SOME T U R E S OF CURRENT LAND UTILISATION.

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An aim of this statement is to provide specific evidence that the application of available knowledge relative to the utilisation of our farm resources is far from being the fullest possible and that the current trends are not always completely reassuring ones. Before entering upon a consideration of such matters it seems worth noting that a general adverse and disparaging criticism of our farming is not at all justified. Indeed, it may be stated with safety that the standard of grass-farming efficiency in New Zealand measured relative to that Of other leading grass-farming countries of the world is quite high.

Underlying the whole discussion which follows is acceptance of the following thesis:--

In general the ability of New Zealand to export farm produce regularly and over. a long period of time depends to a considerable extent upon whether the effectiveness of New Zealand farm labour exceeds that of competitive farm labour having due regard to the labour return in the different places. Correlated with this is the important stark fact that the effectiveness of labour depends not only upon the worker as such but also upon the tools with which he works; in this case principal tools being the stock and the pastures, Because of this some important aspects of labour efficiency are discussed herein.

General Survey of the Position:

According to the latest available official statistics (those for 1 936-37),, out of a total occupied area of 43,199,000 acres the total cultivated area was 1 9,588,000 acres, i.e., 45 per cent. of the whole occupied area. Further, 17,250,000 acres of the whole cultivated area was returned as in sown grass es.

A question of considerable practical importance is what part of the area in sown grass is carrying or profitably could be made to carry high-class swards in which such species as ryegrass, cocksfoot, white' clover and red clover are dominant. A conservative estimate may be formed by taking into account the area being utilised today for dairying and fat lamb production. It is possible to calculate from the data obtained in the dairy-farm survey carried out recently by the Census,& Statistics Office that $4\frac{1}{4}$ million acres are employed in dairying (according to this 1 dairy cow requires 2.5 acres and the production of butterfat an acre averages 105 lb, per annum).

In the 1936-37 killing season approximately 10,000,000 fat lambs were slaughtered, If on the average $2\frac{1}{2}$ fat lambs to 3 fat lambs are produced per acre, then the area devoted to fat 'lamb production ranged from 4,000,000 acres to 3,300,000 *acres.* It may be noted that in a large group of fattening farms in Mid-Hawke 's Bay the average production was 2.2 fat lamb's, an acre.

Hence the total area devoted to dairying and fat lamb production on the basis specified becomes from $7\frac{1}{2}$ to $8\frac{1}{4}$ million acres.

On this as a whole the most profitable farm economy in the light of available knowledge is that which involves the establishment and maintenance of vigorous high-class pastures of

which the major constituents are the better strains of such species as perennial ryegrass, cocksfoot, white clover and red clover, The foregoing considerations do not exclude the possibility of such pastures being employed advantageously on land additional to that already specified, The main means to such pastures are known to be appropriate topdressing, the sowing of the superior strains of the pasture species mentioned, and proper grazing management which is fostered by such measures as ensilage. It becomes of special interest, therefore, to note the position which has evolved in respect to topdressing, sowing Of superior strains 'of the main pasture species and ensilage.

Topdressing:

The national topdressing position as well as the position in the various land districts is indicated in the accompanying table,

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

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

The following rather striking piece of evidence about the relation between topdressing and cost of production was provided in a section of the recent investigation about liquid-milk production for domestic use in the Wellington-Manawatu area.

Table showing Cost (in pence) of producing 1 lb. Butterfat.

Manure per Acre	Number of Farms	Average output lb, butterfat	Working costs	Interest Costs	Labour Costs	Total Net cost
½ cwt. to 1 cwt.	49	10438	5.914	**5.372**	7.745	17.634
1½ cwt. to 2 cwt.	30	**10225**	5.906	4.513	7.204	16.542

Use of Superior Strains of Main Pasture Species:

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

TABLE I: Grassland Topdressed.

Land District	1932-33 Lime only	1932-33 Total	1933-34 Lime only	1933-34 Total	1934-35 Lime only	1934-35 Total	1935-36 Lime only	1935-36 Total	1936-37 Lime only	1936-37 Total
North Auckland	12,270	432,697	14,778	416,399	21,377	441,120	20,018	472,366	18,141	569,145
Auckland	23,020	916,076	26,157	897,165	24,991	987,693	24,751	1,060,110	27,773	1,138,226
Gisborne	1,008	32,073	930	27,024	1,689	40,366	1,037	36,056	1,583	50,873
Hawke's Bay	4,579	102,611	4,480	95,469	6,283	152,068	8,635	158,800	10,620	205,725
Taranaki	7,793	347,250	10,012	286,856	12,938	329,776	7,383	325,775	7,966	368,214
Wellington	12,415	311,870	14,769	244,015	16,325	344,227	18,526	384,785	22,136	449,642
Nelson	2,017	27,314	2,044	23,092	1,801	23,517	1,806	27,013	2,119	33,081
Marlborough	569	14,906	520	12,243	465	13,268	767	15,405	939	19,904
Westland	2,333	9,795	1,555	9,009	2,059	9,935	1,384	10,009	1,819	11,457
Canterbury	12,101	67,988	10,843	60,781	14,004	73,641	19,134	88,636	31,948	128,906
Otago	7,345	50,178	9,608	51,025	13,511	69,624	15,780	82,300	21,181	102,600
Southland	17,502	125,356	20,538	126,092	30,543	198,879	31,704	220,969	30,544	248,526
TOTAL	102,952	2,438,114	116,234	2,249,170	145,986	2,684,114	150,925	2,882,224	176,763	3,326,279

Quantities of Seed finally Certified.

Pasture Species	Season. 1932-33	Season 1933-34	Season 1934-35	Season 1935-36
Perennial Ryegrass (bushels)	245,667	119,019	182,386	279,305
Cocksfoot (lb.)	622,765	200,560	715,982	657,319
White Clover (lb.)	33,731	20,337	93,381	56,092
Red Clover (lb.)	3,763	17,263	32,193	23,620

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

1. If we use on our dairying and fat lamb territory all the perennial ryegrass of superior strain that we produce, do no resowing and sow at the rate of 1 bushel an acre, then on the basis of the average seed production of four years it would take a period of 35 years to 40 years. to sow the area specified,

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

Much comment could be made on the position just revealed. The following comment herein must suffice: It is generally accepted that we have made valuable progress in respect to superior strains of the main pastures. But when it comes to what is being done in the way of incorporating progress in this direction into our farming in general it is clear that the achievement up to date is not impressive. Where is the basic weakness in the position? Clearly the seed is not being grown in the quantities required to bring about a rapid exploitation of the superior strains in our general farming. The growers of the seed say that there is not a demand at a payable price for substantially greater supplies of the seed. It may be questioned whether substantially greater supplies even at a considerably lower price would go into use on typical dairying and fat lamb territory; It will be questioned by some also whether it should go into use and in this connection it seems well to point out that there is much evidence available pointing to the conclusion that a basic step in the most profitable improvement in the pastures of much territory is the introduction of superior strains of the main pasture species; whether this is done by ploughing and resowing or by surface sowing being apparently immaterial.

Grass Conservation:

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

period of rapid pasture growth. This is illustrated in the following table based on data in the Department of Scientific & Industrial Research Bulletin No. 31 by Hudson, Doak and McPherson:-

Daily Yield of Green Herbage in lb. per Acre

Period of Production	No Manure	3 cwt. Super per acre	
		Summer Application	Winter Application
12th May to 28th August	9.2	20.9	24.6
7th October to 17th October	120.2	185.6	194.5
Difference between winter and spring production	III	164.7	169.9

The increase in topdressing that has taken place in recent years has already been noted and it becomes interesting to consider whether there has been a corresponding increase in the conservation of surplus pasture, In climates characterised by broken summer weather ensilage has been strenuously recommended as a valuable means of conserving surplus pasture growth ; hence interest attaches to the trend in ensilage as indicated in the following table.

TABLE Trend in Ensilage
Table showing the Areas in Acres of Grasses and Clovers cut for Silage

	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37
N. Z.	114,301	113,745	116,495	92,271	80,595	82,665	78,385
Auckland	75,270	58,636	72,028	55,235	47,060	48,419	45,538
Taranaki	28,488	30,746	30,508	25,959	23,649	22,857	22,738

As hay-making is complementary to ensilage in pasture conservation the hay-making position is given in Table III and the joint hay and silage position in Table IV.

It will be noted that the upward- trend in hay-making in general counterbalances the decline in ensilage, In view of the undoubtedly useful role of ensilage in districts of uncertain summer weather it might be expected that ensilage would consistently grow in popularity in districts such as Taranaki and Auckland as a means of spreading over a greater period of time the annual job of conserving surplus pasture growth.

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

TABLE III. Trend in Hay-making.
Acres of Grasses and Clovers cut for Hay-making.,

	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37
N. Z.	295,285	317,847	409,974	378,141	414,156	453,353	425,385
Auckland	128,214	118,362	192,450	190,972	201,317	227,115	213,891
Taranaki	39,686	43,955	55,701	52,996	56,444	60,550	54,151

TABLE IV. Trend in Hay and Silage together.
Acres of Grasses and Clovers cut for either Hay-making or Ensilage.

N. Z.	409,586	421,592	**526,469**	**1470,412**	**484,751**	536,018	**504,253**
Auckland	**203,484**	176,998	264,478	**1246,207**	**248,377**	275,534	**259,429**
Taranaki	**68,174**	74,711	**86,209**	**78,955**	80,093	83,407	76,890

The full significanee of Tables II, III and IV is to be seen when the tables are considered in conjunction with the relation between the seasonal production of pastures and the seasonal feed needs of reasonably well-fed dairy herds. In a paper presented to this conference three years ago it was indicated that while 52 per cent. of the whole year's production of pastures takes place in the period October to December inclusive, only 30 per cent, of the feed requirements of a well-fed dairy herd fall in the same period. From this it may be deduced that **42** per cent, of the grass production of this period is surplus relative to the feed requirements in dai'rying. In other words, **42** per cent, of the pasture production is 'available for hay-making and for ensilage, From data in this statement it is made clear that the official estimate of the area of land required for the keep of one dairy cow varies from **2.16** acres to 3.22 acres. If we take an intermediate figure of 2.5 acres per dairy cow, the fact that there are in round figures 1,000,000 dairy cows in the Auckland Province indicates also that 2,500,000 acres are devoted to Auckland dairying. The conservation of surplus grass growth on **40** per cent, of this would give an area of 1,000,000 acres of hay-making and ensilage annually for Auckland dairying alone. Actually the Dominion acreage for both dairy and other farm stock is in round figures **500,000** acres, while the Auckland acreage is but 250,000 acres - one-quarter of the acreage apparently available.

Is Increased Production desirable?

From the facts already given it is clear that we are not making as much use as could be made of available means to increased production,

The question that immediately arises is whether increased production is worth while, Quite a common contention is that the increased production can, as a rule, be obtained only at such a. great cost as to make it more profitable to be content with a lower standard of production, and, in fact, the 'view recently has been advanced strenuously that we have already reached the peak of production in dairying at least.

Some available information throwing general light on the economic advisability of increased production will now be discussed.

-Influence of Size of Farm Business upon Economy of Production:

A matter that seems, in general, to receive much less attention than its importance warrants is the influence of size of farm business upon economy of production, In this connection it is of fundamental importance to bear in mind that the size of a farm business is not necessarily or closely correlated with the acreage of the farm, It will be seen from what follows that increasing the size of the farm business is often a desirable objective" Fortunately increasing the size of the farm business is not identical with increasing the acreage of the farm, otherwise our farming difficulties would be greater than they really are.

The influence of size of farm business upon the farm economy recently was illustrated in an investigation of Heretaungn Plains farming, The investigation embraced dairy farms, mixed farms and sheep farms, all three occurring in reasonably similar proportions in the groups of farms considered. The position disclosed is set out in the following table:-

TABLE V.

	Range on Area in Acres	Average Area in Acres.	Amount available per acre for Payment of Interest and Management Reward.
Group 1	0 to 40	29	18/-
Group 2	41 to 80	51	£3. 18. 0.
Group 3	81 to 120	95	£4. 3. 0.
Group 4	121 to 300	209	£3. 14: 0.

Relative to this table, it is interesting to note, further, that in the case of 61 per cent. of the farms of Group 1 the amount available for payment of interest and management reward was a negative one, In other words, such farms could pay neither interest nor management reward in the particular year that was studied, In contrast with this, one farm of 36 acres in Group 1 returned £7. 2. 0. *an* acre for payment of interest and management reward. This farm aptly illustrated that the acreage of the farm does not necessarily determine the size of the farm business; its gross income was $754, while the average gross income for the group was £420.

Distribution of Undesirably Small Farm Business Units:

The three main types of farms in which there are many instances of business units of too small size are:

1. Sheep farms: Reliable statistical data relative to these are not known to the writer, but a general acquaintance with any of our leading sheep farming districts, readily brings under notice instances in which the returns of the sheep farmer are undesirably low intrinsically because of the small size of the farm business which he is operating.

11. Mixed farming, particularly in the arable farming belt of the eastern coast of the South Island in which the holdings are of too small a size to admit of their satisfactory economic working. The position is indicated by the fact that of holdings in Canterbury of 30 acres or more in area 45 per cent. of them (4,201 farms out of 9,342) are in the 30 acre to 250 acre range in area. The position on a great many of these is acute for the following reason:- they are equipped with a team and the usual range of farm implements; If the team is worked to

full capacity too much arable work is done, resulting in soil deterioration which the farmer expresses by sgying the land is "cropped out" or "worked out"; if, on the other hand, the team is not worked to full capacity the arable work that is done . becomes,, of necessity, loaded with excessive overhead charges and so the work becomes too costly, In certain cases irrigation may give great relief in such a position by enabling the. size of the business unit to be increased substantially simply by increasing production per acre. .

111. Dairying is known from the available statistics to be in a markedly weak position in respect to the size of the units being operated,

The general position is indicated in the accompanying Table VI prepared by the Census & Statistics Office. .

Comments on the Position disclosed by Table VI:

Slightly more than 50 per cent, of the New Zealand holdings devoted wholly or almost wholly to dairying have herds Of 29 cows or less, Of these the holdings with herds of nine cows or under probably do not warrant a great deal of consideration from the viewpoint of commercial dairying as many of them exist merely to meet the needs of individual families and on many others the dairying is merely a sideline on "rurban" holdings ("rurban" being applied by some workers as indicating betwixt and between rural and urban).

The holdings associated with herds of 10 cows to 29 cows are much more significant. They number over 10,000 and according to herd size their average areas are: 10 to 14 cows, 69 acres; 15 to 19 cows, 83 acres; 20 to 24 cows, 101 acres; and 25 to 29 cows, 103 acres. That they are very dominantly dairying holdings is indicated by the following facts:--

The average number of sheep shorn on the holding is 3, the average number of pigs kept is 8, and the average area in field crops is $2\frac{1}{3}$ acres. From this it follows that the dominant source of revenue is butterfat.

&cent Dairying Investigation illustrates Relation between Size of Farm Business and Cost of Production:

Data available from portion of a recent study of dairy production in the Wellington Province are of interest as an indication of the influence upon cost of production of the size of the farm business, Most of the farmers covered by the study engage in the production of liquid milk for human use, but this does not affect the validity of the data as indications of fundamental aspects of dairying management. The following table, Table VII, summarises the position:-

TABLE VI. DOMINION SUMMARY.

Holdings wholly or almost wholly used for Dairying Purposes - Season 1935-36.

Category (No. of Dairy Cows)	No. of Holdings	Total Area acres	Area in Field Crops acres	Total Cattle	Dairy cows	Milking Machines		Pigs	Sheep Shorn	Lambs Shorn	Lambs Tailed
						Plants	Stands				
1 to 4	6,628	48,926	1,959	21,116	15,571	4	13	5,734	2,007	51	1,586
5 " 9	3,726	105,854	3,821	35,197	25,086	29	57	10,784	3,315	158	2,739
10 " 14	2,834	196,442	4,463	48,856	33,726	129	286	14,001.	4,812	612	4,289
15 " 19	2,368	196,014	5,402	55,635	39,932	343	758	15,790	6,182	389	5,308
20 " 24	2,544	258,090	6,438	78,708	55,504	855	1,953	22,964	10,270	572	8,717
25 " 29	2,363	244,561'	7,216	87,705	63,235	1,244	3,023	27,809	10,352	607	7,727
30 " 34	2,532	293,008	7,780	109,992	80,145	1,745	4,636	34,831	14,531	1,265	11,867
35 " 39	2,181	280,067	8,06.7	109,701	80,164'	1,758	5,042	33,558	13,004	685	10,569
40 " 64	2,163	284,717	8,765	121,875	90,055	1,857	5,310	37,819	15,299	763	12,233
45 " 49	1,664	256,062	6,166	106,519	77,719	1,487	4,907	33,198	14,822	1,036	12,179
50 " 59	3,023	489,391	12,308	219,239	162,355	2,846	9,913	69,711	29,843	2,292	22,114
60 " 69	2,319	421,455	10,517	198,664	147,451	2,237	8,447	60,440	28,114	2,510	18,554
70 " 79	1,635	339,323	7,262	160,794	119,882	1,631	6,521	46,818	23,302	2,044	16,057
80 " 89	1,155	265,328	5,882	129,433	36,025	1,157	4,968	38,276	19,455	1,959	13,720
90 " 99	769	194,639	4,029	96,545	71,699	796	3,608	26,731	13,974	1,314	10,253
100 to 124	1,128	323,919	6,940	167,579	122,195	1,223	5,841	49,356	26,130	2,694	17,502
125 " 149	431	155,690	3,623	78,862	58,084	526	2,591	22,484	15,074	1,063	10,026
150 " 199	294	137,215	2,929	65,816	48,868	450	2,101	19,680	12,467	1,394	8,311
200 " 299	154	90,546	1,883	47,539	35,223	311	1,437	14,112	10,872	1,179	7,079
300 " 399	2s	38,749	8135	13,097	9,731	82	364	3,504	3,353	573	2,229
400 " 499	9	8,632	122	5,122	3,828.	30	118	1,515	1,140	350	197
500 and Over	13	35,532	704	14,263.	10,293	60	268	3,614	2,440	--	1,675
TOTALS	39,962	,664,160	117,161	1,973,358	1,447,761	20,800	72,562	592,729	280,758	23,515	204,931

TABLE VII.' Showing Relationship disclosed in this Study between Size of Farm business and costs of Production..

Comparison of Costs of Production of Groups of Farms having Various Sizes of Output (Costs of Group under 5,000 lb. Output = 100).

Range of Fat Production	No. Farms	Average Output lb.	Working Cost	Interest	Labour	Net cost
Under 5,000 lb. fat	19	4,292	100	100	100	100
5,000 & under 7,000	39	6,110	96	109	75	86
7,000 " " 9,000	40	8,186	83	111	65	77
9,000 " " 11,000	36	9,963	87	118	65	81
11,000 " " 13,000	28	12,028	80	99	57	70
13,000 " " 17,000	29	14,567	94	108	55	77
17,000 " over.	26	23,225	64	93	42	60

The interpretation of the table may be illustrated as follows:- In working costs £96 or 96/- spent on farms of 5,000 lb. to 7,000 lb, range of butterfat production was as effective as £100 or 100/- respectively on farms of under 5,000 lb. fat production; similarly, £83 spent on farms' of 7,000 to 9000 lb, butterfat production was as effective as £100 spent on farms of under 5,000 lb. fat production, Likewise, in respect to total net cost $86 spent on farms of 5,000 lb, to 7,000 lb. range of butterfat production was as effective as £100 spent on farms of under 5,000 lb. fat production.

The most striking feature of the table is the general and marked trend downwards in both labour costs and nett cost of production. It is to be noted that the trend in working costs is also downward as the output of butterfat increases but that this trend is not so decisive, or regular, as the others mentioned.

In the same study the influence of size of farm business upon cost of production was strikingly disclosed in another way. The procedure was to compare two groups obtained by taking (1) the 30 farms of lowestnet cost of production, (2) the 30 farms of highest net cost of production. The result was:-

	'Butterfat Output in Pounds	Average Net Cost - Pence per lb,
30 farms of lowest net cost of production	16,877	13.247d.
30 farms of highest net cost of production	6,744	23.072d.

Influence of Intensity of Production upon Net Cost of Production:

One of the ways of increasing the size of the farm business that is very generally available to dairy farmers is increasing the production of butterfat per acre,

The following table indicates the position disclosed by the dairy-farming study already mentioned:-

TABLE VIII. Table showing the position disclosed -about the Relation of Production of Butterfat per Acre to Net Cost of Production, expressed in Pence per lb. of Butterfat.

Comparison of Costs of Production of Groups of Farms at Various Levels of Fat Production per Acre (Costs of Group under 60 lb. = 100).

Range of Fat per Acre	No. Farms	Average Output	Working Cost	Interest	Labour	'Net Cost
		lb.				
Under 60 lb,	12	7,338	100	100	100	100
60& under 90 lb.	20	9,198	96	89	88	97
90 " " 120 lb.	49	11,049	79	73	78	85
120 " " 150 "	40	11.855	77	69	72	81
150 " " 180 "	25	13,616	79	62	69	80
180 & over.	22	9,912	76	60	71	79

The outstanding feature of the table is the steady *trend* downward in working costs, interest costs, labour costs, and net cost of production as the production of butterfat per acre increases. It would be more satisi'actory if the upward trend in butterfat per acre were dissociated with the upward trend in output which may be expected as. already shown to be a factor in the downward trend on costs. It is to be noted that in respect to output Group No. 2 and Group No. 6 are comparable and again Group No. 3 and Group No. 4 are comparable and the comparisons which these pairs of groups provide are illuminating. It is relevant to the table that the average Dominion annual production of butterfat per acre has been assessed as approximately 105 lb,

Influence of Level of Herd Production upon Net Cost of Product&:

Another way of increasing the size of the 'farm business is raising the level of production of the herd. Table-IX indicates the correlation between the level Of herd production and net cost of produdtion found in the dairy-farming study already mentioned.

TABLE-IX. Showing Correlation found between Level of Herd-production and Cost of Production in Study of Wellingtom Dairying.

Comparison of Costs of Production between Groups of Farms Various Levels of Herd Average per Cow (Costs of Group under 180 lb. per cow = 100).

No. of Group	Range Fat Production per Cow	No. Farms	Average Output	Working Cost	Interest	Labour	Net Cost
			lb.				
1	Under 180 lb.	14	6,065	100	100	100	100
2	180 & under 210	21	9,698	83	95	78	87
3	210 " " 240	51	9,863	87	91	79	86
4	240 " " 270	54	10,114	79	78	69	76
5	270 " " 300	36	12,752	72	70	61	71
6	300 " over.	29	14,539	64	64	62	68

This table, while decidedly suggestive,, is not as simple and straightforward as the preceding ones. In it, as the average production of fat trends upwards 'the net cost of production trends downwards. Some of the trend in cost of

Review of the Position:.

The outstanding feature of the recent investigational work which has been discussed herein is the direct relationship between labour coats on the one hand and, on the other hand, size of farm business, production of butterfat per acre, and average herd production. When the personal reward of labour is constant, decreasing labour costs such as have been instanced herein necessarily go hand in hand with increasing output of the worker.

It would be difficult to give too much attention to the advisability of measuring the success of farming production in terms of labour. In the words of Van der Post, of South Africa, "Land, man and capital form the triumvirate of production, but of the three man is the most important." In conformity with this view the richness of a people should be measured not in terms of capital but in terms of the human factor. A community should beware lest in fostering farming it depart from this ideal. A thickly populated and heavily productive region may be impressive but it is not necessarily an area of well-being.

Major implications of the position as just stated are far-reaching and vital,

Under the conditions investigated in the work discussed herein the size of the farm business appears as a very potent factor in determining the output of labour per man. In work of land settlement and land development it, is necessary to pay particular attention to this aspect and to follow a policy which will tend to maintain a high standard of living for the countryside.

The size of the farm business may be increased by the adoption of more intensive methods, In much of the world's agriculture the extent to which this can be done economically appears to be much more strictly limited than it is in much of New Zealand farming, In many parts the adoption of more intensive methods brings about greater production at a greater unit cost of production. In the farm experience reviewed herein more intensive methods have given greater production at a lower unit cost of production, However, it is not shown, and indeed it is not expected, that such a result will be always and necessarily obtained.

Under the conditions studied two of the more intensive measures that were found effective in increasing the output per man were:-

(1) Increasing the production per acre.

(2). Increasing the annual average herd production of butterfat.

Having regard to the national average achievement-in respect to both per acre production and herd production, it is clear there is considerable scope for further application of these measures.

From all this it follows that a farm business which today is too small is not irretrievably weak. This is fortunate in view of the substantial number of undesirably small farm businesses.

A third and particularly important possible means of increasing the output per man is the introduction of labour-saving machinery, equipment and practices. New Zealand dairy-

fng has been to the" fore in this respect, but it is very doubtful whether we have fully explored the field of labour-saving in our farming. It is , however, acutely desirable that we should do so. Relevant to this, it is instructive to note that the impressive features of American farming are (I) its large production per man, and(2) the extent to which it has been mechanis ed. It is considered by' Americans, and it seems clear, that there is a direct causal relationship between these two features. One has only to see what mechanisation has done and promises to do for irrigation farming in the South Island to have visions of further advantageous mechanisation of other b ranches of our farming,

In industries other than farming mechanisation of. an industry tends to govern the possible labour reward. At any rate, the 'extant of the mechanisation of an industry is one of . the factors determining the contribution to society of the workers in the industry. If it is accepted that the worker should be rewarded on the basis of his contribution to society, then mechanisation of farming designed to give a greater output per worker is a ready and direct road to avoiding farm income and standard of living lagging behind those of towns in which mechanisation has been of ever-growing importance.

It 'cannot be questioned that in the past much national progress has been made in farming by focussing attention upon production per se. The matters which have just been discussed lead up to the question whether in the future more emphasis may not well be placed upon the returns per man. One thing is certain: Whether the main objective is made production per se or production per man, the basic means towards. attaining that objective is better grassland. As an indication of what better grassland involves,, it seems useful to quote one of the Articles of Belief of the grass-farming Philospher of Wales, Professor Stapledon:

> "The groper use of grass is a matter of the right implements , the right fertilisers, and pre-eminently of the right seeds, "

DISCUSSION.

E. B. Levy :

Gentlemen, I think you will agree with me that we have had a very interesting and instructive paper - extraordinarily interesting and valuable in so far as it covers a tremendous wide field of interest - brings in everyone, To my mind it is an extraordinarily valuable paper .

R.B. Tennent:

I would certainly like to compliment Mr. Connell on his very instructive paper in which he has given very considerable thought. There are two major points in it, concerning which I would like to make a few remarks and the first is in connection with top-dressing, the importance of which he stresses, and incidently was stressed in the papers to which we listened this morning, and strongly stressed - importance of topdressing - and indeed that has been blazoned right throughout the country, year after year, by Instructors in Agriculture, by propaganda and by manufacturers of manures , until every farmer in New Zealand must, we feel sure, be seized up with the absolute importance of topdressing, and while we have clear evidence before us today that we are not utilising to the fullest possible extent those areas which, we know will respond to top-dressing and there must be some very vital reason why that is not done, We are bringing forward evidence that topdressing will pay and yet farmers do not topdress to the extent to which they should and yet the reason why it has not been, must be perfectly obvious to everyone of us. Is lack of Capital a cause? Now there are essential jobs which have to be done on the farm, labour has to be paid for, *fences* have to be erected, These are *urgent* necessities which a farmer has to meet and the purchase of fertiliser is not to the farmer of any immediate moment and that of course is the major factor. That is why we do not see the progress in topdressing that should be taking place. Until we can find some easy means of purchase of manures , the progress in good topdressing will be very slow indeed, The other, important fact which I personally was impressed by was the statement by Mr. Connell which exemplified the slow progress being made in the use of certified grasses and clovers. From his figures and statement you observe that it is going to take a considerable time before these potential areas can be grassed, will be sown down and there was some suggestion in his paper the reason for that was very largely it was not payable to the farmer. Mother ryegrass costs anything from 18/- to £1 a bushel and ordinary certified seed is costing about 15/- per bushel. I am afraid that we have got to look to some other ways and means to obtain the quantities of certified seeds that are necessary in this country and are not forthcoming. I was very pleased to hear him make that statement because I can tell members of this Conference that there has been some thought of slackening up in the seed certification scheme , as it was thought seed certification had reached its maximum, Now I venture to suggest that one of the big difficulties in -regard to adequate supplies of certified seed is this: prior to the advent of certification, prior to Mr. Levy's fundamental work, I think I am right in saying that Southland and Otago produced approximately two thirds of the New Zealand ryegrass. Mr. Levy introduced ryegrass which would not produce high germinating seed when grown in the major seed production districts of, New Zealand and

co nsequently today we find that there is comparatively little ryegrass seed grown in Southland and Otago which was the major seed production area. Simply because these good strains will not produce good seed of high germinating seed in these districts, We know that that is being investigated and until we get good ryegrass produced in districts and produced in quantities then it is going to be some considerable time, to get the bulk of ryegrass necessary to bring down the price of ryegrass and make it available in larger quantitiesi

H.E. Annett:
I do not think the figures can prove anything. I want to know the reliability of these figures. I want to know how they were collected. Are these figures absolutely authentic? I would like to know a bit more about how these figures are collected,

G.H. Holford:
Even on the best farms the farmer did not get off badly with the guaranteed price, I think it is probably something to do with sale of liquid milk. Mr. Connell knows that I have been very interested in his particular subject. I was interested in looking at these things overseas - the amount of work being done by land utilization services. We started very late to be effective as it might be. Many areas now being farmed might be farmed better. Just one final point that Mr. Connell will find in the investigation of dairy farms, that the family unit is a most important thing in the question of farming businesses in dairying,

H. Woodyear-Smith:
There is one thing in Mr. Connell's paper and that is the use of better strains of grass and clovers has been given a good deal of prominence with which one heartily agrees, There is one very disparaging feature and that is the introduction, especially into the Auckland Province, of grass seed brought under the cloak of certification, whereas it happens to be a lot of muck, The lessons learnt from certification have been forgotten by many and farmers are being misled. They are being misled by undesirable propaganda, by buying seed that is of very little use, There was another point in Mr. Connell's paper - about the decrease in silage in the Auckland Province and I would like to ask him - some farmers have told me that taking in the green material and carting out again is too great a burden especially with the high labour charges today.

R.P. Connell:
The cost of production of certified seed is not the reason for more seed not being used. As to these statistics, they are based on the farmers own returns. it is very hard to say just how reliable they are. I have heard them questioned, They are usually questioned when they are not pleasant. We do know that they prove remarkably accurate in certain details. We know for instance about the lambing percentages., They tally remarkably well with the actual tailing of lambs. There is a close correspondence with lambing returns and killings. There is also close correspondence between farmers sowing of wheat and other crops and the harvesting of these crops, so that on the whole from evidence of that sort, I for one am fully inclined to accept those figures , unless there is some disturbing fact

brought forth that I have not heard. Now with regard to the question raised on ensilage. I have been told for the last four,, or. five years that silage was going out in the Auckland province and those statistics support it, The next point raised by Mr. Holford as to the cost; the high cost. throughout. I should probably have emphasised more that this was a special liquid milk production investigation and I claim that the general practice held but that the actual costs are much above what they would be for ordinary factory supply. For the purpose of the guaranteed price farmers and everyone else agreed on a capital of £73 per acre. In this particular investigation the capital being £126 there would be £53 more per cow in capital in this investigation than in ordinary factory supply. The point raised by Mr. Holford about whether the investigation threw any light on the efficiency of the family unit. It did not. The question about inferior see'd, It seems to me that it has raised an important point. Just what is going on I do not know. if inferior seed is being used on permanent pastures it is a very bad state of affairs, The cost of handling silage is what is being put forward as the reason for not making silage.

H. E. Annett:

The best farmers are making silage whereas the poor farmers are not, They are, to my mind, the lazy ones.