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PRESIDENTIAL ADDRESS

“THE CHANGING FACE OF FARMING”

IN SEARCHING for a subject for this evening's address it seemed to me that I might best talk of that in which I have had most practice—that is to survey the past and the present as a basis for speculation about the future. Economics is sometimes called a science, but what I have to say to-night will do little to sustain that claim, but rather give fresh occasion for the charge that the economist is an adventurer moving uneasily between two, if not more, worlds with an assured haven in none.

I also propose to claim your indulgence in permitting me to show some slides during the course of this address. Figures and economics are almost inseparable and invariably dry and my hope is to make the dose as painless as possible by presenting them in graphical form.

Agriculture in New Zealand was pioneered by the Polynesian people—either the Maori or the earlier people he supplanted. His cultivations were on a more extensive scale than we are apt to think. Cook, speaking of Tokomaru Bay says “Mr. Banks saw some of their plantations, where the ground was as well broken down and tilled as if in the gardens of the most curious people among us. In these spots were sweet potatoes, coccos (taro) . . . and some gourds . . . Taken together, there appeared to be from 150 to 200 acres in cultivation in the whole bay . . .” If further evidence is needed of the extent of Maori agriculture think only of his carefully prepared areas for cultivation of kumara along the banks of the Waikato between Horotiu and Ngaruawahia and in many other areas including Nelson. Here the Maori carried sand or gravel to lighten land otherwise too heavy in texture for kumara, leaving those deep conical pits now overgrown with blackberry. The areas are extensive enough to map as a distinct soil type—the Maori gravels. The old Maori too, was no believer in Social Security—he had a proverb “Tama tu, tama ora; tama noho, tama mate kai” (The energetic prosper, the indolent go hungry). Remember, too that these cultivations were made and maintained in spite of the crudity of his stone age tools. The potato was introduced by Cook and by the early 19th Century had become a staple article of diet and of barter with visiting ships.

The beginnings of European agriculture date from the establishment of the first mission by Samuel Marsden in 1814. The plough was first used in New Zealand at Kerikeri in 1820 and Butler, one of the missionaries, wrote “I felt much pleasure in holding it after a team of six bullocks—I trust that this auspicious day will be remembered with gratitude and its Anniversary kept by ages yet unborn.” The Maoris ably led by many of their chiefs rapidly embraced European crops and methods and were much more than self-supporting, selling or bartering their surplus to the pakeha. The development of Maori agriculture in the period up till the Maori Wars “disposes of any suggestion that the Maori was by nature incapable of the steady and continuous effort needed for successful farming of European type.” William Swainson writing of the Bay of Plenty, Taupo and Rotorua areas says “In the year 1857, the natives of these districts alone had upwards of 3,000 acres of land in wheat, 3,000 acres in potatoes, nearly 2,000 acres in maize and upwards of 1,000 acres planted with kumeras.” There was also a flourishing agriculture in the Waikato round Te Awamutu and in other areas throughout the north. The sweeping away of all this development was one of the tragedies of the Maori Wars.

Apart from the missionaries, there was little attempt at systematic agriculture before 1840. True Bell had stocked Mana Island with sheep as early as 1832 and Captain Rhodes had cattle running on Kapiti and Banks Peninsula whilst various whalers, like John James at Waikaiti,

had shore stations with some small cultivations. The first organised settlements in the North Island by the New Zealand Company came near disaster through difficulties in securing possession of the land they believed they had bought from the Maoris. Some of the more adventurous settlers such as the Deans, the Sinclairs and the Hays, abandoned their promised land in Port Nicholson and shifted to Canterbury, I imagine to their lasting satisfaction. By 1844 Clifford and Vavasour had established themselves in the Wairarapa and in 1847 Clifford and Weld extended their activities to the open tussock country of Marlborough. It was stated that "money invested in sheep doubles itself every third year." Lambing dates seem to have been experimental and are reported to have ranged from May to October but this may be merely a reflection of the paucity of fences.

With the settlement of Otago in 1848 and Canterbury in 1850, the era of organised colonisation came to an end. By 1858 the whole of Canterbury had been taken up, the Wairarapa had been occupied and Hawke's Bay was being settled. The scene was set for the main lines of farming development. This development was not along the lines of the mixed farming planned by Wakefield, but in the development of large scale pastoral farming moulded on the Australian pattern—an early example of planning which failed through lack of appreciation of certain fundamental facts.

True, there was considerable development of mixed farming in close proximity to the markets provided by the small but growing centres of population. But these provided no markets for any extensive development. Transport was poor and food was grown near the point of consumption so that farming showed little district specialisation. In 1858 for instance, in Auckland Province, European farmers had 2,323 acres under wheat to which must be added an estimated further 5,000 acres on Maori land making a total of over 7,000 acres, as compared with 4,239 acres in Canterbury. This position was rapidly reversed after the outbreak of the Maori Wars, though as late as 1890 over 1,000 acres of wheat was being grown in Whangarei County alone. It is, in fact, only within the last twenty-five years that the pattern of farming as we know it to-day, has clearly emerged.

War in the north, the discovery of gold in the south caused major changes in the emphasis in farming. Prices hardened for all farm produce and the area of wheat expanded to meet the demand. The north was hampered by the wars though these in turn provided an enlarged market and effectively disposed of much Maori competition.

Lured by the discovery of gold in Otago in 1861, the European population rose from 60,000 in 1860 to over 200,000 in 1868, the bulk of this increase occurring in the South Island. The south maintained this early lead because it also produced the major share of exportable commodities—wool and grain. The decline in alluvial gold production after 1870 released much labour for other industries including farming.

Before the advent of refrigeration in 1882 the pastoral industries passed through a difficult phase when wool, hides and tallow constituted the only exportable products. The importance of wool in the export trade is shown by the fact that in 1853 wool constituted 78% of the value of farm exports; in 1863, 98.5%; in 1873, 91% and in 1883 had fallen to 61% due largely to the phenomenal growth in grain exports to 26% of the total value of farm exports. Frozen meat exports in this year also appeared with a value of £118,000.

The successful shipment of refrigerated cargo was indeed "a prodigious fact" as "The Times" called it, no less for the producers in New Zealand than for the consuming public in Great Britain and marks a convenient turning point in farming evolution. In spite of the optimism engendered by this development, prices for the main export products continued to fall with depressing regularity. Prices for dairy produce reached their lowest ebb in the early 90's while wool continued

to fall in value for another 10 years. These differential movements in prices stimulated the rise of dairying and by 1902 dairy produce represented 10% of the total exports and no fewer than 208 butter factories and 81 cheese factories were in operation.

Before we leave this early period which was really a period of transition heralding the development of many modern trends, it may be of some interest to pause a moment and look more closely at the conditions then existing. In looking for some historical background to Whangarei County, I have read through a lot of old farming periodicals and have found much of interest. From 1885 to 1910, the local correspondent of the "New Zealand Farmer" made sundry comments on pastures. Cocksfoot, ryegrass and clover are mentioned but unless lightly grazed in the spring, these were reported to provide little autumn feed and *Danthonia*, baygrass and *Microlaena stipoides* were recommended where pastures were burnt—the usual method of combatting second-growth. Much oaten hay was made and mention is made of the ravages of rust. A constant search went on for better drought-resisting grasses—ratstail, buffalo grass and finally *paspalum* are mentioned. One dairy company went so far as to discuss "binding each supplier to putting in a certain area of green feed or roots each season" in order to lengthen the season of operation.

In 1903 it is mentioned "Whangarei Heads has always been noted for its ratstail . . . and it is surprising to see the thick sward that this grass now presents on many of the hills." They haven't got rid of it yet!

Roading in the north was notoriously bad and most dairy factories did not open till about the end of September because of transport difficulties. The needs of the expanding dairy industry provided a considerable stimulus to road improvement and metalling. In spite of current ideas to the contrary, there was much mention of stock mortality. In 1910 . . . "There has been heavy and very general mortality among lambs this season. Worms would seem to be the chief trouble . . . or the runs are getting sheep sick." While in May, 1894, there is the comment that cases of abortion in cows have been unusually common and were put down to ergot in cocksfoot.

The trials and tribulations of starting a factory were evidently severe. In 1888 a meeting decided that "the price offered . . . is too small and the number of cows (500) was too great for any one district . . . at present. The price offered, 2½d per gallon of 10½lb., to contain at least 10 per centum of cream is certainly very low . . ."

In the light of present costs, the offer of the Government of the day "to advance up to £20" for the building of a house does not appear very generous. The spread of diseases of fruit trees was also noted—codlin moth appeared in the district about 1886, phylloxera on vines and cottony cushion scale in 1890, potato blight in 1905. Biological control was effectively employed against cottony cushion scale in 1890 with the liberation of the ladybird *Vedalia cardinalis* which still controls this pest.

To return to our more general story. The period 1900-1914 was one of steady expansion in the farming pastoral industries—markets were stable and prices steadily recovered from the depression of the nineties. The outbreak of war in 1914 ushered in a period of steeply rising prices culminating in the boom of 1921 when the average payout for butterfat was 33d. or nearly two and a-half times the 1914 payout of 13.8d. Prices for other pastoral products also reached a peak in 1920.

The prospects of a sustained demand for produce at luxury prices did not materialise and the boom conditions of 1920-21 were quickly followed by slump. During 1921 farm turnover reached record heights and in this one year land transfers in the North Island were equiva-

lent to 21% of the area of freehold land—in Taranaki the figure was 27%. The legacy of mortgage indebtedness from this period has had far-reaching effects on farming philosophy and farm legislation and has materially affected the reaction of farmers to changing price levels.

The “depression” was really a sudden return to reasonable price levels about which prices fluctuated till 1929. The general trend in prices, however, was downwards and in view of the heavy mortgage indebtedness of many in the farming community, this exerted a continuous pressure for efficiency in production and processing. In no other decade have such improvements in efficiency been made, at least in the dairy industry. Between 1920 and 1930 the number of cows in milk increased by 60%, average production per cow by 30%, and output of butterfat, per unit of labour by approximately 40%. Sheep numbers increased by nearly 30%. The period was one of great activity and advance in farming generally—the use of fertilisers in the topdressing of pastures increased enormously and with it a veritable revolution in sward composition of our pastures and their grazing management—the area cut for hay or silage increased nearly fourfold while with more productive pastures the growing of supplementary crops declined.

The depression of the early thirties forced prices of most farm commodities to lower levels than at any time since 1900. Mortgage indebtedness incurred in the boom of 1920-21 still weighed heavily on many farmers. Efforts were redoubled in an endeavour to maintain gross revenue. Dairy farmers increased their herds while many sheep-farmers either changed over to dairying or ran a small herd on the easier portions of their property. The number of suppliers to dairy factories rose by 21% from 59,417 in 1929-30 to 71,837 in 1933-34, the number of cows in milk increased by 32% from 1,388,872 in 1929-30 to 1,827,962 in 1934-35, while the number of sheep declined by over two million. The area topdressed also showed a sharp decline since fertiliser represented nearly one-third of the main working costs on dairy farms.

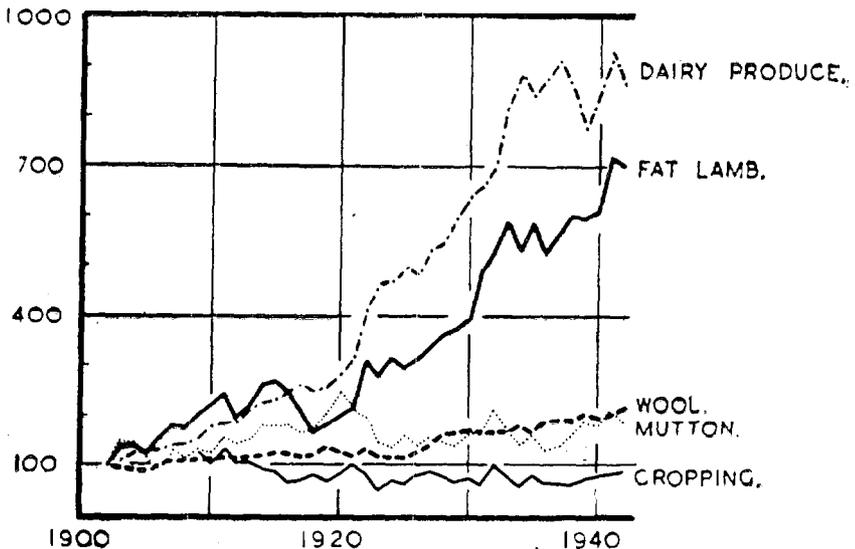


Fig. 1. Illustrates the differential growth in volume of production of various sections of the farming industries (1901-2==base 100). The increase has been greatest in dairying and fat lamb production which benefitted by more intensive grassland management on the plowable area.

It should be emphasised that these reactions were conditioned by the circumstances in which they occurred and might well have been different had alternative avenues of production, such as meat and wool, not shared in the price collapse or had the burden of mortgage indebtedness pressed less heavily. The fact that labour was plentiful and wages showed a real reduction in terms of produce was probably also an important factor.

In the period of generally rising prices since 1935 many of these trends have been reversed though the picture is confused by wartime influences. Sheep numbers, particularly on plowable lands, have increased at the expense of dairy cows; topdressing expanded rapidly until restricted by rationing; real wages have increased and labour has been withdrawn from farming.

If we take 1900-01 as a base, therefore, the major changes in emphasis which have occurred have been the general and, at times, rapid development of intensive pastoral production on our relatively small proportion of plowable land and, generally, this development has been in the North rather than in the South Island. Dairy-production has increased nine-fold in volume since 1900-01, fat lamb production seven-fold, while production of wool and mutton has doubled and cash crops show a slight decline. Taking the average of the three years 1939-1942, the average gross value of farming production was approximately £89.4M. of which livestock products contributed £81.1 million, cash crops £5M. and orchards, market gardens, etc., £3.3M. The livestock industries, and that in practice means grass, contribute 91% of the gross value of production. Only 3.6% of the occupied land in the country is used for crops and orchards. The prosperity of this country depends, probably more than any other, on our ability to grow grass and to convert it efficiently into livestock products.

I want, therefore, to draw your attention to another facet of the changes which have taken place. Mitchell has prepared for me a series of maps illustrating the changes in carrying capacity which have occurred in the twenty years between 1925 and 1945. The figures represent all stock converted to sheep units divided by the area in grass and forage crops and are shown here on the basis of percentage change in carrying capacity.

Taking the North Island as a whole, carrying capacity has increased from 1.57 to 2.14 sheep units per acre or 36.4%. The percentage increase has been greatest in the Waikato and Bay of Plenty counties and least in the East Coast area. A fact not revealed on this basis is that in 1925 the average carrying capacity of East Coast Counties such as Waiapu (1.68) and Waikohu (1.77) was the same as Waipa County (1.70) and much higher than that of Otorohanga (1.25) or Matamata (1.14). The adoption of topdressing and improved pasture management has, however, converted the once despised Waikato into some of the highest carrying capacity country in New Zealand, while the East Coast counties with their hilly topography and poor access have remained stationary or regressed. There appears no technical reason why the revolution which has taken place on the plowable lands should not be re-enacted on the hill lands of the North Island, though economic factors may perforce restrict it to a lower level of intensity. If this change in the intensity of farming of our hill country soils can be achieved, then accelerated soil erosion will largely cease.

Because many of you are working chiefly on the problems of plowable land there may be a tendency to under-rate the magnitude of the hill country problem. There are approximately 31½ million acres of grassland in New Zealand of which less than one quarter is plowable. Our advances in recent years have been on the plowable land where mechanical aids could be employed—those advances are by no means yet fully capitalised but the hill country has, as yet, scarcely felt their impact. Because of the steady rise in sheep numbers it might be thought that all is well but the increase has been predominantly on the plowable land.

NEW ZEALAND

NORTH ISLAND

PERCENTAGE CHANGE
IN
TOTAL CARRYING CAPACITY
1925-1945

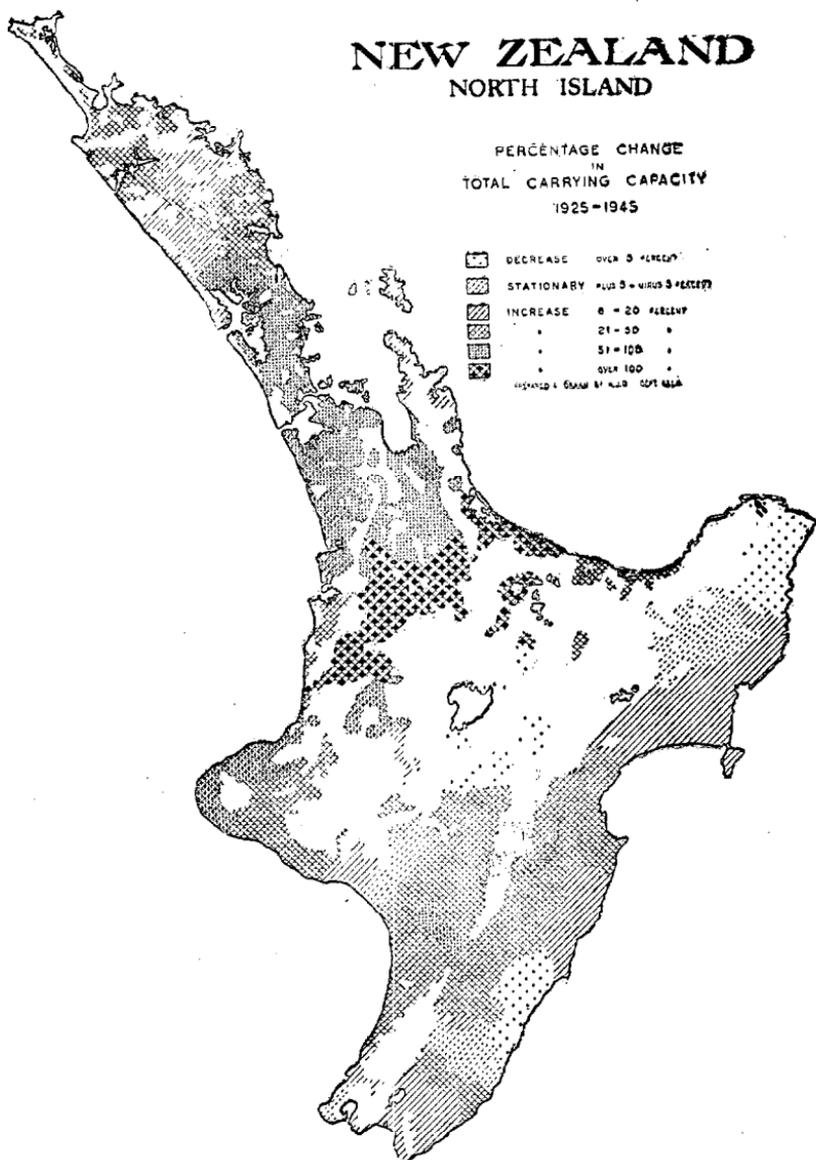
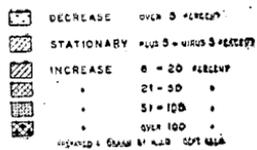
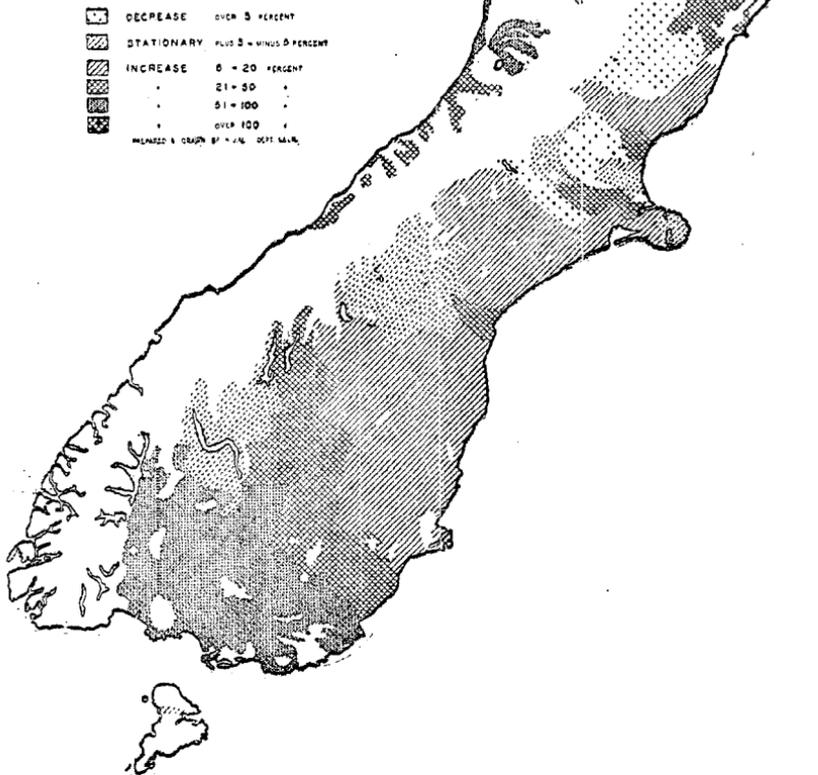


Fig. 2.

NEW ZEALAND SOUTH ISLAND

PERCENTAGE CHANGE
IN
TOTAL CARRYING CAPACITY
1925-1945



Figs. 2 and 3. Percentage change in average carrying capacity per acre of grass on a county basis over the period 1925-45 when all stock are converted to sheep units.

What does the future hold for farming in New Zealand? Since a high proportion of our production is exported such a question can only be answered fully in the light of market prospects. Such a survey would digress too far and I want to confine my few remarks to the physical and economic factors within the Dominion.

If we glance at the progress that has been made since 1900, it is evident that both carrying capacity and productivity per unit of stock carried have increased at a remarkably uniform rate. There is some hint of a reduction in production per sheep unit since 1934 and this is reflected in production per acre of all grassland. This pause may however, be merely temporary. Can we continue this rate of improvement over the next forty years? Given the necessary economic incentive, I see no technical reason why we should not. In Whangarei County the top 10% of farmers on a given soil type achieve approximately twice the production per acre of the average farmer on the same soil type. I believe this to be general throughout the farming areas, on the hill country, as well as the plowable land. At a recent Farmers' Week at Massey, Mr. Levy contended that high producing pastures in New Zealand were capable of producing 500lb. of butterfat per acre. Even if you discount that figure very heavily, there is still an ample margin above the level of average production to-day to permit doubling output per acre.

If we are to be technically equipped for such developments, the research worker and the extension officer must play an increasingly important role. Last year we spent just over £500,000 on agricultural research in this country, but many problems remain unanswered even in respect of old-established practices like topdressing. No one seems

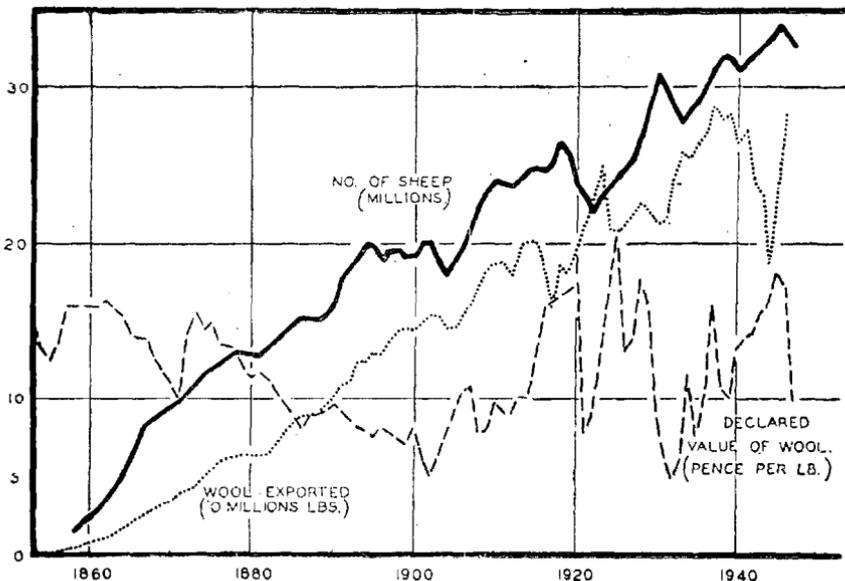


Fig. 4 Total number of sheep in New Zealand 1858-1945 together with wool exported (3-yr. moving av.) and average declared value per lb. of wool exported. Note the almost straight line rise in sheep numbers.

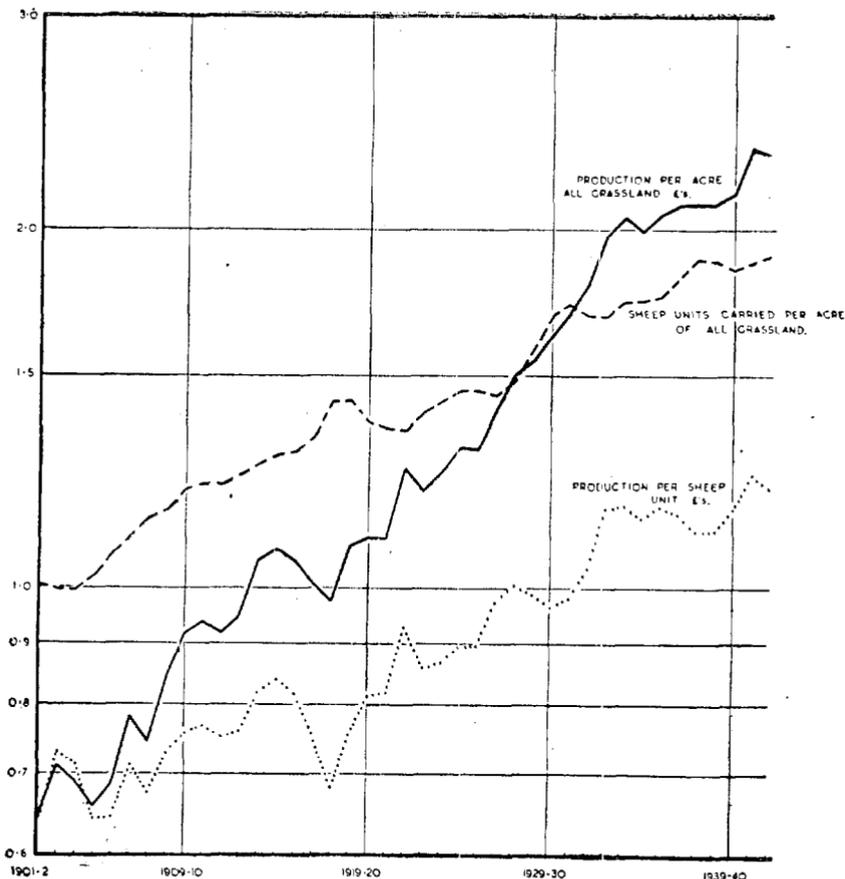


Fig. 5 Average volume of production per acre of all grassland (at standard values); average carrying capacity in sheep units per acre and average value of production per sheep unit (at standard values). (Semi-log scale).

to have measured the changes in productivity or sward composition resulting from topdressing an old-established sward for the first time. It is only recently that Sears has measured the effect of clover in conditioning response to phosphate. Having once raised the phosphate status of a soil what annual dressing is required to maintain production? Wartime experience would suggest much less than many farmers have been in the habit of applying. How can we increase the efficiency of utilisation of added phosphate from its present low level of 12% or thereabouts. The problems are equally multitudinous on the animal side. We are only slowly gathering data on average live-weights of animals—no one can tell me what would be a reasonable average live-weight for a mature breeding ewe, or a dairy cow in the Waikato. Hancock and Wallace in their classic observations on the grazing behaviour of dairy cows suggest that low producers may graze for the same length of time as high producers with the implication that they may eat as much. From time to time the statement is made that the lower pro-

ducing herds in the Dominion are limited mainly by their plane of nutrition—I have said it myself and felt in good company in saying it—to what extent is it really true? Would the use of high quality proven sires be justified in low producing herds or should we first endeavour to improve feeding practices in these herds?

In these days of very necessary specialisation it is difficult to find the worker who can fully integrate his work with that of others and synthesise a logical picture of the whole field. The difficulty is well illustrated in soil surveying. It is not difficult to train personnel to map changes in soil profile in detail—it is difficult to find the man who can combine the jig-saw of minor soil changes into an intelligible and useful map not cluttered up with irrelevant detail. The research worker often complains at the delay in applying the results of research. I suggest that some of this blame must be laid at his own door because in many cases he fails to show how the results of his work can be integrated into current farming practice or neglects some pertinent aspects of the problem from the farmer's angle.

The extension services must also play a major part if past progress is to be maintained. Mr. Burnard gave a most stimulating address on this subject to our last Conference and stressed the needs for the extension worker to act as "a two-way bridge" between the farmer and the research worker. There also appears to be a serious gap in our extension services on the animal side and a lack of appreciation of the fact that under pastoral farming conditions, pastures and pasture management practices cannot be divorced from the grazing animal and its requirements. In other words, the extension officer should to my mind know as much about animals as about pastures and advise the farmer on his farm as a unit.

This brings us to another phase of the problem of increasing production—the farmer himself. Surely of the major factors in production he is the most important, and probably the most variable, yet the nearest he comes to study is as a component of the error variance in farm management surveys. Surely at least one of our Agricultural Colleges should support a research professorship in rural sociology or rural psychology.

Now the question may well be asked should the future development of the farming industries be planned since planning has been a much used and abused term in recent years.

Before attempting to answer the question, I should perhaps disclose to you, in order that you may discount it, the bias of mind with which I approach this matter. My forbears were Scotch and Irish with a dash of Cornish for good measure, and I have inherited in some measure the Celtic instinct for throwing brickbats at Roman Walls. Probably such a confession is superfluous.

Planning tends to appeal to the scientific mind which is trained in planning projects and in the logical analysis of results. The word connotes an orderly and methodical approach to problems and the protagonists of planning are prone to contrast this with the "chaos" of an unplanned economy. I am all for drawing up a plan for the orderly development of farming, setting out the objectives to be attained, the difficulties to be surmounted, the methods which might be used and publishing it widely with the fullest factual information. But this to state the problem not to solve it. The solution must be entrusted to the operation of the market, that "process of election, which not only allows proportionate registration of minority opinion, but also continuous review of producers' decisions by those most immediately concerned with their ultimate results," the consumers. The economic machine is a very delicate one because in essence it consists of individuals like you and me with different reactions to similar stimuli and

different wants to be satisfied. The only successful mechanism which has been devised by which we, as individuals, may register our wants and needs, is through the price mechanism of the open market. Even the substantial produce pool accounts are not without their dangers, and when they come to be drawn upon, great care will have to be exercised to ensure that grades or types of produce no longer demanded by the market are not sustained in production.

Fostered by a "depression psychosis" New Zealand has endeavoured to insulate her economy from the major effects of overseas fluctuations in prices by developing a more "balanced" economy, through development of secondary industries—a policy accelerated by wartime shortages of imported goods. The farming industries have been selling their products at cost of production and competing for labour and capital with manufacturing industries selling their products on a protected local market.

Farming has fought a losing struggle for labour. Between 1936 and 1945 the numbers of persons engaged in farming in Canterbury fell by 30%. Between 1930 and 1947 the numbers engaged in farming fell in all areas, except Auckland Province and one or two counties of Hawke's Bay.

In view of Clark's figures of the relative productivity of persons engaged in farming and secondary and tertiary industry in New Zealand, this transfer of labour can mean only a lowering of the real standard of living of the whole community. While this policy continues farming output is unlikely to increase materially.

"The strenuous years of the great depression have caused New Zealanders, in common with other peoples, to prize security above progress. There is grave danger that this seeming justification for protective policies will be accepted uncritically. In the quest for local stability there is a tendency to forget the price paid in producing, on a high cost basis, goods which were better imported from abroad . . . To a greater degree than with most, the destiny of New Zealand is bound up with that of mankind everywhere."