than 2000 of all taxpayers were above £3000 assessable income. In the normal year I don't think the sliding scale can have much effect on production.

Mr A. M. Carpenter, Fernside: I think we could produce more if the penal clause were lowered in the case of extra production.

Professor Flay. Mr Struthers does not think that farmers as a class are reducing their production because of tax. I agree, but I would suggest that tax may indirectly be affecting production. To get more production we need more grass so that we can get more livestock products. This may involve reploughing. It may involve aerial top-dressing. I pose you the question "What would be the effect on production if the tax due were reduced by the amount the farmer spends on improving his grass?"
TAXATION AND ITS EFFECT ON PRODUCTION FROM THE FARMERS' POINT OF VIEW

T. A. McKellar, Pigeon Bay

Taxation and its effect on production is a very controversial subject and what I have to say may bring down a storm of abuse upon my head. However, no criticism could hurt any more than the blows which the Commissioner of Taxes deals out annually. Some form of taxation is necessary to obtain the revenue for the running of the country, but when the level of taxation goes beyond the 50 per cent. mark then it has a very marked effect on incentive. I am not an economist, nor do I propose to deal with the subject from that angle. Likewise, I am not an accountant. Thus the views which I put forward are purely personal.

For the purposes of this discussion I have divided the different forms of taxation into the headings—

(A) Indirect taxation.
(B) County taxation.
(C) State taxation.

Indirect taxation covers all those forms of taxation such as sales tax, housing tax, customs and excise duties and other levies, all of which tend to make the cost of goods and materials higher. In-so-far as they effect goods needed for repairs and maintenance or for the normal running of your farm, the cost is a deductible item and therefore cannot be held to have a very pronounced effect on production.

It is true that the high cost of artificial fertilisers or wire, for instance, may discourage their use to the detriment of production. Especially is this true where the level of taxation is low and the benefit of offsetting the cost against taxable income not so marked.

County taxation covers rates levied by County Councils and other local bodies such as Catchment Boards, Hospital Boards, and Rabbit Boards. Due to higher wages and our luxury standard of living these rates and levies are in most cases up to the maximum limit. Thus a considerable sum of money has to be devoted to meeting these calls before any profit can accrue to the landowner. County rates are mostly levied on capital value and therefore penalise the progressive farmer as against the sloth. Many farmers hesitate to undertake improvements which would help increase production because they will incur higher valuation for improvements and therefore a higher rateable value. To be fair, the farmer who improves his farm and thereby increases production should not be penalised by increased rates. County taxation should be on the unimproved value. All over New Zealand we see examples of bad farming. Land which was once clean, healthy country is so distressingly often covered with weeds, such as gorse, broom, fern, or scrub today. A brief glance at the hills from Cashmere to Gebbies Valley and beyond will show you what I mean. Farmers with properties like these are not carrying their fair proportion of county taxation and so the burden falls heavier on the farmers who do try to keep their farms up to the
highest possible standard. County taxation leaves a great deal to be desired; it falls far short of being an equitable form of taxation. Again, however, it can be offset against income and so cannot be held to affect incentive to produce.

When we come to State taxation, however, we find that a different state of affairs exists. Land tax, which costs as much to collect as it yields in revenue, is a tax which has outlived any useful purpose which it may have had in the past.

Income tax has reached an absurdly high level. In fact today it amounts to extortion. At this high level it plays a very significant part in retarding production. With income tax reaching the maximum level on an income of £3800 it means that from that figure upwards of every pound you earn the Government takes approximately three-quarters. Thus we find a tendency amongst producers to balance their production against their taxation.

If your farm will produce sufficient to give you a comfortable living and three meals a day it is not very likely that you will work longer hours, drain more out of your land, and strive for higher production when you know that you will be left with only one quarter of the value of all that extra production.

I have no quarrel with income tax on a reasonable level. It is fair and equitable that according to your ability to pay so you should be taxed to a level which will not kill incentive and stifle production. I do contend, however, that income tax in this country has reached the level at which it is retarding production. To encourage increased production of primary products some incentive must be given to the farmers. We do not farm for patriotic reasons alone; in fact the patriotic appeal has been vastly overdone. Some incentive, such as a larger retention of the fruits of harder work is the only appeal which will carry any weight with thinking farmers.

For the purposes of illustrating the effects of direct taxation six sheep farmers have been assumed as having, before undertaking increased production, taxable incomes of—

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<table>
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<tbody>
<tr>
<td>(A)</td>
<td>£1000.</td>
</tr>
<tr>
<td>(B)</td>
<td>£1500.</td>
</tr>
<tr>
<td>(C)</td>
<td>£2000.</td>
</tr>
<tr>
<td>(D)</td>
<td>£2500.</td>
</tr>
<tr>
<td>(E)</td>
<td>£3000.</td>
</tr>
<tr>
<td>(F)</td>
<td>£3800.</td>
</tr>
</tbody>
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Let it also be assumed that—

(1) They each decided to increase their flocks by 100 two-tooth ewes.
(2) That these cost £5 per head.
(3) That the farmer’s financial year is 30 June and that standard values for balance purposes are £1 each.
(4) That wool returns 40d. per lb. and each sheep produces $\frac{7}{4}$ lb. wool.
(5) That they get 100 per cent. lambing and the lambs are sold for £2 each.
(6) That each sheep raises 4 lambs.
(7) That after the fourth lamb the sheep are sold for £1 each.
(8) That the above conditions and taxation rates remain stable over four years.
The annual income from each 100 ewes purchased will be:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td>Wool, 750 lb at 40d.</td>
<td>£125.00</td>
</tr>
<tr>
<td>Lambs, 100 at £2</td>
<td>£200.00</td>
</tr>
</tbody>
</table>

325.00

Let it be further assumed that the only additional labour and direct expenses for shearing is 9.00

This will then leave a balance of 316.00

On average the cost of shearing and wool packs was last year substantially above the £9 now allowed, but with a 40d. average for wool, shearing and shed hand wages will show a considerable reduction.

Over four years at £316 a year each farmer would receive an additional farming income of £1264, but against this there is the depreciation of £400 on the value of his sheep, i.e., the net additional farming income before the application of tax is £864.

Let us now see what happens from a taxation point of view to this £864 with each of our assumed farmers. Current rates of tax have been taken and the figures include both income tax and social security charge.

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Taxation Take</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>£1000</td>
<td>£337 (39%)</td>
<td></td>
</tr>
<tr>
<td>£1500</td>
<td>£397 (46%)</td>
<td></td>
</tr>
<tr>
<td>£2000</td>
<td>£454 (52%)</td>
<td></td>
</tr>
<tr>
<td>£2500</td>
<td>£514 (59%)</td>
<td></td>
</tr>
<tr>
<td>£3000</td>
<td>£570 (64%)</td>
<td></td>
</tr>
<tr>
<td>£3500</td>
<td>£650 (75%)</td>
<td></td>
</tr>
<tr>
<td>£4000</td>
<td>£730 (82%)</td>
<td></td>
</tr>
<tr>
<td>£4500</td>
<td>£810 (87%)</td>
<td></td>
</tr>
<tr>
<td>£5000</td>
<td>£890 (92%)</td>
<td></td>
</tr>
<tr>
<td>£5500</td>
<td>£970 (96%)</td>
<td></td>
</tr>
<tr>
<td>£6000</td>
<td>£1050 (99%)</td>
<td></td>
</tr>
<tr>
<td>£6500</td>
<td>£1130 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

Of the total additional £5184 received by these six farmers, taxation takes £2922 (56.37%) or 11/3d. in each £1, and the farmers are left with £2262 (43.63%) or 8/8d. in £1.

It would, I consider, be true to say that under the conditions stated above a return of £316 from £100 ewes would, on average, tend to be the maximum that could be expected. The only additional cost taken to account has been the shearing charges; nothing, for example, has been allowed for deaths, and some increase in charges generally might be expected. Such expense would reduce taxation but they would also reduce the net return to the farmer.

From the above figures it is between £1500 and £2000 of taxable income that the stage is reached where taxation takes more than 50 per cent. of additional production, and this is so no matter what form the additional production takes, whether it is from sheep, dairying or agriculture.

Under normal farming conditions sheepfarmers will carry on their land that number of sheep, which, from their experience, they know to be its optimum carrying capacity. To carry more and keep their land in good heart means some alteration in farming practice, and probably expense. Can it be wondered then that, with the high rates of tax ruling, farmers, after weighing up the position, decide against taking additional responsibility and risk, and in favour of keeping their land in good heart against the time when less favourable conditions will prevail.

Then when you have given up the unequal struggle against the
trials and tribulations that beset a farmer the State has one last cruel blow which it deals out. I refer to estate and succession duties commonly known as death duties. By means of death duties the State assures itself of at least a half share of the results of a lifetime's work. All too often we find that death duties cripple and impoverish an estate to such an extent that its future production is very adversely affected.

That there is a need for increased production of meat cannot be questioned. Both Australia and the Argentine have run into serious production difficulties, particularly with beef. With a series of droughts in the latter country it has been estimated that since 1949 the number of her beef cattle have declined by 10,000,000 head, and the opinion put forward that it is unlikely with continued increasing population Argentine will ever recover her position as a major exporter. Meatless days have been introduced there from which it is hoped to save some 250,000 tons of meat and thereby endeavour to ensure that exports can be maintained at approximately last year's level.

A market exists for all the meat we can produce. We can increase production and New Zealand as a whole would benefit by such an increase; the only thing lacking at the present time is the incentive and until the incentive is there in some form or other there is unlikely to be a general wholehearted effort and acceptance of the attendant risks which increased production entails.

Mr M. B. Cooke, Lincoln College. Much has been said on the question of standard values and treating flock as capital. Mr McKellar's example would have been worse if the stock were treated as capital. This matter is like a two-edged sword and you might have to die to get any advantage.

Mr T. E. Rowlands, Ohoka. The biggest weakness as regards more production is the independence of the New Zealand farmer. He is loath to accept direction. I would like to ask if Mr Struthers thinks we'd be prepared to accept direction on a national scale as they do in England. We couldn't do it during the war here.

Mr Struthers. In the war we realised that some farmers were not producing to the maximum, but in our production committee we felt that farmers generally were better able to decide their method of farming than outsiders.

Mr Rowlands. If you tried compulsion here you'd have to devise a new method to suit the local temperament.

Mr Hurst. New Zealanders are independent and proud of it. Most people can easier be led than driven. You will get further by showing that increased production can be profitable at the same time as it builds fertility.

Mr King. I don't think the question of taxation is as important as the will to produce.

? I wonder what real benefit we farmers get from all these exemptions. The money is paid by the rest of the community and then it is put on to us in another form. I would suggest that
some relief should be given by lowering the starting rate of income tax. This would be of benefit to all.

Mr R. J. Nell, Ashburton. Lack of capital is the problem of the new farmer. Money to buy lime and machinery. Taxation affects his production. Cheap money may be the answer.

Mr Little. One of our problems is that in the retention pools there are 70 to 80 million pounds drawn from the farming economy. This should have gone back into the land.

Mr Cavanagh. Prices are at the bottom of the trouble, not taxation.

Mr A. Baker, Waiau. I am anxious that the feeling should go from this meeting to the outside world that we are farmers, with the honour and pleasure and privilege of being farmers. Taxation is important but not the only thing.

Mr Grigg. On farms which are producing well, further production is undoubtedly hindered by present taxation. In England prices are raised by subsidies. I think we should avoid that method and look for other ways to overcome the problem.

Mr H. E. Garrett, Lincoln College. I think that the lack of prices to the farming community has a great deal to do with the lack of expansion in our primary production. The prices we have received for our produce, with wool being the exception, in the last two or three years, have been far below world prices. It is highly desirable for us to keep our economy as stabilised as possible and have only a small measure of inflation each year rather than a large measure as they have had in England, U.S.A., and the continent. The only way in which those two aims can be merged is by a very appreciable alteration in our exchange rate.

Mr Mulligan. When we are asked to increase production, any taxation on enterprise should if possible be removed. Any legislation that prevents development work should be corrected if possible.

General Barker. Reference has been made to the 40-hour week. When you are talking about production on a farm it does not apply because we work more than a 40-hour week. If we are going to have equal taxation with the rest of the community surely we should have an equal effort to produce. If we are going to work long hours and going to achieve a bigger production, then surely the rest of the country might be asked to make a small effort to contribute towards that. When the 44-hour week was repealed it was a temporary measure to increase production.

Chairman. If this burden of taxation is too great for us, we will presumably in large numbers be driven to some sort of action like company formation. Is that not in a sense a national evil? And in any case if that is going to reduce taxation personally, it will surely mean that the Government will have to go some other way or put up the scale.

Mr McKellar. I think you are very right. I think it is to the national detriment that farmers should be forced into the formation of companies to reduce their taxation.
HOW TO ALLEVIATE THE HIGH COST OF DYING

N. M. Peryman, Dunedin

This is a topic which is much to the fore today and being of a contentious nature, one can only deal with the question lightly and in wide terms.

I will, however, in the time available endeavour to cover the field of the principles involved, their advantages and disadvantages, along with a few simple practical examples.

No one is bound to leave his property at the mercy of the revenue authorities if he can legally escape their grasp. However, contravention of the laws of death and gift duties is punishable by terms of imprisonment or heavy fines.

Naturally there is no easy way out as most of the loopholes have now been too tightly sewn up. One often hears of some shrewd scheme in operation to avoid taxation, but too often it will not hold water, and in event of death, the Revenue Departments are likely to put their fine comb through things and void or reopen all past transactions. The attack may come from the Commissioner of Stamp Duties or from the Commissioner of Taxes or both.

The taxpayer is wise to avoid schemes which are not based on settled law as the Revenue Departments have a habit of taking all doubtful cases to the courts and the taxpayer or his estate might easily become involved in expensive litigation to establish the law. The following are legal methods available:

1. Gifting.
2. Settlements or Trust Formation.
4. Partnership.
5. Profit Sharing.
7. Life Assurance.
8. Judicious framing of a Will.

Normally it comprises a combination of three or four of the above methods.

The main stumbling block today is the high income tax involved should any method require the revaluation of stock and plant.

One also must remember that the Commissioner of Taxes has power to require a farmer taxpayer to adopt market values instead of standard values for livestock, at any time, and should one appear to overcome this problem by some scheme, he has power to exercise his over-riding discretionary powers and make everything very awkward as legal arguments with the Commissioner of Taxes are rarely worthwhile. He is not concerned with what is morally right in the interests of production or future generations. His duty is to collect taxes according to the law, and, as everyone knows, is an expert at his job.

Sale of property to a company, trust, or an individual and immediately leased back again by the vendor does not constitute a
disposition of stock and meets with the approval of the Commissioner of Taxes.

Before a start is made on the methods, one should know how to calculate the duties payable under one's estate.

The following form is very convenient, concise, and easy to follow.

METHOD OF CALCULATION OF DUTIES PAYABLE UNDER A FARM ESTATE

(a) Valuation of Estate:

**ASSETS:**
- Land 1500 acres at (say) £... per acre . . . 20,000
- Stock at present-day value (say) . . . 9,500
- Plant (say) . . . 500
- Life Assurance . . . 5,000
- Other Assets (shares, etc.) . . . Nil
- Cash . . . Nil

**LIABILITIES:**
- Mortgage on land (say) . . . 10,000
- Advances against stock, etc. . . . Nil
- Other liabilities . . . Nil
- Income and S.S. tax . . . 3,544

(Net value for death duties) . . . 35,000

(b) Death Duty Payable:
1. Estate Duty—based on net value of Estate—Rate 19%

2. Succession Duty—based on value of assets left to say two sons as equal beneficiaries:
   - Bequest of £10,728. Rate 6% . . . 644
   - Bequest of £10,728. Rate 6% . . . 644
   - etc.

If the widow is left a life interest the income is discounted and succession duty paid on this sum. The corpus of the Estate is treated similarly. Normally the total amount payable is not materially affected.

(c) Income Tax:
- Actual value of Stock—as above . . . 9,500
- Less Book Value of Stock . . . 4,500

Add estimate of normal assessable income (after deduction of special exemptions (say £400)* . . . 1,000

i.e. Net Profit £1400

Total Taxable Income in year of death . . . 6,000
Self £200
Wife £100
Insurance £100

£400

From tables—Tax on first £3,800 . . . 1,354
Balance @ 12/- in £ . . . 1,320
Plus 15% less £10 . . . 390
(Now Plus 10% less £15) . . . 3,064

(d) Social Security Tax:
(May or may not be payable depending on when property was acquired. Not payable if owned prior to 1930).
At rate of 1/6 in £ on assessable income including any special exemptions (say £400) i.e. on £6,400 . . . 480

Total Duties payable by Estate . . . £8,908

Note: Where the assessable income has been low in the preceding three years before death the excess income in year of death may be spread over the three years.
In some cases a considerable tax saving may be obtained but even so the tax would still be very high.

Any life assurance company or trustee company will supply tables as to death duties, succession duties and income tax payable so that one can quickly make a fairly accurate assessment of what the cost will be should one die.

What is the best method to employ? This will vary in each individual case and requires the utmost thought. A good deal will depend on whether or not one has ample time to obtain the result or through advancing age, it is important to act immediately.

1. GIFTING. This presents the only real loophole through which excessive death duties can be countered, and all people possessing reasonably large estates should take advantage of this avenue of escape. “Death-bed” gifts do not escape. Were they allowed, a very large number of estates would avoid death duties. A gift must be completed three years before the donor dies, otherwise it is brought back into the estate. The gift duty is a deductible debt in assessing the value of the estate for duty purposes and a gift made within the three years period may save a substantial sum in duty.

Important aspects to keep in mind:
(a) Gifts in total of under £500 per year are exempt from duty.
(b) The donor is responsible for the payment of gift duty but the Stamp Office can claim from the recipient.
(c) The onus is on both donor and donee to notify the department of the gifts made or received.
(d) A gift of money by cheque is not completed until the cheque has been presented to the bank for payment.

(e) Gifts in excess of £300 require donor to notify Stamp Office within one month.

(f) Gifts by mortgage—i.e., a father gives his son a mortgage of say £5000 over his property. At first sight this would appear an admirable method of unloading assets, but, unfortunately mortgages created by gift cannot be deducted as a debt from a person’s estate, and consequently normal death duties would be payable.

(g) There is some doubt if one can raise a mortgage or debt on one’s property and immediately give it away. The gift will be all right but the debt may not be recognised as a liability against the estate and interest may not be allowed as a taxable deduction. One can, however, give away all one’s liquid assets and then raise a mortgage or debt to work the property and pay taxes.

Death Duties Act, 1921, Sec. 9'-Allowance to be made for Debts. "No such allowance shall be made for debts incurred by the deceased otherwise than for full consideration in money or money’s worth wholly for his own use and benefit."

Land and Income Tax Act, 1923. Sec. 80 (I) and (H): If the amount borrowed is used to meet personal expenditure or is lost, or is used for some purpose not producing income—for example, money secured under mortgage or sub-mortgage to erect a private dwelling—no deduction of interest paid thereon may be allowed.

(h) If the subject of the gift is land, the value of the gift for duty purposes is the government valuation, but the Commissioner has the right to call for a new valuation. Land as land is not often given but is generally sold (being careful that the sale price is not less than the government value), the donor taking a mortgage for full cost which in turn is reduced in the normal way by a memorandum of reduction by way of gift.

(i) Stock if given must be assessed at full market value and donor, as well as paying gift duty on the total value, will have to pay income tax between book value and market price.

(j) Where a property has not been sold but gifted, the donor must not reserve any benefit—for instance a right to continue to occupy the property, otherwise death duties may still be payable on the amount given away. When a gift is made for the purpose of placing certain assets outside death duty, the donor must not retain any vestige of interest or benefit, and the gift must be absolute. This is a very difficult provision of the Death Duties Act and transactions coming close to it are to be carefully avoided.

(k) Tax saving by gifting. One of the main purposes in divesting assets during the lifetime is to reduce both the rate of death duties and the amount on which they are assessed. The following illustrates the advantages of such an action:
Death duty on £20,000 rate is approximately 25% or £5,000

Death Duty on £40,000 rate is approximately 39% or £15,600.

If four gifts of £5,000 each are made in succeeding years, the gift duty would have totalled £450 x 4 = £1800. This is provided, of course, that the donor survived three years from date of last gift. Assuming the deceased had survived the necessary period, the saving in duty would be £15,600, less £6,800 (£5,000 + £1,800) = £8,800. The saving would be rather better as the value of the estate would be reduced by the £1800 paid in gift duty. This reduction would save duty on the £1800 at 25 per cent. and would also reduce slightly the rate of duty payable on the balance of the estate. The making of the gifts would also of course reduce the amount of the donee’s assessable income in future years—thus effecting a further saving in tax.

It is obvious, therefore, that the aim should be to reduce any large estate down to within the £20,000 range.

Even if one does not survive the three years after the gift one still saves a good deal of death duties due to the gift duty paid being a deductible liability against estate, i.e., on a £60,000 estate left to one child.

Death and succession duties on £60,000 approx. 50% = £30,000

Gift duty as one gift £60,000 approx. 25% = £15,000

Reassessed as death and succession duties:

£60,000 less £15,000 = £45,000 at 41% = £18,450

or an extra £3,450 to pay on top of gift duty paid, and a saving of £11,550.

(i) It is safer to gift an undivided share in property, stock and plant rather than a fixed area of the property. Commissioner of Taxes in either case has power to consider the transaction involving a disposition of stock, and in case of a fixed area, will be very suspicious that the donor in future will help the donee at the expense of the remainder, i.e., “there has been a reservation of some benefit of advantage in favour of the donor”. It is settled law that a partnership between the donor and the donee does not amount to the reservation of a benefit.

2. SETTLEMENTS OR TRUST FORMATION—Surest and Safest.

Formation of Trusts is the safety device of gift transactions, i.e., owing to the frailties of human nature and the possibility of premature death of the donee, it is quite possible that in some instances, gifts intended for specific purposes could be dissipated or otherwise pass out of the orbit of the beneficiaries of the donor’s estate. The formation of a trust guards against this factor. In event of gifts being made to minors, it is, of course, essential to appoint trustee. Gifting into a trust is the safest and surest method of lowering your cost of dying.

Aspects worth keeping in mind are:

(a) It pays to gift revenue earning assets into trusts so that the administrative costs and running expenses can be met from internal income, i.e., an undivided share in property,
S. & P., a complete farm with S. & P., an agricultural contracting business, or invest the money in good shares.

(b) Income of trust—income tax and personal exemptions. When portion of a property is given or sold to a trust for child or children the father can continue to farm the property in partnership with the trust. By dividing the income in this manner the tax rate is reduced while each party receives the normal personal exemptions, i.e., each child obtains a personal exemption of £200 so that if trust was for two children the trust could earn £400 per year before paying any income tax. By this added exemption, father’s tax rate will be considerably reduced. He may, however, lose the benefit of the child exemption, i.e., £50 per child.

(c) Social security tax on income of trust. Where beneficiaries under the trust are under 16 years of age and their interest is vested and not contingent (on their attaining 21 years of age) income payable to the trust is free of social security tax. Vesting to a minor, however, could be dangerous and awkward in event of his death.

(d) How to form a trust. Before a property can be sold to a trust it is necessary for the trust to be in existence. A trust cannot be formed unless there is some gift of cash which for the practical purposes can be as little as £50. In cases where assets are being divested otherwise than by outright gift, it is desirable that the person forming the trust be other than the person who is selling land or property to the trust. As a practical example, take the case of an ordinary farmer who wishes to form a trust in favour of his children. The first move would be to lend his wife the sum of, say, £50, the loan to be evidenced by I.O.U. which could be released by gift a year later. The wife then forms the trust in favour of the children with assets of £50 and gives the trustees ample power to buy property, borrow money, lend money and farm it. She names herself trustee. The father will then sell the property to the trust leaving on mortgage the full purchase price. The wife will some time later appoint the husband as a co-trustee of the trust. After a period of, say, six months, the father gifts the mortgage wholly or partly to the trustees, and pays the necessary gift duty.

The father can, of course, make an outright gift to the trustees, but if he is going to lease it back or enter into a partnership with the trustees, an outright gift is impracticable because he is retaining some benefit of advantage in favour of the donor.

(e) Control of and cash position of properties held by trustees. Many farmers are hesitant over forming trusts as they fear that they may lose control of their farms and tie up a large proportion of their working capital. The following is the position:

Control: (i) Provided the property has been sold to the trustees and the mortgage later gifted there is no reason
why the father cannot lease the trust property from the
trustees at a fair rental, say, 5 per cent. of a recent
government valuation. In this manner the father is
able to get the land out of his name and in cases where
a capital appreciation in land values is likely, no worry
as to additional death duties will occur. On the other
hand, the father, as he still farms the whole area, is
in complete control of farming operations.

(ii) Father to sell to trust leaving cost on mortgage.
Father retains stock. Father and trust enter into a
partnership agreement whereby he receives manage­
ment reward, each interest on its capital and then divide
profits.

(iii) Method whereby father may continue to receive
whole income from farm. Assume a father sells a pro­
perty to trustees and the purchase money is left on
mortgage to the father, Trust and father then farm in
partnership. The rate of interest on the mortgage may
be low, say, 2½ per cent.-3 per cent. The Courts have
held that a mortgage free of interest is not necessarily
a gift but there are certain doubts about this question
and it is safer to fix a small rate of interest. The
father could arrange to apply all income which may
accrue to the trustees in reduction of the mortgage
given him by the trustees. Thus that portion of the
farm income payable to the trustees is separated from the
father's income for tax purposes and his rate of tax
is reduced. He still receives the actual cash each year
until such time as the mortgage is repaid but it comes
into his hands as capital and he would be able to
use the money either to build up a fund, reduce his
indebtedness, or put into the further development of
the property. In the course of time the trustees would
obtain a debt free farm without the necessity of paying
any duty.

Borrowing from trustees: When the trust is being formed
the trust deed should be so drafted that very wide
powers are given to the trustees. These powers inter
alia should allow the trustees to lend trust funds to
the father. Thus if, say, £2000 were required to erect
an additional dwelling and the trustees had this amount
of cash to their credit the father could obtain by
borrowing within the family.

Maintenance of children from trust fund: The trust deed
can be so drawn that the trustees are empowered to use
their funds to educate, clothe and even board the children.
Thus these costs would no longer be a charge against
the father's taxable income but could be debited against
the trust income which, as already shown, could be tax
free.

(f) No mention must be made in the trust deed that the funds
are to be held for payment of taxation as this would be
considered as "reserving a benefit to the donor" in which
case the trust funds would be included in the donor's estate for taxation.

(g) Trust has an income of its own right and can insure father's life for £10,000–£20,000 or more, but premiums must be paid from the trust's income and will not be exempt from income tax. Father can gift existing policies to trust at their present surrender value which would be small as compared with their death value and thus remove another asset from estate and provide beneficiaries with cash on his death. Father only retaining sufficient himself to take full advantage of income tax saving, i.e., £150 in premiums per year.

(h) Other suitable assets could be gifted, i.e., company shares.

3 JOINT FAMILY HOMES ACT

The Joint Family Homes Act contains provisions of very great importance not only to people in the towns but to farmers. The act enables a man or a wife to establish a family home of a value not exceeding £5000. The family home will belong to both husband and wife jointly and pass to the survivor on death of one of them without payment of death duties. There is no gift duty or stamp duty payable on the creation of the settlement. Therefore a man owning a home valued at £5000 can immediately transfer a half-interest in that home to his wife free of gift and conveyance duties. On his death before his wife, the remaining half-interest will pass to his wife clear of death duties. Thus a man can effectively reduce his estate by up to £2,500 with the consequent saving of duty.

The act can apply to farmers, but in their case it would first be necessary to survey an area off around the house, making certain that the total value was under £5000. Considerable thought would need to be given as to whether it was desirable or not for the homestead on the farm to be absolutely vested in the widow, as this would affect any subsequent disposition of the farm by way of sale and might result in another homestead having to be built. On the death of the widow, one homestead might then be no longer required.

4. PARTNERSHIP

That is an agreement whereby a farmer farms in partnership with his wife, sons, trust, or some other person or persons. This requires a disposition of stock and consequent added income tax to change over to this type of arrangement.

Normally each partner has a definite amount of capital invested in the property, and his share is worked out on that ratio after each has received fair wages for the effort supplied in its management. Sleeping partners only receive their share of profits in proportion to their capital. Family partnerships. In forming family partnerships one should be careful to meet the requirements of recent amendments to Land and Income Tax Act—Sec. 16—Payment of excessive salary or share of profits to relative employed by or in partnership with taxpayer, i.e.

If the Commissioner is of opinion that the remuneration, salary, share of profits, or other income payable to or for the benefit of that relative or company under the contract of employment or engagement or the terms of the partnership exceeds such amount as is rea-
sonable having regard to the nature and extent of the services ren-
dered, the value of the contributions made by the respective partners 
by way of services or capital or otherwise, and any other relevant 
matters, the Commissioner may for the purposes of the principal 
Act allocate the total profits or income of the business or under-
taking before the deduction of any amount payable to that relative 
or company between the parties to the contract or the partners or 
any of them in such shares and proportions as he considers reason-
able, and the amounts so allocated shall be deemed to be income 
derived by the persons to whom those amounts are so allocated 
and by no other person.

Main advantages being:

(a) Each partner shares in good times as well as the bad periods.
(b) Spreads the profits and keeps the rate of tax down.
(c) Enables family to build up a capital account in property. 
Family will not necessarily be paid out their share each 
year but only the bare cash for personal expenses. Their 
share of profits would be used to repay debts. By this means 
the mortgage or debt on property is gradually transferred 
from an outsider to a family liability. Spreading the tax 
enables this to be carried out fairly quickly, i.e., instead 
of owing £10,000 to some mortgagee would owe, say,

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>£1500</th>
</tr>
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<tbody>
<tr>
<td>Wife</td>
<td>Daugther</td>
<td></td>
</tr>
<tr>
<td>Two Sons</td>
<td></td>
<td>£7000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>£10000</td>
</tr>
</tbody>
</table>

(d) However, should any of his family disagree, they would have 
a legal right to claim their share in the partnership.
(e) In event of death of any member, their share in partnership 
would be subject to death duties.
(f) Farming in partnership with a trust overcomes the frailties 
of human nature and ensures that the trust has a good 
income still under command of the donor.
(g) Each member of family could have a substantial income in 
their own right whereby their father could transfer to each 
a proportion of his life policies, reduce his estate and provide 
his family with ready cash in event of his death.
(h) Each partner shares in any natural appreciation of the land 
that may take place and shares in any appreciation that takes 
place through development.

5. PROFIT-SHARING
This is somewhat similar to a partnership except that only the 
profits are divided up according to the effort and capital contributed. 
Normally no capital is contributed, only effort. This is the only 
scheme that does not require a valuation of stock and plant. 1951 
Amendment to Act however restricts its use a good deal—no possibil-
ity of paying out to members of family that do not take any part 
in its management.
Agreements must now be for the longer of the following periods:
(a) Seven years.
(b) Until an infant attains 21.

Main advantages being:
1. Reduces burden of taxation, i.e., spreads the tax and keeps it at a lower rate.
2. Enables members of family to build up a capital account which at a later date they can use in purchasing a share in property.
3. Production is increased and the national revenue as a whole must benefit.
4. Members of family have an income of their own right, and if necessary could take over some of father's life assurance to keep it out of his estate.
5. Enables liabilities to be transferred to family.

Disadvantages:
1. In event of family friction father may have substantial legal liabilities to pay.
2. Members of family do not share in any increased value that may take place in the property itself, and for undeveloped land being brought into production this is quite a disadvantage.

Profit-sharing with Wives:
Some farmers are making profit-sharing agreements with their wives, the Commissioner of Taxes agreeing to sums up to £250 per year being paid to wife. This may not be very great but can mean a worthwhile saving. It is, however, more convenient in most cases to pay one's wife an allowance for keep of men employed as a taxable deduction and sums of up to £200-£300 are normally approved depending on size of property.

6. PRIVATE COMPANY OR INDIVIDUAL FARMER
(Reference the Accountants' Journal, Nov., 1951, by R. W. Chaplin)

Main obstacle is disposition of live stock requirements. Farmer could, however, convert farm into a company and rent the company's land back again, but company's income would be very limited. Main advantage being that farm would be held together as a separate holding.

If a farm will not divide into two economic units, every effort should be made to protect it from further subdivision, such as might take place in the event of his death and distribution to his family, and the formation of a company will assist this. However, if it will make two economic units, it is probable that its total production would be increased if a subdivision were made. In such a case, where there might be two sons to follow the farmer, or where he might feel it desirable to benefit two sections of his family, the formation of two companies to take over the separate blocks of land would be justified.

The formation of a farming company opens up the following opportunities which are later considered in more detail:—
(i) The farm is held together as a separate holding;
(ii) The farmer can make provision for his death duties while he is alive;
(iii) He can retain control as governing director of the company, although he may have reached an age when he wishes to retire from the heavy physical work of the farm;
(iv) In good times profits can be left in the company in order to reduce its liabilities;
(v) It is a simpler matter to transfer shares in a company than to transfer parcels of land and livestock. No disposition of stock involved and no added income tax.

Farm held together as a separate holding.

Whether this is desirable, from the point of view of the family and of good husbandry, would need to be considered in each particular instance, and would depend upon whether the land was suitable for sub-division, and whether the farmer wished to retain the land as a separate unit rather than to have it eventually split up amongst the members of his family.

Once the land has been sold to a company its ownership is not disturbed even by the death of the farmer, as the death would only affect the ownership of the shares and the land would continue to be owned by the company.

A company is a more permanent institution than, for example, a partnership owning the land, and there is less risk of disturbance from a change in shareholders than from a change in partners.

Provision can be made for death duties:

As an example, if the farmer had an estate worth £20,000 it can be assumed that estate and succession duties would take approximately £5,000. His estate might include 1000 acres of land worth £15 an acre, or a total of £15,000. If the land were sold to the company at that figure, the company would pay the farmer cash amounting to £10,000, and he would pay for his shares in the capital of the company amounting to £9,999, and one share could be held by another person. The balance of the purchase money, amounting to £5,000 could be obtained by the company by giving a mortgage on its land. The farmer would now have £5,000 in cash and 9,999 shares in the company. The cash could be used either to provide for his death duties, or if he should substantially reduce his estate before his death, would be available to assist in meeting his living expenses during his retirement years.

Management control can be retained by the farmer:

Provision can be made in the articles of association for the appointment of the farmer as governing director during his lifetime, so that while he may have given up active manual work he can still supervise the management. He can also draw a suitable salary for his services and suitable fees as a director.

Profits may be left in the company in reduction of its liabilities:

So far the opportunities we have considered are open to the farmer even where it has not been possible to transfer the livestock, but there would normally not be much opportunity under this heading unless the company was deriving income from the livestock as well as from the land.
It is generally desirable, where a company is a proprietary company, to declare dividends absorbing the bulk of the annual profit, but while this should be done here, it would be a simple matter for the shareholders to leave a portion of their cash from dividends on deposit with the company.

Such cash could be used, in the example quoted previously, to reduce and eventually pay off the mortgage on the land, particularly as there are institutions which are willing to lend money on table mortgage today, and which will give rights of reduction or repayment at the option of the mortgagor.

At a later date, when the mortgage has been repaid, it might be reasonable to increase the capital of the company by the issue of preference shares which could be made available to the ordinary shareholders who had accumulated cash on deposit with the company, or the farmer may wish to take his cash out of the company and give others the opportunity to take the preference shares.

Transfer of shares:

It is assumed that the farmer is himself the main shareholder at the incorporation of the company, but he may desire to pass his ownership of the shares to the members of his family, and this can be done with the aid of the company by way of sale or by gift in parcels of suitable size to meet his wishes, and can, of course, be commenced where the company owns the land only.

While gifts to the value of £50 in any one year are free of gift duty, it is often desirable to take the opportunity to make larger gifts with the payment of the appropriate gift duty, having in mind that gifts made more than three years prior to the death of the donor cannot be brought to account for the assessment of death duty.

Where there are gifts of shares in such a company, the Stamp Department very properly values the shares on an assets basis, and this means that there is little departure from the valuation which would have been made if the farmer had retained the assets instead of taking shares in the company. A gift of shares in a company may in effect enable a partial transfer of the land and livestock to be made without risking the danger of additional gift duty on the basis that there has been the reservation of some benefit of advantage in favour of the donor. This is a difficult provision of the Death Duties Act, and transactions coming close to it are to be carefully avoided. This does not constitute a disposition of stock and plant so no added income tax is involved in any transfers.

7. LIFE ASSURANCE.

Life Assurance for the purposes of meeting death duty payments is more essential than ever before but it must be bought exactingly and thereafter used intelligently as an integral part of estate arrangement.

A man leaving an estate worth £20,000 to a son would pay £5260 in death duties. He might buy a £5000 life policy for the express purpose of paying death duties, and regard the matter as satisfactorily dealt with. But it would not be, for on his death the estate would be worth an additional £5,000 because life assurance is assessed as a part of the estate. So duties would amount to £7,450. The
purchase of a £5,000 insurance policy would have added to his duties by £2,190 so that over two-fifths of the value of the policy would go out in additional duty, and for that privilege the policyholder would have paid substantial annual premiums.

On a proper analysis of the position, however, it will be seen that despite the above facts, the completion of a substantial policy is not only highly desirable, but provides a very satisfactory investment and is the only method of creating the extra cash...exactly the time when it is needed.

If the fallacious argument that the securing of a policy is not advisable owing to the fact that a proportion of its proceeds is absorbed in duty is accepted, then to apply the same reasoning, it would be inadvisable for such a person to accept a rise in salary because it would mean a higher rate of, and a higher amount of income tax! A similar reasoning would mean that it would be inadvisable for such a person to accept a gift or have an increase in the value of his assets because it would increase his death duty.

In the last two cases, it may be argued that the proceeds of the gift or the increase in assets could be spent to avoid any increase in the estate, but if a policy is effected, assets in the estate to the extent of the sum assured could also be given away or spent so as to avoid any increase in the total estate. The main point is that the policy provides cash at death, without having to dispose of assets or find a buyer at an inopportune time.

The point to be noted is that it is generally immaterial what amount of the policy is absorbed in death duties as long as the net estate will be higher by effecting the policy and the balance of cash to find for duty is less than it otherwise would have been.

In every case the completion of a policy results in a higher net estate and less cash to find for death duty as compared with the same estate without the life assurance provision.

The Government may get more in death duty from the estate under the policy method but the main concern of the owner of the estate and his beneficiaries will be “what will be left?” and “can it be secured without delay and trouble?” If provision for payment of duty is not made under the policy plan the Government may be paid less in death duty, but if cash for the death duty requires to be secured by disposing of assets or mortgaging same then the final balance of estate must be less than under the policy plan.

The difference between the premiums paid and the proceeds of the policy at death is an increase of capital and it not liable for income tax or social or national security tax.

Individual problems: As with death and gift duties, life assurance today calls for specialised knowledge, in its application to specific needs, and in no two cases can it be used identically. This also applies to gifting and the drafting of wills.

For this reason an intending purchaser of life assurance should select carefully both the company from which he intends to buy, and the representative with whom he deals, making sure that both appreciate the importance of his personal problem.

Smaller policies preferable. When purchasing assurance, do so with an eye to future gifting. Buy five £1,000 policies rather than one £5,000 policy. The smaller policies can be gifted out of the estate singly, later on, at less cost, and in the meantime five smaller
policies are more useful should you need to lodge security in
different places.

By the use of life assurance policies money can be gifted out of
an estate more cheaply than by any other method. When a policy
is gifted its dutiable value is assessed at the surrender value at the
time of gifting which is usually only a fraction of the maturity
value, and in the event of the donor dying within three years the
policy comes back into the estate only at the surrender value at the
time the gift was made, and not at its appreciably high cash value.
Schedule showing effect of life assurance on estate and as a means of
providing cash to meet death duties:

**LIFE ASSURANCE TO ASSIST MEETING DEATH DUTIES**

Comparison Showing Amounts Which Would Be Left As A Mortgage
Against Stock And Plant After Paying Death Duties And Income
Tax, Etc.

(1) Schedule shows effect on stock advance where proceeds
from varying sized policies are available (only variable
item being amount of life assurance held).

(2) Schedule shows effect on position where percentage of
existing land mortgage is 50% of the land value.

**ASSUME FREEHOLD VALUE OF LAND—£20,000**

As per Example worked out

<table>
<thead>
<tr>
<th>No Assu...</th>
<th>£5,000</th>
<th>£10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assurance</td>
<td>Mortgage</td>
<td>50%</td>
</tr>
<tr>
<td>Net Value of Estate</td>
<td>£16,465</td>
<td>£21,456</td>
</tr>
<tr>
<td>Rate for Death Duty</td>
<td>22%</td>
<td>25%</td>
</tr>
<tr>
<td>Death Duties to Widow</td>
<td>3,620</td>
<td>5,364</td>
</tr>
<tr>
<td>(Life Interest, two sons)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income and S.S. Tax</td>
<td>3,544</td>
<td>3,544</td>
</tr>
<tr>
<td>(on 1951 basis)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL DUTY</td>
<td>£7,164</td>
<td>£8,908</td>
</tr>
<tr>
<td>METHOD OF RAISING:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Further Advance on Land</td>
<td>£3,000</td>
<td>£3,000</td>
</tr>
<tr>
<td>Life Assurance</td>
<td>nil</td>
<td>£5,000</td>
</tr>
<tr>
<td>ADVANCE AGAINST STOCK</td>
<td>4,164</td>
<td>908</td>
</tr>
<tr>
<td>VALUE OF STOCK &amp; PLANT</td>
<td>£10,000</td>
<td>£10,000</td>
</tr>
</tbody>
</table>

Had this farmer who holds £10,000 of life assurance gifted £5,000
of it to a trust he had created with an income of £150-£200 per year
to meet the premiums, total duty and taxes would have been back
to the £8,908 figure and his estate would have had an added £5,000
in cash to meet the expenses, i.e., £10,000 in cash to meet £8,909
duties. Estate would not have to increase mortgage on land and
would be starting off with a credit of £1,092 for farm working ex-

cpenses. As compared with a farmer who had no insurance, his
estate would have to increase mortgage on land by an extra £3,000
and raise a debt on stock and plant of £4,164.
8. PREPARATION OF WILLS.

Wills have always been vitally important documents, but since the revision of the rates of death duties in New Zealand in 1940 their preparation has called for a high degree of skill and specialised knowledge. Yet it is amazing that many farmers and business men have not brought their wills up to date, with the result that when they die their estates will pay unnecessary thousands of pounds to the Treasury.

If a will has not been thoroughly checked over by a competent person since 1940, it should be done immediately. A few simple alterations might save the beneficiaries a lot of hard cash! If a new will has not been made since marriage, then there is no will, because marriage invalidates all previous wills. If children have been provided for in a will which has not been altered to provide for others born since, the document may finish up in the court with unnecessary expense and undesirable publicity, and the disbursement of the estate may not be carried out as the testator wished. There are many more “ifs,” but, finally, if you have never made a will, do so, because you are going to die, you know!

Possibility of hardship:

Dying can be so costly these days that badly-drawn wills, especially when one death follows closely on another in the succession of an estate, can easily cause hardship or perhaps the forced sale of a very profitable farm or business, particularly if the estate comprises mainly stock and plant without adequate cash reserves.

For instance, the estate of a testator leaving a business or large farm worth £50,000 to his widow would pay about £20,600 in death duties, leaving a residue of £29,400. If the widow died shortly afterwards, leaving everything to a son, duties would be approximately £9,500. These two deaths would have caused the loss of three-fifths of the value of the estate, and would probably necessitate a large mortgage or a forced sale.

Cases like this have happened recently, and are still occurring, simply because people do not appreciate the vital importance of the drafting of wills. In the example just given, had the testator left the property to his son, and a set life interest or annuity to his widow, the estate would have been saved over £8,000. Further considerable savings could have been effected in other ways as outlined earlier.

Conclusion.

People possessing really large estates cannot afford to overlook gifting, as in some cases this is the only possible way in which their estates can be preserved. But—and this is a very big “but”—gifting is a highly complicated procedure, and anyone commencing a gifting programme must be prepared to spend both time and money on the project, and he must make absolutely certain that the people he engages to do the work for him are completely conversant with, and competent to carry out, gift work.

Some people have taken advantage of gifting in order to save death duties, but they represent only a small percentage of those who should. Some have not explored the avenue because they do not know about it; others, having spent a lifetime amassing wealth, cannot bear to part, during life, with any fraction of it.
Planned gifting into a trust is the safest and surest method of lowering the cost of dying.

The assessment of income tax on the disposition of livestock is a most serious obstacle at present but in many cases this cost could prove well worth while for the sake of future generations.

If you already own an economic farm but require more land for your family, purchase it in trust for them and save taxes.

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Mr Murray. If the proceeds of life insurance were not included in the estate, it would save a lot of bother.

Mr Peryman. I agree, but it would involve an Act of Parliament to change it. I think the farmers have to be prepared to make provision according to the law rather than ask that the law be changed.

Mr Struthers. It would be a tremendous help if, where the whole estate is carried on, duty could be assessed on the standard values of stock.
FODDER CONSERVATION
SEASONAL PRODUCTIVITY AND STOCK FEED REQUIREMENTS
I. E. Coop, Lincoln College

Success or otherwise in farming depends to a large extent on ability to relate the feed grown for the stock to the actual requirements of those stock. Since pasture forms the basis of feeding this means equating stock requirements to pasture production. Only in so far as pasture fails to meet these requirements is fodder conservation and forage cropping necessary.

In this introductory talk in the series on Fodder Conservation I assume that my remarks should be mainly in general terms indicating the importance of fodder conservation in stock feeding, and suggesting how the fodder might best be utilised. To this end I propose to restrict myself to sheep farming, though the principles involved are also applicable to dairy farming.

At this early stage I must first indicate briefly the relative food values of pasture, hay and silage, and forage crops. Pasture and other greenfeeds such as Italian ryegrass, rye-corn and greenfeed oats, while in the leafy stage are by far the best feeds grown on the farm for they are balanced feeds, highly digestible, high in protein, capable of maintaining milk production in ewes and rapid growth in lambs. As these feeds mature and start to run to stalk and seed, a rapid decline in food value takes place. Roots are also nutritious but
are rather deficient in protein, so that heavy feeding of roots for long periods is inadvisable and usually leads to trouble. Chou moellier is higher in protein than roots and is also a useful winter feed, but is not as good as greenfeed and has some disadvantages. Hay and silage are of lower food value than any of the aforementioned feeds and are generally regarded as maintenance and not production food-stuffs. That made from lucerne will be higher in protein than that from pasture, and silage can generally be made of higher protein content than hay.

Returning now to pasture production and stock requirements, two graphs or charts are shown illustrating the seasonal growth or production of our standard ryegrass-clover pastures, under what may be called typical Canterbury conditions with a dry summer and Southland conditions with a moister summer and longer winter. Quality of the pasture growth is not shown. On the same graphs are given the approximate seasonal requirements of a fat-lamb flock of ewes as managed in the two localities.

SHEEP REQUIREMENTS

The annual cycle of ewes, and the feeding of ewes, falls into three main periods:—

(i) the dry period of three months, that is when the ewe is dry, from weaning to mating,
(ii) the pregnancy period of five months, the latter part of it coinciding with winter,
(iii) the lactation period of four months from lambing to weaning.

The requirements of sheep in these periods vary a great deal.
Dry Period

Excluding the fattening of weaned lambs, wool growth is the only form of sheep production during the dry period. The ewes need be fed no more than at the maintenance level for which the quantity of feed is not large and the quality relatively unimportant. The maintenance level is defined as that which just maintains body weight or condition of the animal. Paddock roughage such as dried leaf and stalk left from the early summer growth, is quite adequate for the purpose.

I would qualify this statement under two situations. Firstly, where the ewes at weaning are low in condition or where, as is more often the case, poorly grown ewes are bought in, some build up should start as soon as possible. Secondly, and by far the most common case, ewes fat at weaning should be confined to bare paddocks to reduce condition before mating.

About two or three weeks before mating and for a similar period after the rams are put out the ewes should be flushed. If autumn rain comes early enough, the fresh autumn pasture growth will do this automatically, but if it doesn't eventuate, supplementary feeding is called for. Assuming that no greenfeed such as lucerne or second-growth rape is available, I believe that silage can play an important role at this period. While hay is satisfactory, silage is generally of higher quality, and being succulent, provides a more suitable supplement to a diet which for the past three months has been nothing but dry paddock roughage.

Pregnancy Period

During pregnancy the foetus, or unborn lamb, grows very slowly indeed during the first three months and only during the last three or four weeks before lambing does foetal growth cause much drain on the ewe. This is important for it means that the really critical period is at the very end of the winter in the weeks just before lambing, and is especially important for twin-bearing ewes. The early winter months are not at all critical. Consequently the maintenance level of feeding during the dry period can well be continued after mating and through the early winter.

Previously it had been believed that generous feeding through the winter and "steaming up" before lambing were necessary to ensure rapid growth of lambs. This has recently been shown to be an exaggerated notion and, in fact, to be a waste of food and money. Further, mortality at lambing has been shown to be higher in heavy ewes than in thrifty, lower-conditioned ewes. Nevertheless ewes must on no account be allowed to slip back in condition in the late winter, for losses from pregnancy toxæmia would then be likely to occur.

Bearing in mind then that generous winter feeding is expensive and is unnecessary, the system which I would recommend is as follows. After mating and in the early winter, the ewes can be fed a bare-maintenance diet until a month before lambing begins. Towards the end a progressive improvement in feeding should take place so that by the time lambing is reached the ewes are being given high-quality feed in reasonable amount. In conducting this system, feeds of relatively low food value should be given in the early winter, gradually changing over to feeds of higher value as lambing approaches. Thus in the early winter I would feed swedes and tur-
nips, supplemented with hay or silage. The feeding of roots over extended periods without adequate hay, silage or greenfeed supplements is inadvisable. As lambing approaches, cut down on the amount of roots, start rationing greenfeed and continue with plenty of hay or silage, until by the time lambing is reached the roots have been finished and the ewes are getting ample greenfeed plus hay or silage. The highest quality hay or silage should naturally be reserved for the critical late-winter period.

Such a system not only provides the ewe with the improving quantity and quality of feed which its requirements demand, but also diminishes the nutritional disorders such as pregnancy toxaemia and milk fever.

Lactation Period

The rate of growth of lambs is determined almost entirely by the feeding of ewes and lambs after lambing and is scarcely influenced at all by the nutrition of the ewe at other times. This is therefore a most important period. It presents two problems:

Firstly, in order to make maximum use of the spring and early summer growth it is necessary to lamb two to four weeks before the spring flush of pasture. Now the feed requirements of the lactating ewe are between two and three times the maintenance requirement and the quality of the feed must be high. Spring and early summer grass meets these requirements satisfactorily. But, what of the two to four weeks immediately after lambing? This must be met by saved feeds of the highest quality in which respect greenfeeds in the form of newly-sown autumn pasture, greenfeed oats or ryecorn are most important. This is just as critical as, if not more critical, than the late winter feeding.

Once the grass commences growing vigorously all is usually well until it starts to run to seed in November or December. This is no doubt one of the penalties we pay for using perennial ryegrass. But the fact remains that towards mid-summer it becomes too stalky and there is insufficient leaf to maintain quality of feed. Control by cattle is the ideal solution. However, on account of fencing, poaching in winter, winter feeding and the unavailability of suitable cattle from the hill country in spring the carrying of cattle is unpopular. Topping is only a partial solution. I feel that control by making some paddocks into silage while the grass is still leafy may offer something of value. Fundamentally the problem is to extend the period when leafy pasture is available to the ewes and particularly to the lambs.

WOOL PRODUCTION

The production of a heavy fleece of well-grown, high-quality wool requires that the ewe be reasonably well fed at all seasons and particularly during the winter. Periods of reduced feeding to control the condition of ewes after weaning or after mating will undoubtedly cause a decrease in fleece weight. Under the system of feeding suggested, some slight reduction in fleece weight per ewe and in quality will be caused. However, the more efficient utilisation of feed by the ewes enables more sheep to be carried per acre, so that total wool-production of the farm, which is the really important factor, is at least maintained if not increased.
Equating Pasture Production to Sheep Requirements

Reverting now to the charts of pasture growth, we see that growth exceeds requirements very considerably in the early summer. Though some farmers find it profitable, even at considerable cost to the sheep, to use this surplus for small seeds production, most of it should be conserved as hay or silage by closing a proportion of the farm for the purpose. There may also be a slight excess in the autumn flush and this should most decidedly be reserved as autumn-saved pasture.

On the other hand, there are three periods when current pasture growth is insufficient to meet the requirements of the stock. These are:

(i) the dry, late summer and autumn period. As has already been mentioned, this is a time of low sheep requirements so that paddock roughage, supplemented if need be with hay or silage is all that is necessary.

(ii) three to four months of winter. Here we must rely on roots, chou moellier, plus hay and silage, together with light grazings of greenfeed and autumn-saved pasture.

(iii) two to four weeks of early spring immediately after lambing when greenfeed must form the bulk of the diet.

I would like to stress that not only is fodder conservation necessary but also is fodder reservation. We fill in the periods of pasture deficiency with hay and silage conserved from the summer excess together with roots and greenfeed especially grown for the purpose. But we must also see that the feeds of highest quality are reserved for those periods when they are really needed. It is for this latter purpose that greenfeed should be control-grazed only through the winter, rationing it out very carefully while the ewes are on roots and reserving the bulk of it as lambing feed. Similarly, paddocks should be shut up in the autumn so that autumn pasture growth can be reserved to supplement the grown greenfeed in the late winter instead of allowing it all to be eaten at the time it grew.

I have not yet mentioned lucerne, though in my opinion this is the most suitable fodder to conserve, and in Canterbury at least is the key to high sheep-carrying capacity. If a proportion of the farm is in lucerne the summer pasture excess is lower, but all hay and silage required is taken from the lucerne. Lucerne possesses the advantages of greater production per acre and higher protein content, besides providing late-summer growth as a partial solution to the problem of a succulent feed for that period.

In the matter of providing greenfeed at a time when the ordinary pastures are dry or dormant, reliance has in the past been placed on specially-grown feeds such as rape, greenfeed oats and newly-established pasture. Though it scarcely comes under the title of fodder conservation, and indeed reduces the necessity for such, the establishment of mixed swards or of special-purpose pastures such as timothy, lucerne and cocksfoot for summer, and short-rotation rye-grass for winter and early spring offer considerable help. In addition leafy autumn pasture-growth, which is of high food value, can be conserved in cold storage, as it were, for use as greenfeed during the winter.

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I would not be doing justice if I did not pay some attention to Southland, whose production per acre is envied by Canterbury men. The moist summers ensure ample grass growth through spring, summer and autumn and only during the winter does it fall down. The winter is long and during this period reliance is placed on swedes and turnips which grow remarkably well. There is, however, a real problem of providing a protein-rich supplement to balance the heavy feeding of roots during the winter and especially in the critical weeks before lambing. I would venture to make the following suggestions to meet this situation. Firstly, the policy of set stocking and eating bare all paddocks during the autumn is, in my opinion, wrong, since it uses all the valuable pasture greenfeed at a time when it is not needed. Conservation of autumn pasture can and should be adopted. Secondly, short rotation ryegrass has a life of several years in Southland and with its good winter and early spring growth can provide a bulk of valuable greenfeed for use with roots in the winter and again as lambing feed. Lastly, we come to hay and silage. Lucerne is considered difficult to grow so that pasture provides the source of hay and silage. Owing to climatic conditions hay is not made until late in the season and is, in consequence, not of high food value; not that much hay, by Canterbury standards, is made. Silage making is almost unknown. I believe that the Southland farmer must give silage a real trial. It would give him an additional means of pasture control, it would give a feed of higher protein value than hay and hence a useful supplement to roots, and it would mean that more feed would be conserved than at present.

FODDER CONSERVATION

I have looked at the problem of sheep feeding from the point of view of efficiency of food utilisation and maximum sheep production per acre. I could perhaps have simplified the whole thing by reiterating a theme of good feeding at all times, but this would be economically incorrect. I have tried to indicate where feeding is relatively unimportant and where it is critical, and in meeting the requirements of sheep how excess pasture-growth at one period should be conserved for use in subsequent periods when pasture growth is adequate.

Fodder conservation offers one of the best methods of achieving efficient farming and high production. Lucerne, where it can be grown satisfactorily, is easily the best fodder crop for the purpose. Special forage crops such as oats, and oats plus a legume such as peas, are also valuable, though not as good as lucerne. Pasture, especially in the wetter climates, will continue to provide an important source of material for conservation. How much should we save? As a lower limit sufficient to provide 1500 bales of hay per thousand sheep, but I don’t think we are taking conservation seriously unless we produce 3000 bales and more per thousand sheep or the equivalent in silage.

Little silage is at present being made on sheep farms but with the new mechanical and labour-saving methods now available a new era is dawning. Conservation in the form of either hay or silage, or both, is a worthy aim. Because both are stored and, especially in the case of silage, can be used several years after making, they not only ensure our being able to feed the sheep throughout the different sea-
sons of the year but, what is equally important, they enable us to smooth out the fluctuations that occur from year to year in feed supply and carrying capacity. With a constant and adequate reserve of hay and silage the farm can be stocked to its fullest capacity. If the season is bad, at least there is a sufficient reserve of fodder to enable the sheep to be fed satisfactorily. If the season is better than average the farm is already carrying a large number of sheep to make full use of the pasture available so that none is wasted. Either way production per acre is about as high as it can be taken.

Mr Hurst. With later lambing you would have more green feed when the ewes lamb. If I lamb in mid-September I can carry more sheep.

Dr. Coop. In Canterbury our pastures usually deteriorate rapidly in December. We like, therefore, to get our lambs into the works at the latest, in early January. It takes 16 weeks to get lambs to killable weight so, counting back, you will see why we lamb before the pasture grows. With irrigation, of course, you can save yourself a lot of trouble by postponing the lambing.

Mr Hurst. I practice early shearing and since I started I have never had a case of ante-partum paralysis.

Dr. Coop. I think it is partly a matter of exercise. Being cold the ewes have to keep moving and they also eat more.

Mr A. Grant, Waimate. On most farms in Canterbury we have few turnips and little green feed or hay. What supplementary feed could we use for the next two months? I was thinking of such things as barley and nuts.

Dr. Coop. Normally I am against the use of special feeds unless it's a case of stopping sheep from dying. As a rule you wouldn't get your money back. Fodder conservation in the last two years would have been the answer.

Mr Grant. If we don't use special feeds, some sheep are going to die. What should we buy?

Dr. Coop. Lucerne at 10/- a bale is cheaper than nuts at £20 to £30 a ton.

Mr H. Jones, Ealing. Some years ago I brought a sample of hay to the College for analysis. As a result of the test I decided to use nuts which cost me 4½d.-5d. per week per ewe and carried them through successfully. Since then I have continued the practice.

Dr. Coop. It is far better and far cheaper to supply the full requirements from foods grown on the farm.

Mr M. B. Turton. Could it be published what the College thinks is best to do this year? It's vital as far as Canterbury is concerned. With oats at 4/-, barley at 4/- and wheat at 8/- I found wheat the cheapest feeding at 2oz. per day.

Dr. Coop. I am not decrying these things if you get your money back or if it means saving your sheep from dying. You'd have to work it out on the cost per ton. If you have lucerne hay, then you don't need to buy protein. If you have poor meadow hay, then buy
protein in the form of nuts or peas. I'd pay a premium for these as against grain.

? . When we feed silage to sheep do we have to feed hay also?

**Dr. Coop.** Theoretically it is not necessary. Some farmers are this year feeding sheep entirely on silage and we have a series of experiments at Ashley Dene: silage alone, silage with hay, hay alone.

Mr R. J. Nell. My mob of 1000 ewes has had nothing but silage for the past two months. They seem to be doing fairly well.

**Mr L. Carpenter, Fernside.** We used raw molasses with hay, but don't know whether it was worth while. Does molasses have any part in feeding ewes over the last four weeks?

**Dr. Coop.** Molasses has a high food value but is low in protein. It can be fed with lucerne hay but if you have only poor pasture hay then you want something higher in protein than molasses.

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**MECHANISATION AND USE OF SILAGE ON A SOUTH CANTERBURY FARM**

Baker Bros., Levels Valley

(Read by G. Baker)

I have been asked to give this paper on the making and use of silage in South Canterbury and like any other farmer, I naturally feel very diffident about making any definite recommendations on types of machines to use or techniques to employ, and I can only tell you of our experience with mechanised silage-making over the last two years. First of all you will want to know just where we farm, what our conditions are like in comparison to your own, and what type of mixed farming we do, and where silage can fit into our programme. Our property is in the Levels Valley on rolling clay downs and clay flats on the floor of the valley and like the most of South Canterbury we get about 24 inches of rain yearly. We don't place full reliance on the annual rainfall figure as we feel that high winds with the consequent high evaporation do more damage and retard growth than actual low rainfall. The area we farm is 317 acres—all clay bottomed land—and we practice a fairly usual rotation of linseed, wheat, rape, fallowing for grass, and grass and clover seed harvesting. You will notice from our rotation that we don't grow any turnips or swedes for winter feed and have not done so since 1938. This will give you the clue for silage as a winter feed proposition; but we have always made a lot of hay and have had lucerne stands to meet part of this requirement.

The carrying capacity of the place has gradually grown from 300 ewes which we ran on the original 207 acres, to the 950 ewes plus 100 dry sheep and about 40 cattle which we carried last year on our present acreage of 317. In carrying that amount of stock we were also able to grow one paddock of wheat, one of linseed, one of rape, as well as harvesting approximately 70 acres for grass and clover
seeds. When we got to this stage, it was apparent that we could not go much further without some safety measure other than large quantities of hay which we were making.

We seem to have been keen on ensilage for many years in a small way, as since 1930 we have made four stacks of silage at different times and did it the hard way. But in spite of the work involved, we have appreciated its use as far as the stock were concerned.

When we first heard of the possibility of mechanising silage making in 1948, we were naturally interested as the hay fork with a seat on it rather appealed to us—and of course mechanisation looked as though it would harvest more silage per year than ever anyone would attempt manually. When the equipment was available in 1950, we ordered and got delivery of the first forage harvester which came to the district and consequently we had its “teething troubles” all to ourselves. We bought just the forage harvester and one dual-wheeled trailer, and fitted sides to it and to our original trailer, thus giving us the complete team required for the job. The making of the sides was a simple and cheap business, but we had a few headaches scheming out the best method of unloading, and eventually finished up with the netting mat which has worked out very satisfactorily.

When we decided to go on with silage-making, we earmarked for this purpose a crop of oats as well as some of the grass paddocks which otherwise would have made some hay or would have been wasted. We wanted a good back-log supply in our first year in case subsequent years were not as growthy. We hadn’t the faintest idea how much silage this would make so we opened up with a plough and Killifer scoop, a trench which we thought could take the first cut of seven acres of lucerne together with 22 acres of grass. This trench or pit, as you may like it called, was about 30 yards long by 15 feet wide and about 5½ feet at the deepest point. On sloping country the site is easy enough to find and to get a depth of 5 feet you will realise we had to go down only about 2½ feet and the spoil was battered up on the sides to make the total depth. Making the trench on a slope gave good drainage but this had to be improved in the second year as it is surprising the amount of seepage which came away in the first few weeks after the green material had been put in. It is very important to get this seepage away from the mouth of the silage pit as when it comes to feeding out in the winter time, using a tractor and trailer, it soon becomes a bog if there is too much moisture about. The first pit we considered held about 200 tons of material and when it was filled and covered with about six inches of soil according to all recommendations (and we didn’t know any better anyway) we went on with the second pit and the oat crop. This trench was slightly shorter and narrower and gave us a further 150 tons of silage as storage back-log.

You may wonder why we concentrated on so large a tonnage in our first year, but we had nearly 1,000 ewes to winter and also we had the perennial Canterbury fear of possible dry summer or autumn and not enough feed for a lot of hungry mouths. Also the making of a large amount gave us a fairly good idea how much work was involved and how much labour was required.

The method we used in both seasons is roughly this:—one wheel tractor drawing the harvester and trailer which is being filled—an-
other tractor, crawler for preference, taking over the loaded trailer and emptying it in the pit. We have had the use of a third tractor from a neighbour to assist in pulling the load off while the crawler takes the tractor through the pit over the material already put there. This is not absolutely necessary as a long rope with one end attached to the netting mat and the other dead-end placed over a post out behind the pit will do the job as well, but requires rather more careful driving on the part of the crawler tractor driver. So it boils down to being able to put in chopped silage mechanically with only two men driving tractors. There is a little spreading to do to level off the dumped load and to get the material over to the sides of the pit but the tractor driver at the pit gets time to do this. There are other mechanical methods of unloading trailers but these are expensive and add a lot to the cost of the plant which is already dear enough.

A lot of farmers are afraid that making good silage is a fairly technical business requiring temperature control and such like but we have found it to be the reverse and far easier to make than good hay, particularly in broken weather. Our method is to put into the trench a good three feet of green material first and then leave this for two days until the temperature is well up, that is about 130° to 140°. A simple dairy thermometer placed down a hole in the material will give you this indication. The next move is to carry on and fill the pit as soon as possible on top of the warm material and to consolidate it as much as possible. The very fact of a heavy tractor and trailer going through the pit with each load helps a lot in firming it down and also in keeping the temperature from rising too high. The temperature should be about blood-heat throughout the pit when it is finally sealed up. You will realise that after the first operation, that is after the first material has heated up, it is a tricky business taking a tractor and heavily loaded trailer over a mass of slimy material and this is where the crawler tractor is invaluable. After a load or two is put on, you are travelling on fresh material and the going is good. The last operation is levelling off the top of the trench in an effort to get a nice camber on the top material and then running over it frequently with preferably a wheel tractor which seals and consolidates better than a crawler. As I mentioned before we covered the first year's pits with soil and this looked all right and did a good job in sealing the pits but it took a lot of getting off when we came to feeding out. So we resolved to try to do without it this season, particularly on a pit which we know we will use this winter. We feel that a pit which is going to be stored for some years should be either covered with soil or fenced off from stock. The result of our laziness this year, in not covering with soil, is that the pit has sealed beautifully and there is only a surprisingly small amount of wastage on the top, only two to three inches of material which is not good silage. The main point about not covering with soil is to use only the best and most succulent material for the top layer, as this will bind together well and keep the air out. After all, silage making as I am led to believe, is simply a means of preserving, only in a trench—not in a jar.

There are other methods of bringing material into a trench, for instance, the buck-rake, which we believe is very good and a lot less costly and from a neighbour's experience the buck-rake handled
material into the pit just as quickly as our forage-harvester but of course there is mowing time to be added to that.

Another point before I leave the actual making of silage is that we so far haven’t used any molasses and don’t intend to as we feel that it is costly and messy and requires another man on the job and so far, over two seasons, we have made first-class silage without it.

The next stage which we were faced with was the winter feeding of our flock with silage, wondering first how they would take it, next how they would do on it, and finally how much would they require per day for a full ration. I had better point out here that our sheep were used to eating hay, and that we made it our business to add to our hay stock by baling up a lot of threshed grass-seed straw which we felt might be necessary as roughage to go with the ensilage. We opened the pit and found that the silage was as the books said it should be, that is, a light lemony-green colour and just slightly sour. It was easier to get out than we had anticipated as the chopped material lay in flat layers and was easily handled with a hay fork. We soon found that the easiest method was to cut down with a hay knife back about five feet from the front edge, thus giving us a platform to work off, and this portion of the pit lasted about five days feeding. We started with roughly about one pound of silage per ewe per day and worked up gradually to about three pounds per day, which seemed fully satisfying to the ewes. Thus the total amount of silage required for 1000 ewes and 40 head cattle per day was a little over 30cwt. per day, which was forked on to the trailer by two men in a quarter of an hour. These forks are the hickory handled ones and without seats. Added to the amount of silage on the trailer was a few bales of hay which were put into a feeder in the paddock.

The silage was merely forked off the trailer in lumps on to a clean grass paddock and right from the start the ewes and all stock took to it very well and as far as we could see there were no great numbers of shy feeders and no ewes were lost during the period of feeding out which lasted 10 to 12 weeks. It was interesting to watch the ewes taking the silage as they would not walk over it as they do with hay and further they would eat at it for about ten minutes to quarter of an hour and then make towards the hay feeder and take some hay. They would return then to the silage and it was always cleaned up in the morning. The cattle were different in that they would feed at it, then lie down and return to feed at it and clean it up in the afternoon.

The whole operation of hand feeding silage to a flock of 1,000 ewes plus cattle was done in about two hours and I would venture to say that the average farmer would spend at least this amount of time and more per day putting similar flocks of ewes on and off turnips and putting up break fences.

Farmers will naturally want to know what effect straight silage feeding had on our ewe flock and lambing percentages, and I can say that the ewes came through the winter as well as any other sheep in the locality with a real bloom on their wool which neighbours commented upon. The lambing percentage was slightly better than usual, around 128 per cent., but of course the weather was good, and this must in fairness be taken into consideration. There was a noticeable
lack of such things as bearing trouble in the ewes and only two or three ewes suffered from dopiness.

One noticeable thing was when we were feeding the lambed ewes on grass greenfeed, and unlambed ewes and cattle still on silage, the lambed ewes would come over to the fence looking for silage even though they had the best of greenfeed. We decided then to give them a small ration of silage with the greenfeed.

So much for the feeding out of the silage. Before I finish I would first like to tell you of the general effect of silage making on our grass-farming. The main advantage we have seen from mechanised silage making, is firstly that we take the material off when it is most succulent and is good food, and at a time when the pastures are in full growth and can recover well before the dry weather sets in. We know this because we have made a lot of hay in the past and we know as you do that, in a dry season, the taking of hay opens up a pasture and recovery growth is often not good. One other big effect on our grass farming is that by having the means of making a large quantity of silage we can control our grazing better now than we were ever able to do even with haying and small seeds harvesting. During the last phenomenal season we had complete control of our grass whereas, without silage machinery, I am sure that our place and all our grass would have been hopelessly out of control.

In closing, I would stress that only good material will make good silage. We have no compunction about putting our best cuts of lucerne into the pit, and we have found that our best silage has come from young, quick-growing ryegrass-white-clover pasture.

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Mr Pilbrow. Do you feed straight hay with your silage or do you use ryegrass straw?

Mr Baker. We have been feeding ryegrass-white clover-straw.

Mr Hayman. Did you find any difference in the size of your lambs from ewes fed on ensilage? With me, they do well on the ensilage. They came out in lovely bloom but when they were fed without hay the lambs were small at birth.

Mr Baker. I cannot say I have noticed any small lambs.

Mr Nell. I can verify how stock relish silage. I had a thousand ewes in a 25-acre paddock for a week, fed only on silage. The paddock was quite bare. I shifted them into a paddock which had been shut up for 3 months. We fed out some silage and 90 per cent. of the sheep left the grass for the silage.

Mr Inch. How long can you keep silage?

Mr Baker. We have kept it for 4 years. In England I understand they have kept some for 15 years.

Professor Calder. We have had stacks open up in excellent condition after four years. There is the problem of the material which drains away from the pit or stack. If we could avoid this seepage we would avoid considerable losses of food material. Has Mr Baker found that if he lets the material wilt he doesn't get seepage?

Mr Baker. There are six pits in our district and ours, made with fresh material, is the only one still running. The ones made with the
buckrake where the material would be wilted haven't run nearly as much as ours.

Dr. Coop. If you try drinking the seepage it's like gravy. It is high in minerals and is so high in soluble nitrogen that it burns the grass.

Mr Hayman. I find that if you cut lucerne and make the silage direct it is so wet that there are large losses by seepage. I think it is better to allow it to wilt for one day.

A speaker. The more I pack the silage the less loss I get.

Chairman. What was your rate of making?

Mr Baker. We put in half an acre per hour with the forage harvester. A neighbour put his in with the buckrake at the same rate.

Mr Hurst. In feeding out from the stack or pit is it easier to handle the chopped material or that put in with the buckrake?

Mr Baker. I think it is a little easier with the chopped material, but in any case it is fairly hard work.

Professor Calder. Cutting silage out of the stack or pit is quite easy if you have the boys about to do it for you.

Mr H. G. Pinckney, Invercargill. I feed my ewes on silage from May to July and then feed swedes. I find silage keeps the sheep healthy and I have been able to cut my swede area in half. The time taken to make it depends on weather conditions. You must give it time to heat and in cold, wet, weather you may have to miss a day. A neighbour of mine spreads his material in the pit with a tine harrow on a hydraulic tractor. When feeding, I scatter it on the paddock and also feed hay. I have fed 400 ewes on silage alone and found they did well provided the quality was good. I think it would be a good feed for lambing ewes.

Mr Nell. We put in 350 acres of a rather light crop and averaged one acre an hour. The bottleneck proved to be the transport to the pit. I will admit it is a continuous process, but I changed my farm management to fit in with silage making. We pre-lamb shear and then go for the lick of our lives on the silage.

Mr Baker. I would like to make it clear that I consider the forage harvester dangerous on hill sides.

Mr Hayman. If used on sloping country it should have a brake on at least one wheel.

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FODDER CROPS AND THEIR UTILISATION

S. C. Bowmar, Gore

There is no doubt the area of root crops in Southland is gradually showing a decrease in comparison with stock population. This I think is a good sign while the overall production of the Province is increasing for it proves that the farmers are building fertility by better farming methods and grasses and greater use of lime and

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fertilisers, thereby shortening the period during the winter when the grass will not grow. If on the other hand production was declining it could then be said that the easier way was being followed, that is, limiting the stock to winter carrying capacity rather than that of the summer.

How far this winter feed area can be reduced without affecting the carrying capacity is a difficult question, so many factors being involved.

The saving of hay has a large bearing on the whole matter, but with hay the great difficulty is harvesting it in really first-class condition in our climate. If this were possible more use could be made of our normal heavy growth of late summer and autumn. Then much greater changes could take place in our management, but at present to rely too much on hay for sheep is from experience a risky business. For cattle, if an area that will not poach is available it is a relatively easy matter provided ample supplies have been provided. For calves the quality of the hay must be good. It appears to me that there is an opportunity for the investigation by some enterprising party of the whole question of artificial grass drying for use in Southland where we have an abundance of relatively cheap but low-grade fuel. Costs would have to take prior consideration because while there is the need for renewing pastures, the production of roots and leaf crops is relatively cheap and with hay it is good food. But if the cost of drying grass was sufficiently low to allow of its use, then, the climatic conditions at the time of its saving would not matter. Great use could be made of the autumn growth and this would in turn make for easier management of the pasture for this heavy growth of grass tends to smother the clovers. The greater food value of dried grass should help solve many of our early spring problems but costs, I fear, would be the stumbling block.

Under our conditions the risk of failure of the root and leaf crops is very low, while the opportunity for cleaning the ground of weeds and raising soil fertility by the heavy stock concentration during feeding off is very good. Furthermore, the necessary heavy liming is from experience best carried out when the field is under cultivation.

This heavy liming has been our practice for the past 22 years and was originally carried out to combat clubroot, which was then a major problem. This liming and the selection of resistant types of swedes if a second crop is necessary, has, as far as we are concerned, almost completely overcome this trouble. The main disease in second crops is dryrot, which still is a matter of concern; therefore, we seldom deviate from the system of one crop of roots. There is no doubt that it does not pay to use the paddock which is to be ploughed for roots the following year as a run off, for this trouble will make its presence felt. Care and thought are necessary if consistently good results are to be obtained.

Any necessary draining is carried out before the field is broken up, such as mole draining and the cleaning of field tile drains.

The system we use to produce our root and leaf crops and to raise the fertility prior to the sowing of new pasture is as follows.

We sow 2-2½ tons carbonate of lime on the first ploughing before ridging the swedes and choumoellier. The artificial manure used is approx. 200lb. of reverted super down the back spouts with the seed, while 200lb. of super (super compound) is sown down the front spouts
below the seed. 14lb. of Borax with a filler, usually 112lb. of super, is pre-sown.

After the swedes the land is cultivated by the hustler rather than ploughed before the rape is ridged. One ton of lime is sown. The manure used is the same as that for the swedes.

The third season the ground is again cultivated, a further ton of lime is sown before the grass mixture and 6-8oz. of rape. I consider greater benefit is obtained by mixing rather than turning under by ploughing the built up fertility.

The manure used with the sowing out is 8cwt. of reverted super down the coulters of the drill with the rape and cocksfoot. The mixture is broadcast from the grass-seed box. The ground at this time is well consolidated by the use of concrete roller.

The mixture consists of certified perennial rye 14lb., H1 10lb., crested dogstail 2lb., cocksfoot 5lb., pedigree white clover 4lb., but the quantities of the different grasses vary to suit the fertility. We use greater quantities of cocksfoot and dogstail with lesser amounts of ryegrass if fertility is considered insufficient to suit the higher demanding types.

The grazing of the new pasture is commenced early to control the growth of H1. This does not affect the growth of rape as the lambs will continue to graze the grass without eating the rape until it is grown. Approximately 10 lambs to the acre are put on 6-7 weeks after sowing. These are drafted for fats just before the rape is ready to eat off when a greater number are put on to cope with the extra feed. Care is taken to control grass growth before damage is done to clovers by smothering.

The roots are fed off in small breaks with a run-off paddock in which hay is fed by racks. The racks are shifted with each fill. The consumption of hay varies from year to year with hay quality, severity of weather and amount of feed on the run off, but between the first week of July and the second week in August the average is approximately 13 to 2lb. per ewe.

In the early winter the hoggets are given first grazing on the breaks of the crops and the ewes have to clean up; but in the late winter the procedure is more or less reversed, making sure the ewes are given more than their share of the green leaves. The practice of fattening lambs on the swede leaves before winter is avoided as far as possible because of the value of this change of diet later on and the spreading of dryrot.

The ridged rape is used to fatten lambs, as a rule counting on 30 to the acre, but no definite number can be given because of their varying condition when put on.

We try to avoid grazing this rape too closely so that by leaving the crop over the winter a considerable amount of secondary growth is made. This is also a valuable change of food for ewes in the early spring.

During the growing of the ridged crops as much inter-row cultivation as possible is carried out. I haven't mentioned the pre-cultivation for the crops but it is important to have the land well worked under our conditions and for the type of land on which we farm. It is a silt loam on heavy clay, consequently in wet weather it settles down firmly. Cultivation is started early and the land periodically worked until the seed bed is finally prepared, it then being firm and
fine in mid November for the swedes and early December for the ridged rape.

We allow between 50-60 sheep per acre when calculating the amount of winter feed required. If only swedes are sown slightly more can be relied on, but as a rule we sow four ridges of swedes and two of choumoellier, this being done by the use of a three-row ridger. The seeding used is 12oz. swede and 20-24oz. choumoellier. This different rate of seeding was at first a problem but by enlarging the holes to \( \frac{3}{8} \) in diameter in the two row or turnip side of one outside seeder, it was satisfactorily overcome.

Supplementary feeding of the hoggets starts early in May and continues until mid September. The ewes are fed from approximately June 20 to August 20 for the old ones and to early September for the younger.

Lambing commences 1st September for ewes with Southdown rams and 14th September for the ones with Romney rams.

Close watch is kept on the flocks from early August on and any ewes showing signs of not doing are taken from the flock and put on especially saved grass.

It appears from experience that once the fields have become closely grazed during early winter that only very light grazing if any at all is required during the period of low soil temperatures if we wish to have sufficient succulent growth on our pastures to give the ewes during that vital period just prior to the lambing. Also, cover is necessary on the pasture as protection against heavy frosts. It is, therefore, difficult to overcome this period without the use of root crops with their high production per acre, the relative low cost of producing and feeding them. However, there is already some evidence that in the future it may be possible with different management and species in our pastures to do without roots to a very much greater degree without affecting the carrying capacities.

So far we have not been able to provide better winter feeding as cheaply or with less labour, both at the time of producing and at the time of feeding. I know full well that roots and choumoellier are far from an adequate diet for ewes in themselves but with good management and ample supplies of good hay they are satisfactory. We find it is better to commence supplementary feeding early or before severe grazing of the pastures takes place and then to take the ewes off these crops as early as possible, shifting them each day on to a clean paddock. From experience there is nothing like a fresh bite of good grass to eliminate the usual spring troubles and to produce milk. It is, therefore, our aim to produce good grass at the earliest possible time. It is also essential for us to have one or more fields set aside with good growth on them until it is reasonably certain that these troubles will not make an appearance. To be caught without this can be serious.

May I, in conclusion, again stress the importance of saving the hay from good pastures and harvesting it in the best possible condition, also the care needed to guard against the infection of dryrot in root crops.

I am sure too much is expected from hay that has not been in good condition at harvesting and the nutritive value too low because of the high proportion of stalk included.
A practice, which I think is worthy of more consideration where conditions are suitable, and one which is of value to us, is the saving of some of the best pasture after the lambs have gone off their mothers in the first draft. If the fields have been evenly grazed and are shut up early in January, by March a good growth of leaf with very little stalk is made. This growth, although not producing great bulk per acre, will supply the best of hay provided the weather at the time of mowing is reasonable.

There is no doubt that there is a great deal to learn in the future about the winter feeding of stock and the production of that feed for them, both for the benefit of their health and the land on which we all depend. It is, therefore, necessary that we as farmers make certain we take advantage quickly of any developments that skill and science can bring to us.

Mr L. Carpenter. How do you inter-cultivate your crops? In Canterbury we cultivate our carrots in the garden but as for our crops on the farm we just sow them and say "God bless them."

Mr Bowmar. I don't know about your problems in Canterbury. With us we inter-cultivate to control weeds especially Poa annua which, in the earlier stages, would choke the crops.

Mr Hardy. It is remarkable how the swedes and chou come away after scuffling. You can see the result in a day or two.

Mr Pilbrow. Do you think the yield of rape is greater in 21 inch rows than in 7 inch?

Mr Bowmar. We've never attempted to sow it in 7 inch rows. If we did in our country it would be all rape. By sowing it on the ridges the lambs at least get some air between the plants.

Mr Pinckney. How long do you fallow the land before sowing swedes?

Mr Bowmar. We plough any time from May to July as it suits our farm operations. The time does not seem to matter much. When sowing rape on ridges I sow 2 lb. per acre.

Professor Calder. Mr Hardy has dispensed with swedes and says his ewes last longer. Mr Bowmar uses swedes and chou. Perhaps the mixture may be better for the ewes than the straight swedes.

Mr Bowmar. I agree with Mr Hardy that on some of the light land in Southland which has not been farmed to the best advantage, and consequently long periods of feeding on swedes are necessary, the life of the ewe is shortened. We try to give the shortest period possible on swedes. Until we built our fertility our hay was so low in protein that we had to do extensive feeding with swedes. Now we can use good hay and autumn saved grass and reduce the period on swedes.

Mr Hardy. In defence of my argument, may I pose a question? Does Mr Bowmar think I could get another season out of the ewes that he discards?

Mr Bowmar. Yes.

Mr Nell. What is your lambing percentage and your carrying capacity?
Mr Bowmar. The lambing percentage is approximately 120 per cent. It would be higher but we have a specialised management for our two-tooths which reduces the percentage slightly. We run four to six ewes per acre on the pastures from lambing onwards and draft 60 to 70 per cent. of lambs off the mothers from the Southdown ram and a little less than 50 per cent. from the Romney. Weights off the mothers are about 37.5 and off rape 32.

Mr Cooke. Would you give us your area and total carrying capacity? Have you any cattle and how do you use them?

Mr Bowmar. We farm 880 acres. We carry 2750 ewes, 750 hoggets and 450 dry sheep. We run about 70 head of cattle which we use as “mowers.” In time we will have to use more cattle in Southland.

Mr Pinckney. I plough in autumn and sow rye-corn which I feed along with young grass in the spring. I then plough in November and sow swedes early in December; these are eaten the following September. I then plough and sow cape barley which I cut for ensilage early in January. The paddock is then ploughed and sown in H1 and white clover. I get four crops in two years and this provides that extra feed in the spring so necessary for the ewes.

Mr Davis, Balfour. I plough in January and sow green feed, part in Algerian oats and part in rye-corn. I get a quick graze in the autumn and use it as green feed in the spring. The Algerian oats are shut up for chaff and the rye-corn ploughed for swedes. The chaff area is ploughed in January and sown to soft or hard turnips. The following spring the whole area goes to rape and grass. With this method I get a great variety of feed in the autumn.

Mr Bowmar. The last two speakers farm land which is equal to anything in Southland. Ours is very light land and we have to struggle to keep up and build up fertility. We just couldn’t stand the racket of cropping as Mr Davis and Mr Pinckney do.

DRY LAND FARMING AND THE FEED SUPPLY (A)

P. L. Dillon, Leefield, Blenheim

Leefield is a property of 4,200 acres situated in the Waihopai Valley, 17 miles south-west of Blenheim. The flats are about 700 feet above sea level and the hills run up to about 3,000 feet. The average rainfall is about 30 inches, which, like Canterbury, is unevenly distributed. Nine hundred acres of the flats are what you would call heavy stone and the other 600 acres of ploughable land are free of stones with a heavy clay sub-soil. The hills are, of course, all danthonia with the exception of the wether block of about 1,000 acres, which is a cold piece of country facing south and covered with native mountain flax and second growth. The property is subdivided into 26 grass and subterranean-clover paddocks of from 10 to 75 acres in size, the average being about 50 acres, three sunny
hill blocks of about 500 acres each, one stony flat of 100 acres still to be broken in, and the wether block I have already mentioned.

In 1939, when I succeeded to the property, it was all in native grass except for one 50-acre sub-paddock. The carrying capacity was then:

- 1,300 Ewes
- 500 Ewe Lambs
- 300 Wether Lambs
- 400 Wethers

a total of 2,500 Sheep

and about 25 head of Cattle.

The lambing percentage at that time was 73 per cent and the average weight of wool per sheep 7.25lb. (I might add that they were Corriedales).

Due to the urgent call for increased production at the beginning of the war, I decided to try to develop the place and make the development pay its way by growing wheat and fattening the wether lambs. Prior to this it had been purely a grazing proposition with no fattening except in unusual seasons. This scheme proved to be most successful, being done by late-winter or early-spring ploughing and summer fallowing for autumn wheat—which was always Cross 7—or early-winter ploughing and winter-fallowing for swedes. The wheat paddocks when harvested were then fed off with sheep and ploughed in the autumn, allowed a winter fallow and sown in rape in the spring. They were ploughed again the following autumn for sub. and grass to be sown before mid-April. Mixture 8-10lb. sub. and one bushel of certified rye grass. The swede paddocks were ploughed in the following spring for a summer fallow either for autumn wheat or to be sown down in sub. and rye. It may be noted here that all land ploughed had both a summer and winter fallow before being sown down; this I consider most important and possibly one of the reasons why development of this land has been such a success. I consider that adequate fallowing has saved me thousands of pounds in lime and fertiliser and has given me far better crops and brought the land to a reasonable fertility more quickly than would have been the case had I cropped the land continually before sowing down. It has been heartbreaking on occasions to have to plough a really stony paddock two, or perhaps three times with the breakages on implements very great, but I am satisfied that the fallow policy on this type of sour land has paid large dividends. Lime, of course, has been applied in fairly large quantities—one ton of lime and one cwt. of super has always been put on first-year young-grass paddocks in the early spring; after that I have put one cwt. of super every year when available and a ton of lime every three or four years.

There is one statement I have made which I feel sure Canterbury farmers will raise their eyebrows at and that is the amount of sub. sown per acre, 8 to 10lb. per acre I know is a lot of seed but I am sure it pays, particularly on browntop, sweet vernal or twitch land. My experience has been that with heavy sowing you do get a quick coverage of what you want and then if properly treated with

100
lime, super, and heavy rotational grazing, the sub. will hold its own; whereas with a light sowing, the plant, I find, gets choked out with poor grasses, such as browntop, sweet vernal and twitch. I remember an old agriculturalist once telling me that you could not hope to clean a paddock properly unless you had it up for seven years. I believe it is cheaper and better to make a heavy sowing and choke out the weeds than to crop a paddock for as long as that.

I have found that it is important how and when sub. is sown. To be sure of a sub. pasture I am satisfied that it has to be sown in the autumn and through the drill. Some farmers do get away with it quite often by sowing in the spring with another crop or with grass, but it is a "chancy" business and the wrong time of year for the seed to germinate, and with a heavy sowing it is a costly gamble. Contrary to what one might expect, the seed likes to be put in the ground and not broadcast; it must not go too deep, but likes to be covered, and so if sown with a cover crop of oats or barley to help prevent frost lift, I have found it necessary to drill only to a depth of an inch or an inch and a half. This may sacrifice some of the cover crop but it safeguards the sub. The best method I have found of sowing is to work a good fine seed bed and consolidate well with the roller, then put the broadcaster with the grass-seed just ahead of the drill; set the drill to sow 1 cwt. super per acre and to a depth of one inch; mix the sub. seed with the super in the drill box by hand and drag a light set of cover harrows behind. I have found it most unwise to sow the seed through the small seed box as this will crack a large proportion of the seed.

For the first eight years of development on these lines, all returns were put back into the farm by way of fencing, watering, manure and lime. Development did pay its way. By 1947 the carrying capacity had risen to:

2,453 Ewes
1,064 Ewe Lambs
482 Wether Lambs
459 Wethers

a total of 4,458 sheep shorn as against 2,500 in 1939;

with 200 odd head of cattle as against 25; lambing percentage up from 73 to 98, and weight of wool per sheep up from 7½lb. to 12½lb.

and also 614 fat wethers, 1025 fat lambs and 50 fat bullocks.

By 1951 the carrying capacity was:

3,073 Ewes
1,284 Ewe Lambs
1,150 Wether Lambs
524 Wethers
77 Rams

a total of 6,108 sheep shorn
with 100 head of cattle.
Lambing 97%, and Wool
Weights:
- Wether Hoggets . 10lb.
- Ewe Hoggets . 13.5lb.
- Ewes . 11.65lb.
- Wethers . 11.3lb.
Total net weight 72,631lb.
Average 11.9lb. per sheep.
521 fat wethers, 750 fat lambs and 49 fat bullocks.

Water for the summer for this amount of stock has been a bit of a problem in this dry area, but this has been overcome largely by the use of dams, even in the heavy stone. I have one dam in a very stony paddock which has no catchment gully at all and must act as a sort of dew pond. Heavy rollers have been used to get rid of the stones so as to make it possible to get manure and lime lorries over the paddocks. Another method where the stones were too bad for rolling was to grade the stones into lines with a heavy diesel grader. This proved most satisfactory.

The method of feeding and grazing is becoming increasingly complex and has to be watched most carefully. At the present rate of carrying I aim at having about 150 acres of sheep feed to carry the lambs through from weaning, at about the beginning of January, until the second week in September. Most of the wether lambs in an average season would go off their mothers fat. Of the 150 acres I try to have 100 acres of ridged swedes or choumollier, or a mixture of both, and 50 acres of thousand-headed kale. In an average season that would provide the hoggets with ample for the autumn and winter, with probably a bit left for the ewes to clean up. In a bad year it would not nearly be enough and I would have to rely to a great extent on Moose nuts, Tomoana nuts and hay. I always keep about 20 tons of nuts on hand in case I get caught; these are fed when necessary at the rate of 2 oz. per sheep per day, together with what green feed I can give them and hay. I have not yet tried ensilage as the cost of a forage harvester has been the stumbling block and I have so far managed to get through without that expense, but I feel sure the day will come when I will have to face up to it. I always keep about 6,000 to 7,000 bales of hay per year which is stacked in barns. This is nearly all made from sub and rye. I have only one small paddock of 10 acres of lucerne sown this year, as space cannot be spared a larger area from heavy grazing for long periods of the year. If we take the wether block of 1,000 acres which carries only 524 sheep, the 100 acres of unbroken-in flat, which is virtually useless, and 200 acres for plantations, farm buildings, yards and cottages out of the picture, you find that we are carrying 5,584 sheep on 2,900 acres, approximately 1,500 acres of which are native hill country; you will see that every inch has to be grazed hard for all periods except the flush of spring, when there is always a surplus. Last spring, which admittedly was exceptional, I could only control 400 acres of sub, which from early November to mid-December carried 8,078 ewes, their 2,980 lambs, 2,434 hoggets—a total of 8,487 sheep and 100 head of cattle. It will be seen from
these figures that something has to be done with the surplus feed and as it is liable to dry off at a moment's notice, with the consequent danger if stock were bought to control it; hay is the only answer. The grazing method adopted, and which seems most successful, is to wean as soon as the sub. dries off—usually about the beginning of January—put what wether lambs are not required into the works or saleyards and the ewe lambs either on to the kale or preferably the hay paddocks if they have freshened up. The three hill blocks having been spelled since spring, the ewes are divided up and put out there, the surplus ewes which are always sold forward having been taken out and got off the farm. The ewes stay on that hill country until the rams go out during the first week in April. This gives the sub. paddocks time to freshen up and we pray for a good autumn rain about the middle of March. Topdressing is done at this period if we can get the lime and more especially the super. By the beginning of April we hope the sub. is green again. The ewes come in looking a bit hard and are drafted up according to their wool and put out with the rams—two to the 100 in the sub. paddocks; they are left there for six weeks, being continually rounded up and the rams checked. During this period there is nothing on the hill country. At the end of May the rams are taken away and the ewes put in one mob and rotated through every paddock and hill block on the place, with the exception of the wether block, the paddock where the hoggets are running off their kale, choumollier or swedes, and the useless unbroken-in flat. Whilst in the paddocks they are fed one bale of hay per 100 and a sack of Tomoana nuts per 1000, just fed off a vehicle on to the ground. They have a day in each paddock and three days on each hill block, which makes a rotation of about three weeks. Whilst on the hills they, of course, get no hay or nuts. The hoggets get about four hours on their feed each day and a bale of hay per 100 per day in their run off paddock and 2oz. of Moose nuts per day fed in troughs. The ewes and hoggets are button-holed and eyecropped before the rams go out in April and crutched in August just before lambing. This saves a lot of dagging at shearing time. After crutching the ewes are put into their lambing paddocks. If the feed has not come away too well some have to be left on the hills until it does. The best paddocks are left empty from now until mid-September to freshen up for the hoggets when they have finished their winter feed. If ewes have had to go on to the hills at this time, they are worked into the paddocks as the feed supply improves. By early October, when tailing is done, all are always in the paddocks, and the hills have nothing more on them until weaning time. From now until Christmas feed becomes an embarrassment.

Wool is the first consideration as it is wool country. I have no other breed of ram on the place except Corriedales. (I consider that a farmer must decide whether he wants wool or meat and if it is wool he must breed wool from every suitable ewe and not mess about with several breeds for fat lambs as that only reduces the number of ewes he can cull each year, which in turn, of course, reduces the quality of his flock.) All hoggets are shorn as lambs at weaning, which I am sure pays, but only if they are fed adequately. They are also always drenched with a phenothiazine drench when the first autumn feed starts to come away; this I look upon as an insurance. After the initial dose they are drenched only if thought necessary.
One other point which may be of interest; I have not had a fire on Leefield for 17 years. The days of burning in the autumn or spring have gone and the rough tag is all controlled with cattle. It is amazing how the hill country has improved and the clovers come back; and cattle are a very profitable side line.

Mr Little. Does your sub. tend to run out under your heavy stocking? How often do you have to plough and resow?

Mr Dillon. My first sub. paddock was put down in 1936. The sub. was still there but I had to plough this year because it was like a sheep camp with nettles, horehound and barley grass. Sub. paddocks must be grazed hard. The heavy trampling and close grazing keep out the weed grasses, particularly hair grass.

Mr Iversen. In Canterbury we normally sow two or three or four pounds of sub. We consider it vital to take stock off early to allow for a seeding period in the first season. Mr Dillon sows ten pounds. Does he have to take the same trouble as we do in the first season?

Mr Dillon. I think it is a good thing to be careful about the first year’s pasture. I disagree with the advice given in Canterbury to sow two to four pounds. You should sow eight to ten pounds.

Mr Chaytor. What area of land in Canterbury and Marlborough do you think could be developed in the way you have done, with crops paying for the development?

Mr Dillon. There are many thousands of acres of light land in both provinces which could go into good sub. pasture in the way I have described. It needs incentive.

Major-General Barker. In Australia they have a lot of trouble with sterility in ewes feeding on sub. clover.

Mr Dillon. I had some trouble which I thought might be connected with the Australian problem but on investigation by the Animal Research Division it was found to be due to some other cause. In Australia they often have pure sub. pastures, but I understand they get sterility mainly with the Dwalganup strain. There is very little of this in New Zealand and we should beware of sowing it.

Dr. Coop. There have been no authenticated cases of this form of sterility in New Zealand.

Mr Verity. What yield of wheat did you get from the land before you developed it?

Mr Dillon. We used to average 30 to 35 bushels a year. I don’t believe one crop of wheat ruins light land. If we could break down the tradition that it does, we’d get more wheat grown.

Mr Murray. Did you inoculate your sub.?

Mr Dillon. The pastures which I broke up were just Danthonia and browntop with no clover. I didn’t inoculate.

Mr L. Carpenter. What is your programme for re-sowing an old paddock?
Mr Dillon. First it goes into ridged chou and swedes. Then into wheat and after that I'll sow down. I don't know yet how much sub. I will sow.

Chairman. Re-establishment of sub. from seed in the ground requires two furrows to bring the buried seed back to the surface.

Mr A. Grant. With this building up of your fertility do you find volunteer white clover coming in?

Mr Dillon. No. I have on occasions sown white clover with sub. and have even harvested a crop of white clover seed. After that the sub. took charge. On stony land the two do not seem to live together.

Mr Grigg. Which strain of sub. do you recommend?

Mr Dillon. I sow Mt. Barker. I haven't tried any of the others. 

Have you attempted to harvest sub. seed?

Mr Dillon. I shut up an area for seed and the experts told me there was 30,000lb of seed there. So I bought a new header which cost £2,300. I was told to let the sub. dry off and then mow it. I did this but found I had left the cobs under the mower on the ground. I harvested two bags. I sold the header.

Mr Samson, Marlborough. I live in the next valley to Mr Dillon. We have a better rainfall than he does and the sub. does so well that it seems to choke itself. We ploughed up in March and there is always enough seed in the ground to germinate and re-establish the pasture. As regards harvesting we use a stiff-tined hay rake after the sub. has dried off. We like to work after there has been a shower of rain or early in the morning when the dew is still on it. If it is on the short side we use a special implement which a local engineer made for me. Tines were fitted 2in. apart and worked on the tool bar of the tractor. A frame can move up and down through the tines. We drag it along and lift. The frame goes down and pushes the stuff off the tines.

D R Y L A N D F A R M I N G A N D T H E F E E D S U P P L Y (B)

H. M. Copland, Dromore

The only reasons I can give for being asked to give this paper are that some members of your committee are interested in my methods of pasture establishment and also in the results I have obtained in the way of fat-lamb production. I would like to make it clear that I make no great claims for what I am doing—I haven't yet done all that could be done.

My farm consists of 1488 acres of medium to light land nine miles north of Ashburton. The land is level and there is very little variation in soil type. It is watered by the county water races. The unimproved value is £5/10/- per acre. The district has an average rainfall of 28 inches fairly well spread, but we are subject to severe dry periods at almost any time of the year. The effective rainfall is
reduced considerably by the dry nor'-west winds and by the constant easterlies. The winter is long with severe frosts and occasional snow.

Prior to 1940 Mid-Canterbury was called the granary of New Zealand. Farmers took more interest in cereal cropping than in pastures and stock, not only on the heavy land but over practically the whole area.

On the light land the farmers fallowed the soil for four or five months, ploughed three times and cultivated numerous times. Then they would sow wheat; after the wheat they would probably sow oats, and in the spring sow grass with the oats. About the only places where grass would grow reasonably well would be an old stack bottom or around the gateways leading in and out of the paddock. Probably the pasture would be left down for about three years—by that time it would be either hairgrass or browntop or both. Then the farmer would go through the same procedure again.

About 1940, stock prices were a little better and labour for agricultural work and harvesting was not so easy to get so the farmers, with encouragement from the Department of Agriculture, began to take a serious interest in pastures and livestock management. I myself started sowing lime in anything like decent quantities about 1936. At that time an order for 200 tons was considered enormous—latterly in our area that's quite common.

I am convinced that lime and lupins have done more to build up the fertility of our light land than anything else. I firmly believe that before sowing we must have our soil in good heart to grow good pastures and to stand the dry periods we are liable to get at any time of the year. After I had been liming for a time I could see that our pastures were not running out so quickly so I decided to sow a mixture of grasses, hoping to curtail the renewal programme still further. I give the Agriculture Department credit for their advice on pasture management on better-class land but I don't agree with their pasture mixture for light land. Their mixture is all right for a damp season, especially the subterranean clover if it gets a favourable autumn, but when we get a dry autumn the sub . just disappears. I don't think a mixture predominant in sub. clover, ryegrass and white clover is suitable for dry light-land farming.

I sow about 10lb. perennial ryegrass, 7-8lb. cocksfoot, 3lb. red clover, 1lb. white clover and 1-2lb. dogstail. My reason for less ryegrass is that I find it too vigorous the first season and this does not help the other grasses to establish themselves. After the first season the ryegrass thins out but as the pasture gets older may re-establish itself quite well. Cocksfoot, if given a reasonable chance the first season, establishes well but I do not graze with sheep to any extent the first season. Both cocksfoot and red clover establish well if controlled with cattle the first season. Once established, cocksfoot and red clover give the most grazing through dry periods, in the early spring and after grub infestation.

My farm is divided into 31 paddocks, the largest 90 acres, the smallest about ten. I run 1600 flock ewes, Romney-Corriedale cross, mostly bought in as ewe lambs in the autumn. In addition I run 200 stud Corriedale ewes, 60 stud Border Leicester ewes and 700 hoggets consisting of the ewe replacements and the stud ram lambs.

I generally buy in young cattle in the autumn and usually finish up with 400-500 by October or November when the flush of growth is on.
I plough up about 100 acres of pasture a year, putting half into rape and half into turnips. About 50 acres goes to oats for seed or chaff and to lupins for seed. I sow down about 100 acres in November, sowing the grass with turnips. All the farm has now had at least four tons of lime but I still apply one ton of lime before sowing a new pasture. I topdress this with two cwt. of super in the following spring and then give it half a ton of lime and two cwt. of super every second year. From a five-year stand of lucerne of 25 acres I have averaged from two to three tons of hay annually.

I start to lamb in mid-August. By lambing early, I get a big percentage of lambs away off their mothers. (Here I would draw your attention to the figures for the past seven seasons.) The rest of the lambs are weaned in the first week of January and go on to feed. The ewes are then sent off the farm for four to five weeks. They go to old browntop and sweet vernal pasture to reduce their condition. While the ewes are away the paddocks freshen up and they come back to a change of good feed. I attribute my lambing percentages to this practice.

Half the rams go out in mid-March, the rest on 1st April. As you may have guessed from the figures Border Leicester rams are used. These are bred on the place. The ewes are wintered on lucerne hay and turnips.

Well that is my own story. The light-land farmer's biggest problem is to use economically all the grass grown. Light land responds quickly to favourable weather and packs up just as quickly under dry conditions. I think we on dry land should try to find a way of economically using all the grass we grow. The economical use of all the grass on the farm is of more importance on our type of land than anywhere else. I am sure we cannot achieve that objective by buying in and selling off stock.

Making hay from the surplus is quite a help but I do not think it is the answer on its own. Our most growthy periods are the most difficult for saving good hay. To get a decent cut of hay the paddock has to be closed for a time. Then after the hay is taken off one finds that the pasture has deteriorated.

I must admit that I haven't done anything in a practical way as far as ensilage is concerned but I had my eyes opened the other day when I saw what a near-by farmer is doing with silage on sweet sandy soil which responds quickly and dries out quickly. Gathering the surplus for silage in growthy periods would give us a reserve for dry periods.

With this more intensive system of grass farming we will need more and more assistance from the Department of Agriculture in the way of soil testing. If we can treat our soil to obtain a proper balance in the feed grown, we may be able to get as good results from one inch of grass as we do from three today. The answer must come from the scientist—I warn you against trying to buy it from the salesman of stock licks.

To sum up, I think my results are due to the following facts:

1. Cocksfoot sticks to us under adverse conditions.
2. The use of Border Leicester rams.
3. The use of cattle as controllers, especially in the first year, until cocksfoot is established.
4. The soil is in good heart when we sow pasture.
## APPENDIX

(Figures in bold type are off the mothers)

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<th>Season</th>
<th>Ewes Tupped</th>
<th>Lambs killed</th>
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Mr Lister, South Canterbury. Are you troubled with grass grub?

Mr Copland. We do get it but less than we used to before we used lime. The bare patches in the pastures soon fill up.

Mr Grigg. What part do you consider the lupins have played in building up your soil?

Mr Copland. A neighbour was the first to grow lupins for green manure in the Ashburton County. He found that stock liked it and thrived on it, so I sowed it too and used it as winter feed. That was in the early 1930's. I used to sow lupins and plough in but I couldn't see much benefit from using them for green manure.
as compared with feeding them off. I think it's the deep-rooting system and the nitrogen collected that makes lupins beneficial.

Mr Grant. Will you tell us something about your cattle?

Mr Copland. I buy in calves and may have up to 400 over the winter. I run them on the paddocks and start to feed hay in July. At lambing time the cattle go on to turnips. There is plenty of grass in the spring and early summer and I normally sell them in December and January.

Mr Grant. Don't you think your cattle may have more to do with your heavy weight lambs than the Border Leicester rams?

Mr Copland. I think it's a bit of both.

Mr Dillon. Don't you find that turnips in September have a low feeding value being pithy and rubbery inside?

Mr Copland. Not the ones sown at New Year. These are the ones I keep for September.

Mr Middleton. Do you set-stock or graze rotationally?

Mr Copland. We set-stock. We think the lambs thrive better if they are not shifted about.

Mr Hardy. The sooner we get our new freezing works in Southland the better. If there are many farms like Mr Copland's the Canterbury works will not be coming down for our surplus stock in the future. I'll have much pleasure in taking this lamb sheet back to Southland.

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PLANNING THE FEEDING PROGRAMME

H. E. Garrett, Lincoln College

What are the objectives of any planning of feeding programmes? First and foremost is the aim of making as much money as possible or, if you prefer the term, making maximum returns. The second objective is to do this as easily and conveniently as possible—we are fairly lazy and like to do only a moderate amount of work. It is also the aim of any farmer, and a most desirable one it is, too, to continue the improvement of his holding. This can be done by raising fertility and lowering the weed content of soils and by improving the assets above ground, such as pastures, fencing, water supply and buildings. We have heard a lot here at this conference of the farmer's patriotic duty to produce as much as possible in the world as we find it today, and I think that many farmers do wish to respond to this moral call to duty in a greater or lesser degree so long as it does not interfere with their lives too much. That is as it should be, I feel, remembering that cricket matches start in Christchurch on Saturday mornings now. So much, then, for the main objectives of any feeding programme or, in fact, of any system of managing a farm unit.

Now, as Professor Coop has pointed out, there is a definite animal requirement over the twelve-month period and a definite pro-
duction of pasture feed over that same period. These two have to be fitted together in such a way that the farmer can make a good living without working too hard to do it, and also produce enough off the property to stop his neighbours talking about the teeming millions in Asia who will take this country over if he and a few more like him don't produce a bit more. Well, there are a number of ways in which the job can be done.

Firstly, animal requirements can be fitted to pasture production. This is fairly easy in some areas of the North Island where grass grows all the year round. By some judicious closing-up of pastures little or no feed other than grass is required. These conditions are seldom, if ever, found in the South Island. Unfortunately we have to do something more than this.

To some extent we can fit our stock requirements to the available feed supplies by such practices as intelligent drafting of fat lambs, by timing the sale of our cast ewes and by buying in varying numbers of store stock for fattening to suit the changes in feed supply. Some of these things are not easy to do and make profits, because the market usually moves the opposite way from the feed supplies. But the great thing about all these measures for making feed requirements fit the feed supplies is that they are easy—they do not require a lot of work; at any rate, not physical work. A nice judgment of the situation is often required, however.

The other idea is to make the feed supply fit the stock requirements. Here we see various devices employed and we have heard about many of them at this conference. We can make hay, make silage, grow roots, grow green feeds, close pastures in the autumn and topdress them for winter-feed production, and grow rape and other feeds for fattening. We can also get over the difficult winter period by taking small seeds off our pastures and by this means keep available summer pasture down to the grazing area which will just support the stock we can carry over the winter.

Which of these methods we adopt, and how we will fit them into the management of the property depends on the nature of the property itself and its situation. But whatever the property, I am convinced that the best approach is to start with a study of what has happened in the previous season, or if possible, over several years. I know that changes in weather produce changes in supplies of feed, but a study of what has gone before is still by far the best approach. The absolute method, taken alone, of estimating what different pastures and crops will carry, without knowledge of the performance of a particular property or the surrounding district, will lead sooner or later to serious difficulties with stock feeds. You may easily be able to improve on the previous management but the thing to do is always to start on the foundation of what is there already. Incidentally, in my opinion it takes five years to make a poorly-managed farm become reasonably productive and ten years to reach a really first-class condition where you are developing such a property out of income. For the purpose of studying feeding programmes I have selected four properties representing a sweep right across the Canterbury Plains and now propose to spend a few minutes describing each to illustrate the planning of the feed supply. These properties are being farmed by occupiers whom I would describe as rather better than the average-efficient-farmer, if that term means anything to you.
Mr Iversen. Last year I suggested at this Conference that the Canterbury farmer should carry more stock. After the recent dry autumn I wonder if they would like to shoot me today. As regards the planning of a feeding programme I would like to stress the following points:—(1) The use of autumn-saved grass and the rationed use of that grass. (2) The better utilisation of grass. For instance at the Experimental Irrigation Farm at Winchmore they are running seven ewes to the acre by using every blade of grass that grows. We grow a lot of feed and waste it. We make a lot of hay and waste it. (3) All plants do not grow at the same time. We've had a rye-grass complex too long. (4) We should think more of grazing lucerne or a lucerne-cocksfoot mixture. I thought we had the lucerne-grazing king in Canterbury until last week I went to Gimmerburn in Central Otago. On a farm there of 1100 acres there were 700 acres of lucerne used for grazing.

Mr Samson. We put down cocksfoot and lucerne on some light stony land in the Wairau Valley. In an adjoining paddock we put sub. clover and Phalaris tuberosa. With the use of lime and super on our land we get a tremendous growth of volunteer clovers. I knew we should not graze the cocksfoot and lucerne hard in the first spring but there was so much volunteer growth that I was afraid it would be choked out, so I topped it and baled 1100 bales of toppings from 20 acres. It is now an excellent paddock of cocksfoot and lucerne and has been particularly helpful in the dry autumn. The sub. and Phalaris was also topped and not grazed until May when there was about six to eight inches of growth. I put 75 rams on 10 acres of this pasture with a little hay. They were there till October and couldn't keep the sub. down.

CLOSING REMARKS BY THE CHAIRMAN

"The second Farmers' Conference now draws to its close. For three days we have listened to a most interesting and inspiring series of papers. We have many of us brought opinions to the Conference and we have discussed many matters both inside and outside this hall...

"I hope you have, as I have, made some new friends during the last three days, and now we return to our farms and homes and our over-worked wives. For a whole day we discussed the question of wheat, but we still have not reached a conclusion as to whether good land can be farmed well without wheat. For a long time we've talked about taxation, but we still haven't the full answer as to the effect of taxes on production. We have discussed the question of silage and roots, and I doubt whether any of us who grow roots will stop and use silage. So what are we going to do? I believe we should study very carefully every new idea that comes forward, and that we should try to plan our own balanced system of husbandry. We should grow some wheat if we have the land suitable. I think
we should go in for silage. We should try all methods of protecting our families for the future, but I do not think we should give everything away and then find in three or four years that we have not died after all . . .

“I am convinced that agriculture in New Zealand is entering on a new era, but I don’t think the landscape is going to change rapidly from the point of view of a townsman who is taking a drive in the country, except perhaps in two ways. It will become greener and I think and hope there will be a few more houses. Improvement will take place. It will show in more healthy stock, in more wool, in heavier lambs. I hope we will not see any more one-man farms . . .

“Farmers as a race are conservative and it is fundamentally right that this should be so. A few in each district stand out and go ahead a little further than the others. These people are pioneers in new fields and each of them effects a small change in agriculture as a whole. They are the people to watch. They are definitely the people we want to come to our next Conference.

“Thank you for your co-operation.”

ANNUAL MEETING

At the conclusion of the papers a short annual meeting was held.

It was carried unanimously “That the Conference be continued as an annual conference and be run in future on similar lines to the present one.”

It was agreed that the dates should be about the end of May and that all Provincial Councils of Federated Farmers be notified as soon as possible of the dates decided on.

It was further decided that the College be asked to arrange a field day immediately prior to the holding of the next Conference to enable farmers from a distance to see over both College farms.

In closing the Conference the Chairman invited all members to consider suitable subjects for discussion at the next Conference and to forward their suggestions to the Secretary.