CONFFERENCE ORGANISING COMMITTEE

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Wherever one goes on an agricultural mission in foreign countries it is common to run across New Zealanders working in agricultural development. This is the sort of thing that occasionally happens. Last year after completing a short project in Uruguay I had to report to Rome for two days at F.A.O. headquarters. There I was asked to share an office with an officer in the Investment Group. He turned out to be a New Zealander, Douglas Masterton, an ex-Lincoln student, working on World Bank appraisal missions in the Middle East, North Africa, and South Asia. I was also asked to share a hotel room with another New Zealander, as Rome was packed with pilgrims for Holy Year. He turned out to be an old Lincoln classmate of mine, Gerald Day, who was being briefed for a 3-year term as mission leader on an F.A.O. dairy development project in San Salvadore.

We think that there are about 60 New Zealand agriculturalists working for the various agencies engaged in agricultural development, such as the U.N. Development Programme, the World Bank, the Asian Development Bank, the Food and Agriculture Organisation, the South Pacific Commission. There are an increasing number involved in overseas work for New Zealand private consulting organisations on a commercial basis. One group, as you will have seen in the paper, has
been involved in protracted negotiations on a massive land development project in Iraq. Currently another firm has a small team in Uruguay charged with reporting to the World Bank on the development of that country's dairy industry. Two of our national stock firms are involved in international consulting work with particular respect to livestock development. Another firm is currently negotiating a sheep development project in Rumania following a visit there last year by a small team which appears to be leading to an opening up of contacts between the two countries. It seems certain that Rumania will be buying substantial numbers of breeding sheep from New Zealand.

Under the New Zealand Overseas Aid Programme, about 35 agriculturalists are engaged on long-term assignments and a further 15 "man years" is provided on short-term work.

About one-third of our bilateral aid programme i.e. about $20 million in 1975/76 was agricultural or rural in nature. To illustrate the types of projects with which we are involved, here are some examples:

In Fiji -
Aerial topdressing equipment and technical expertise.
Dairy factory development and provision of experts.
Dairy development scheme.
Beef development scheme.
Poultry adviser.
Land use assistance.
Training of agricultural extension officer.
Cattle grazing in pine plantations.

In Papua-New Guinea -
Highlands sheep management programme.
Soil survey.
Swamp drainage.
Cool stores for fruit and vegetables.
In Tonga -
Livestock development programme.
Coconut replanting scheme.
Banana rehabilitation project.
Institute of Rural Development assistance.

In Western Samoa -
Dairy development programme.
Poultry development programme.
Small farmers' assistance scheme.

In Bangladesh -
Agro-aviation. Crop spraying facility.
Poultry breeding.

In India -
Animal breeding project.
Sheep farm establishment.

In Indonesia -
Artificial insemination programme.
Dairy development - Java.

In Korea -
Beef cattle research/development.

There are agricultural projects also in Pakistan, the Philippines, Nepal, Thailand, Sri Lanka, Tanzania, and a few other countries.

This gives some idea of the extent and nature of New Zealand participation in overseas agriculture currently, in a very superficial way. I now want to look more closely at some aspects of this participation.

The first question that is often raised with me is whether New Zealand, so heavily dependent on its own agriculture, can afford to be providing so many highly trained experts contributing to the development of other countries? Even
apart from the humanitarian obligation we have to assist countries where poverty and malnutrition are a crushing burden, the proposition that we can't afford to provide people is totally indefensible. Professional agriculturalists are an international commodity. New Zealand probably benefits as much from the short, long, and permanent visits we receive from overseas agriculturalists as the contribution we make to other countries.

A corresponding question which is often asked is - why should we contribute to agricultural development in other countries, when our main effort should be directed to selling our own products? Again this proposition is indefensible on humanitarian grounds, and at any rate hardly any of the countries to which our aid programme is directed can afford to buy our high priced products. It seems that they can't even afford to buy the mountains of milk powder now accumulating in Europe and in New Zealand at the G.A.T.T. minimum prices.

While I'm on this particular tack I'd like to say something briefly about the philosophy of aid, since agriculture is a cornerstone of our own programme, and also because it is my earnest hope that farmers, who in New Zealand live wonderfully free and open lives, should have an open-hearted attitude to the contribution New Zealand is making to the development of some poor countries, pitifully inadequate though this is. It is my earnest hope that no farmer would subscribe to the despicable lifeboat theory which pictures affluent countries safely in a lifeboat, surrounded by a sea filled with poor nations, some just keeping afloat, others drowning. The theory proposes that those in the boat should be highly selective as to who they should toss out life-savers, for if everyone is helped the boat might sink. This kind of view tends to arise from our being inundated with pictorial evidence of the starving in Bangladesh, Ethiopia and the Sahel. Certainly the famines in these areas are real and
overwhelmingly tragic, but they are isolated situations. Far more important are numbers, thousands of times greater who are being consistently debilitated by malnutrition. Millions of children, unphotographed and untelevised, in low income countries lack the slightest resistance to disease, and those who do survive will usually bear with them through life physical or mental scars. Small though our programme is, if it is highly selective in terms of identification of projects, carefully monitored in its execution, and compassionate in its philosophy, it can make useful contributions to the World's most important problem - the problem of expanding agricultural production in those areas where the needs are great. The point is that given the potential for existing agricultural technology, the irrigation of arid areas where water availability allows it, the development of rangelands, new higher yielding seed varieties, more effective fertiliser usage and pest control, better storage to prevent waste, world experts believe that there could easily be sufficient food to feed the world's population over the next century - Bangladesh, for example, has average rice yields about one-fifth of those in Japan. Double or triple cropping is feasible, but the average farm grows only 1.4 crops annually, and only 1-2 million hectares out of a total of 10 million are planted with high yielding varieties.

While the problems of narrowing the gap between actual production levels and the technical potential are immense (they are difficult enough in New Zealand) they can be narrowed, and New Zealand through its aid programme, and through its human resources can make a contribution.

Where are New Zealanders able to make the most effective contribution? The area in which we have a sharp comparative advantage over the rest of the world is in the production of animal protein from the grazing of pastures adapted to a maritime temperate climate, on an all-year-round basis.
Unfortunately there are not many places where this technology is very appropriate, and certainly not in any countries where the great production expansion needs are most evident.

New Zealand type pasture improvement and management techniques have been transplanted in one or two isolated instances. For example, Uruguay looks to New Zealand for its leadership in the development of its substantial pastoral potential, following the guidance given by McMeekan, Flay and other New Zealanders. (There is a small team there now looking at the development prospects for its dairy industry). But even there, one has to make sharp adjustments, both to the human and institutional situation, and also one finds that simple but vital little matters don't work, such as white clover/ryegrass pastures, and even subterranean clover has problems due to premature striking in summer thunder-showers, followed by lengthy periods of seedling desiccation.

So even in situations where one imagines that the adaptation process will be simple, this is rarely the case.

Our expertise lies in a comparatively narrow field when we consider the enormous complexity and variability of the world's agriculture. Our experience is confined to farming in a benevolent temperate climate and very sharp adjustments to your thinking have to be made when you land up in some places. Recent experiences I have had include the middle of the Arabian peninsula, with a mean annual rainfall of 30 mm, sustained daily temperatures of 50°C, and hot blasting sand-laden winds coming out of the South. Or on the island of Sumba in Eastern Indonesia, where for five months of the year it drips with heat and monsoon rains, and for seven months ± 2 it is bone dry.

You can believe that trying to devise viable livestock systems based on Waikato or Southland experience in such environments would not be very productive.
Moreover, while our international reputation rightly stands on our livestock management skills, unfortunately the Romney ewe and the Hereford cow are not as ubiquitous in the developing world as they are in New Zealand.

As Vince Ashworth, now one of our most experienced international agriculturalists has put it "New Zealand agriculturists have also to learn that there are efficient productive breeds and types of animals other than those which we have in New Zealand. Excellent meat sheep which grow hair, or hardy Karakul which in order to produce the finest lamb pelt at three days of age must not be fed in the normally accepted manner. Milk from sheep, goats, buffaloes and camels is important in various parts of the world. Camels, donkeys and cattle can be important for draft and transportation, and replacing them with tractors and machinery for example can not only be impracticable but can be more costly and less efficient".

In the Middle East for example, and in North Africa, the fat-tailed sheep is predominant, the Nadji in Saudi Arabia, the Awasi in Iraq, and the Barbary in Libya. These sheep are gregarious in nature, they have no anoestrus, they have moderately good growth rates, the lambs are never castrated, the wool varies from valueless black hair in the case of the Nadji to useful carpet wool in the case of the Awasi. If they lamb outside a Bedouin tent or not under some other form of shelter, the lamb is likely to die within an hour, of dehydration.

So you can see there is not much point in assuming that you are going to transplant a system of all grass farming, block rotational grazing with 24-hour shifts, synchronised lambing on ryegrass/white clover pastures, and all the other refinements of New Zealand fat lamb production systems.
In Rumania, which has a significant sheep industry of 14 million sheep, with plans to increase it to 20 million under the current five-year plan, it is a little disconcerting to find that the Merino is the breed used in the lower Danube basin under intensive feedlotting and fattening systems, while an animal resembling if anything an extra long woolled, extra hairy Drysdale, called the Tacuna, is the mountain sheep. It is farmed under a transhumance system - walking down out of the Carpathian mountains on a 2 months journey in the autumn, spending four or five bitter winter months under shelter in the Danube basin, lambing there, and after weaning at about six weeks, walking all the way back to the mountain pastures again, and while on this trek they are hand-milked for about another six weeks, for cheese production. It's hard to say who are the hardier, the men who sleep in the open with the sheep, in massive coats made with sheep skins, or the sheep themselves. The weaned lambs are fattened in broiler-house type pens and sold live to the Middle East.

Again you see, while these systems have been developed under climatic conditions which are at least comprehensive to New Zealanders, you have to be extraordinarily reticent about proposing revolutionary changes in farming systems.

While temperate breeds of cattle may adapt to some high altitude tropical areas, in general the New Zealand agricultural expert in the tropics of South-East Asia also has a major adjustment process to go through. Indeed he may find that the most important animal he has to deal with is the water buffalo and there aren't any courses on that remarkable animal at Lincoln College so far as I am aware. You have to understand that it is not only a potential source of meat, or live exports (with rather interesting forms of transport) but also a beast of burden, a basis of draft power, a source of financial liquidity in the event of crop failure, a basis of bride price, and now and then the main component of a village feast for religious purposes.
This is an appropriate point to emphasise for a minute or two the problems associated with trying to transpose western style agricultural systems in an alien environment. I shall illustrate with a particular project in Eastern Indonesia with which I was personally involved. Despite the immense problems of over-population in parts of Indonesia, especially in Java, there are extensive areas of open country in other parts of this great archipelago, to which modern techniques of tropical pasture development can be applied. The Indonesian Government was persuaded by World Bank specialists to put up proposals for the development of large scale cattle ranches in suitably identified areas (the term "ranch" has a particular fascination for Indonesians). Professor Coop and I led separate missions in various parts of the country to prepare submissions to the Bank for funding. These submissions require detailed, on the ground surveys of the chosen areas, and the drawing up of twenty-year development programmes and budgets. This is the sort of large scale project to which the World Bank has been attracted, and of course it is compatible with the farming systems philosophy of the type of people usually involved in the identification and implementation of such projects - Americans, Australians, New Zealanders. But the concept falls short. In the first place it is unlikely that the benefits will reach grass roots level - that is, the village people, apart from providing some employment for a few, more likely it may cut across some of their traditional rights of access and utilisation of communal grazing land. It is possible that the major beneficiaries may not be the local people at all. The point is that this western idea of putting a big fence around a large area of land and developing it as a cattle ranch, may be a spectacular way of demonstrating how clever we are, and of displaying in an obvious way what is happening to aid funds, but how many people are benefitting, and who are they, is the much more relevant question.
To carry the point further - it so happens that on some of the outer islands of Indonesia, particularly in Sumba, Flores, and Timor, a traditional system of distributing cattle to peasant farmers, called the Sumba contract, was working perfectly satisfactorily. Under this system local government officials distributed from small multiplication centres one bull and five cows to successful applicants. These cattle were for the entire use of the peasant, but he was required to pay them back, with additional cattle as interest in a specified time. The only problem with this most beneficial system is that there are never enough cattle to go round.

With the benefit of this and subsequent experience I can now see that World Bank finance and our enormous input of sweat and tears would have been better directed to upgrading the Sumba contract system, by assisting the local authorities to develop their multiplication centres so that they could provide more and better cattle, and by assisting the small farmers to improve the nutrition of their animals. The problem with this bit of idealism, is that such a project is not "bankable" in the sense that that word is used in World Bank circles. That is, it is difficult to work out a system of responsibility for disbursement of funds, and reimbursement of capital and interest. A nice tidy cattle ranch, run by a board of directors responsible to central Government, provides such a mechanism.

But the point I wish to make, and it is the main point of this address, is that our particular expertise in large scale, low cost, extensive livestock grazing systems may be entirely inappropriate to the traditional and technical environments in which our overseas experts may find themselves.

Besides the technology problem, New Zealanders have to contend with the fact that they derive from a social, cultural, political and linguistic situation which is very insular and isolated. You have to adjust to many attitudes, for example,
to a different view of the significance of time, of the
inignity of manual work, of the courtesies due to local
dignitaries, of the importance of observance of religious
traditions, and of the extreme sensitivity of people to the
slightest indication of criticism, real, inferred, or even
jocular.

Our inadequacies with foreign languages is also a severe
impediment in some jobs. Can you, for example, imagine the
difficulties of extracting needed technical information from a
small farmer in Sulawesi who speaks one of the 300 Indonesian
dialects. I put my question in English to the official
interpreter. He puts it in Bhasa Indonesian to the local
official, who puts it to the farmer in the dialect. A
lengthy and animated discussion between the three ensues.
You presume that this is related to the interpretation of the
question and the answer. Meanwhile the sun pours down and
the sweat pours off. All you wanted to know was whether he
gets one calf per year from each of his three cows. You
learn that in fact he doesn't own the three cows which the
local official said were his. Two belong to his wife's
brother and he doesn't know whether they have had a calf
lately. You knew you shouldn't have asked!

Despite these problems it is essential for anyone hoping to do
effective work in foreign countries, particularly undeveloped
ones, to have qualities of patience and humility, recognising
the differences in values and traditions in the people you
are dealing with. And let me say that many of the values are
a good deal more impressive than many of ours.

I may have given the impression that there is a lot going
against the New Zealander and his agricultural technology so
far as making an impact in international agriculture is con-
cerned. So let me hasten to add that he also has a lot going
for him. In general he has no social hang-ups and fits in
well at most levels. Whatever racial prejudices he might have
he usually doesn't make them obvious. He has a resilient attitude to work and doesn't easily throw in the sponge. (For example, the recently publicised loss of a major turnkey land development operation in Iraq could very well go down as one of our most magnificent failures. A group of New Zealand agriculturalists and engineers fought tooth and nail for that contract, the first phase of which was worth $150 million, for 18 months against enormous odds. They beat off all the international opposition by designing an enormously impressive scheme down to the last yard of concrete. It involved the building of a town, schools, hospitals, etc., a massive irrigation scheme, based on the Winchmore automatic border strip system - with which the Iraqis were highly impressed, and the development of large scale dairying, sheep and beef fattening units, all on a 100% internal housing air-conditioned system, with zero grazing, and costed it to the last cent. Nothing less like a New Zealand farming system could be imagined, but the New Zealand submission was the best in the face of widespread international competition. Eventually, with the pens almost out for signing, the whole thing fell through on failure to agree on a cost escalation clause - when I commiserated with the project leader, with whom I played in the front row for Canterbury University, he said, "You win some and you lose some". That's what I mean by resilience.)

While I have emphasised the difficulties of transplanting some of our basic technologies in an alien environment, I do not want to over-emphasise this. It is clear for example that our techniques of range land development are very relevant to places such as high altitude grazing land in Peru, and to low rainfall range lands in parts of southern Africa. Our irrigation technologists and agronomists have much to offer, as have many other specialized scientists and technologists.
Finally, I must express the view that New Zealand farm managers and farm workers have the capability, adaptability and toughness, to make strong contributions at the actual operational level. In particular, their ability to get things done with inadequate resources, ability to improvise, to keep machinery going, and to understand animals without having to get a team of vets in, to build things, and patch things up, are qualities which are in very short supply in many parts of the world. It is one of my hopes that an increasing proportion of our aid funds may be used for providing people with these qualities.
There seems to be abroad in this country a feeling that with high prices for meat and wool, and continuing massive Government subsidies, the farmers have got it made! There have been protests that the worker is having his throat cut, and the farmer is getting all the lolly.

The country must disabuse itself of that notion, because it is not true. Meat and wool farmers' incomes have certainly made a remarkable recovery this season. On the other hand, dairy farmers face a cut of some 7.5 per cent, and have the problem of a mountain of milk powder. And this is just not their problem, it's New Zealand's problem, yours and mine.

All classes of farmers are having to cope with a massive increase in costs - as we all are. But over the past three years, from 1973 to 1976, New Zealand farmers have had to face a 45 per cent increase in the cost of the goods and services they use on their farms. The major cost increases have been in vehicles, fuel and power; contracting services; wages, repairs and maintenance; and depreciation - this last mainly because of the sharp increase in the prices of plant, machinery, and buildings.

Some of this increase has been forced on you by my Government in its drive to put our economy right so that we know what
the true costs of goods and services are. For most farmers
the most significant part of last week's package announced by
the Government was the setting up of stabilisation schemes
for meat and wool. Many will not have grasped the signifi-
cance of the restraint on wage agreements, the freeze on
higher salaries, all for one year. The details of the
stabilisation schemes have been well publicised and most of
you will now have an idea of how they will operate. The
dairy farmer has had the protection of his own scheme for so
long that he is unable to understand why the meat and wool
man has had to wait until 1976 before he could be mustered.

Practically all of our primary industries, whether they are
producing for export or for the local market, are now
operating within a price and income smoothing arrangement.
This is a major step forward, and one that will at least
provide farmers with a greater measure of security from the
effects of market uncertainty.

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1975-76? Well, they don't balance until June, but we know
they will be well above last year.

The price smoothing schemes for wool, meat, and dairy
products have similar objectives, but the different ways in
which they operate reflect the differences in the type of
product, the industry organisation, the marketing structure,
and the basic attitudes of the individuals in each industry.
Stabilisation schemes must give farmers a greater measure of
security and introduce another stabilising factor into the
national economy; but there is no point in claiming that
they will do more than that. There is no supplementation in them - so long as they are self-balancing in the long term. And it must be recognised that a very large option has been left to the individual farmer to exercise his discretion in operating his own private equalisation account. The Wool Board made strong representations to me that this should be so - their claim being that to be in the woolgrowing industry you had to be a gambler at heart.

Stabilisation schemes cannot guarantee growth and innovation, although they do provide a secure base from which the industry can expand and develop. There are those who claim that coping with market fluctuations is the most effective method of sorting out the men from the boys, and that we should not shield people too much from the rigours of the market place. There is some truth in that, but not to the extent that farmers, particularly young ones with big mortgages, can be financially crippled by a market slump and be discouraged from even trying to make progress. I think there is sufficient flexibility in the schemes that have been announced to reflect changes in the market place. It's a bit like having an umbrella when it's raining. You can keep your head and shoulders dry, but it won't protect you against wet feet. Let us not fool ourselves that we have found the lodestone of success by accepting stabilisation, however reluctantly.

The major benefit accrues to all New Zealanders, including those who insist on calling themselves the 'workers', leaving the inference to be drawn that farmers and others who do not come within the orbit of the Federation of Labour are some sort of hangers-on who do not 'work'. Farmers have long known that the most insidious enemy against their desire to increase production is inflation, with its rapidly increasing costs. The Government has made righting the economy its major task. Controlling inflation and increasing exports are the two major drives in our move to
achieve this objective. To that end we have all had to accept some doses, injections, dips, and prodding that we felt we could well have done without.

There are some in this audience, I am sure, who would have preferred to have gone on, as did their fathers and grandfathers, with the pattern of booms and slumps of the last 100 years. But the other fellow, the bloke who is not the farmer, will no longer accept such a technique. Nor, for that matter, will most farmers. If we want New Zealand to discipline itself into living within its income, we, the farmers, have to be seen to be accepting restraints, also, hence stabilisation.

Farming spokesmen have consistently stated that stabilising incomes and smoothing prices is not enough, and that something that encourages and rewards growth is needed. I have full sympathy for their point of view and I know that the Government's responsibility for providing a climate favourable to economic growth does not stop with the setting up of stabilisation schemes. I realise that the phrase, "Climate favourable to economic growth" has as many interpretations as there are farmers. Probably double that if you include that essential joint decision-maker, the farmer's wife.

Livestock numbers have remained static over the past five years, and there has been an apparent decline in stock performance as indicated by lower lambing percentages and wool weights per head. My task is to find ways and means that will reward increased production. That is the national need. If the schemes we introduce seem to disadvantage the man who is static, either by his own decision or even through no fault of his own, my apologies to him, but the national need is paramount.

In the mid 1960's when the growth in stock numbers was so rapid, we had the rare combination of relatively favourable
terms of exchange for farmers, reasonable surpluses for reinvestment, an acceptance by farmers of improved systems of management which incorporated higher stocking rates, a succession of good seasons, and, it is claimed, a lower average age for farmers. We may be lucky if we get such a favourable conjunction of circumstances again, but at least we can try to recreate some of the necessary conditions for growth. These include reasonable profitability, including what you can leave behind when you die, adequate supplies of labour and finance, plus marketing opportunities. For the farmer's part we could expect some improvement in stock performance and a wider adoption of the management practices now followed on our most efficient farms. Given these factors, it should be possible to achieve some fairly modest increases in production.

By 1985 it should be possible to increase our stock units by 23 per cent to 120 million. This would not require any new technology or specially new patterns of management. But it would require additional investment and the majority of farmers would have to move their standards of management closer to those of the really efficient producers, and it would require the conviction that it was worth the effort.

Our agricultural scientists claim that they have already tested and proved sufficient new techniques and methods to last us for the next 20 years if they did nothing more. They feel frustration that as farmers, we are so conservative, so slow to grasp some innovation, some new technique. It is hard for them to realise what it is to be challenged to be an innovator with your animals and your land, both of which are part of you, and you are asked to risk both for some new theory proved in a test tube or in a paddock trial, yet follow them we must if we are to survive the competition.

It is asking a lot to get people to work harder and to change their familiar management patterns to something more complex.
They need incentives in the form of adequate financial rewards at the conclusion of a development programme, and also direct help in getting it under way. We must take a hard look at our man management – how we pay him, house him, work him, and think of his retirement and old age. We have to think about the farm worker who devotes his life to the industry but will never own a farm or be the boss. A lot can be done by increasing the resources available through the Rural Bank, and by making further provision for financing farmer co-operatives of various kinds. And yet the Rural Bank is not the be all and end all of farm finance. For myself, I would not like to see us with only the Rural Bank. Competition is a spur I can understand. We must be certain that we look closely at every type of proposal, whether it takes the form of changes that would help farmers to economise on the cost of inputs, or whether we adapt our tax system to leave more in the farmer's pocket when his development programme has started to pay off.

This country sinks or floats on the amount of farm produce it is able to sell, so it is imperative that we have increased farm production and the organisations that will get out and sell it. To produce is one thing, to sell another, and we have always demanded that this be kept in our hands. "Our Boards shall be Producers' Boards". On our heads, then, be the results.

Is there an alternative to farming to maintain this country? There are great stories told about tourism, manufacturing, forestry, and the like. All fair enough, too. I have no doubt that these industries will grow and make an increasing contribution to our export income. But what is the base that these industries will grow on? What do we live on in the meantime? There is one answer to both questions – farming. There is no alternative in the short term, and I personally doubt that any one industry will ever replace farming as New Zealand's principal income earner.
My task as Minister of Agriculture is to try to translate to the Government the state of the farmer. I must listen to him, analyse his needs and keep them in front of the policy-makers. To do this I need communication. I need to know how you are farming, on the hill country and on the plains. You have the means of seeing that I get this information. You will never get all that you want or expect. But I assure you that the vital role of agriculture in this country is accepted by the National Government, that we want, and must have, increased production from our farms, and that appropriate incentives and rewards are being examined to bring that about.
THE STATE OF NEW ZEALAND AGRICULTURE - PRESENT AND PROSPECTIVE

Both at home and abroad New Zealand agriculture is passing through eventful times and it is only against such a backdrop that any realistic assessment of the farming industry can be made.

SOME MAJOR INFLUENCES

What will be the U.S. agricultural policy after November of this year? Will the Russians and Chinese make continued massive grain purchases? Will the Common Agricultural Policy of the E.E.C. be liberalised significantly? Are the sea transport operators going to demand further large increases in freight rates for transporting agricultural produce to world markets? Will international exchange rates continue to fluctuate considerably in 1976? Can a satisfactory arrangement be evolved for the disposal of the large stocks of skimmed-milk powder? Will we see a definite subsidence of rates of inflation throughout the world during the next 12 months? Will the terms of trade of agricultural exporting countries improve in the near future? Will the coming round of G.A.T.T. negotiations yield anything for economies such as New Zealand? Are there any prospects of
agreement on an international policy for the holding of surplus stocks of primary produce? Can the United Kingdom economy stage an economic recovery under its new Prime Minister?

The answers to these and other issues will exert a large influence over New Zealand agriculture between now and the 1977 Lincoln Farmers' Conference. I mention them at this stage to re-emphasise that in a dependent economy such as ours events beyond our shores can have an immense impact on the fortunes of agriculture. But what of the home front? I should like to examine New Zealand agriculture which I regret to say seems to be suffering from a bout of inertia.

THE FARM LABOUR FORCE

From the inadequate statistics available it would appear that the numbers engaged on our farms have increased slightly in recent years. Today there are estimated to be about 140,000 in the on-farm labour force out of a total labour force of just over 1.2 million - about 11 per cent compared with 6 per cent in Australia. Although there are no precise figures there are indications that the numbers engaged in the provision of services on farms - the contract fencers, topdressers, ploughing contractors, shearsers, etc., were certainly maintained. We may have to await the results of the recent Census to confirm this. I also understand that the Labour and Employment Department is making efforts to secure better statistical information on the numbers engaged in the agricultural sector. This is worthy of every encouragement as we have considerable gaps in our knowledge of this sector.

CONFIDENCE FACTOR

Farmer confidence is always an important factor in assessing the state of the farming industry. Unfortunately we cannot
measure it precisely but there are certain indicators that give us a guide. If one puts these various pointers together at present the result is not a very satisfactory one, either from the viewpoint of the nation or the industry. Yet if we are to pull the industry out of its current inertia it is imperative that there be a lift in farmer confidence or 'expectations'. In a period of high inflation most sections of the community are unsettled but it is an additional cause for concern when the main export industry is affected.

LIVESTOCK

In the New Zealand system of farming one of the main determinants of output is livestock numbers. Livestock units in the middle of 1975 were estimated to be just below the 100 million mark - see Fig.1 - made up of 55.3 million sheep, while cattle represented the equivalent of 44.3 million units. It will be seen from the table that the total number of stock units has not changed much over the last three years and is of course considerably below the projected target set some years ago. Breeding ewes at mid-1975 increased only slightly to 41 million while cattle, both dairy and beef, were virtually static at 9.62 million - see Fig.1.

Why have livestock units failed to reach the planned levels? This is a question to which we have been seeking an answer here at the College. Obviously climate played a major role in frustrating these planned targets but to blame the weather would be too facile an explanation. There were undoubtedly other factors including inadequate investment resulting from lack of profitability, farmer attitudes to output expansion, the general economic and financial 'environment' particularly the inflation that followed the wage explosion after 1968, both overseas and in New Zealand. This cause may have had its origins in the events that followed the riots by the French students in 1968. One of the Australian economists at the A.N.Z.A.A.S. Congress in Tasmania last week said,
FIG. 1. LIVESTOCK UNITS AND SHEEP NUMBERS

Livestock Units

Sheep Numbers
(At 30 June earlier year)
"If we are looking for scapegoats for our present sorry state of affairs we can find them in considerable numbers." He went on to give a list which included "the Americans for taking so long over losing the war in Vietnam and infecting the rest of the non-communist world with the virus from which our inflationary troubles stem".

Our failure to reach the projected livestock targets was compounded by the decline in lambing percentages and wool yields - see Fig.2. These two factors cost sheep farmers and the nation hundreds of millions of much needed dollars. Here again all the causes are by no means obvious and staff at Lincoln have been considering the main reasons behind these two unfortunate trends shown in the table.

Are we at long last on the road to achieving the stock performances of the mid 1960s? Reports would indicate that following the better season in all areas except the lower part of the South Island, much better livestock performances can be expected.

LAND VALUES

The Government Valuer last year announced that for the year ended 31st March 1975 the rural land sales index rose by 48 per cent. While it is important to realise that this index is only a rough guide and that it excludes many transactions, the large movement in the index could not be ignored. It was a reflection, amongst other factors, of the loss of confidence in money as a store of value, of the desire of farmers to acquire other properties and the relatively liquid capital market. Since then there are indications of greater stability in land values following the tighter monetary conditions, reduced optimism and certainly less overt government encouragement to the amalgamation of farms.
FIG. 2. LAMBING PERCENTAGE, WOOL YIELD PER SHEEP AND VOLUME OF FARM PRODUCTION

Lambing Percentage

Wool Yield per Sheep

Volume of Farm Production

(1960-61 = 1000)

Year

The index of farm production is estimated to have risen by 3 per cent in the 1975-76 season and it will be seen from Figure 2 that output is now back to the level reached in the 1971-72 season. Within this overall index it has been estimated that output from grain and field crops in 1975-76 was up 15 per cent, horticultural products, poultry and bees up 4 per cent, wool up about 2 per cent, mutton and lamb down 3 per cent, beef down 2 per cent, dairy output up 3 per cent and pig production up 5 per cent.

EXPORT EARNINGS

Two-thirds of this output was exported and according to the Reserve Bank statistics receipts from exports in the year ended March 1976 were as follows:

<table>
<thead>
<tr>
<th>EXPORT RECEIPTS FROM PRIMARY PRODUCTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year ended March</td>
</tr>
<tr>
<td>1976 1975</td>
</tr>
<tr>
<td>($N.Z. Million)</td>
</tr>
<tr>
<td>Meat 601 495</td>
</tr>
<tr>
<td>Wool 411 295</td>
</tr>
<tr>
<td>Butter 179 106</td>
</tr>
<tr>
<td>Cheese 85 35</td>
</tr>
<tr>
<td>Milk Powders 114 118</td>
</tr>
<tr>
<td>Other Dairy Products 72 55</td>
</tr>
<tr>
<td>Other Animal Products 156 129</td>
</tr>
<tr>
<td>Other Primary Products 92 73</td>
</tr>
<tr>
<td>Totals 1,710 1,306</td>
</tr>
</tbody>
</table>
As a proportion of total receipts from exports the 1976 figures represent 77 per cent of total export receipts compared with 78 per cent in the year ended March 1975. In addition to these receipts there were of course the export earnings from forest products ($173 million in the 1976 March year) and receipts from 'manufactured' exports of $313 million. This is a welcome rise from the $195 million from manufactured exports in the 1975 March year. I suspect however that a significant content of receipts from manufactured exports represents the earnings from the aluminium project. This industry is I understand purchasing electric power equal to about 5 per cent of the price charged the farming sector and consumers generally. That is a substantial subsidy in anybody's language.

FARM INCOMES

The improved earnings reflect of course the 15 per cent devaluation of 10th August of last year and this has flowed on to farm incomes. The improvement in some export prices, the small increase in output and the devaluation led to an estimated almost 50 per cent recovery in net farm income for the year ended 31st March 1976 - see Fig.3. It is estimated to have reached $400 million after plunging to the disastrously low level of $268 million the year before. This is a welcome trend but regard has to be paid to the 17 per cent internal inflation that has occurred. It eroded the farmers' purchasing power not only as a buyer of farm inputs and capital goods but also as a consumer.

The recovery in gross and net incomes has enabled the industry, particularly sheep farming, to resume some of its deferred investment, but at this stage it is too early to quantify the extent of this rise - see Fig.3. Reports indicate that for one of the major components of investment, fertiliser sales have increased substantially but some of this may have been buying in anticipation of a price rise. Also
FIG. 3. NET FARM INCOME AND EXPENDITURE PER STOCK UNIT ON SHEEP FARMS

Million Dollars

Net Farm Income

Dollars

Expenditure per Stock Unit (In Constant Values)

Year
we do not know to what extent the sheep industry increased its application of fertiliser. The statistics do not make this important distinction. There are few indications of a rise in farm machinery investment - indeed quite the reverse. For example the import figures show a distinct fall-off in the rate of imports of tractors. In any case the spectacular increase in the price of tractors and farm machinery generally will be having a depressive effect on sales.

The New Zealand Meat and Wool Boards' Economic Service has estimated that net income per sheep farm increased in the year ended March 1976 to $9,800 as against exactly half of that figure for the year ended March 1975. In the dairy industry the Ministry of Agriculture has estimated income per dairy farm to be $7,000 in 1975/76 compared with $8,843 a year earlier. This would indicate that the rise in total net farm income in 1975/76 is confined mainly to the sheep industry.

Comparisons of total farm incomes with aggregate salary and wage payments is always of interest although it is difficult to make such comparisons that reflect realistically the farming position. The New Zealand Institute of Economic Research has estimated that aggregate wage and salary payments in the year ended March 1976 rose by 11 per cent but of course as was the case with farm incomes, these payments were affected by inflation. In real terms there was thus a decline of about 6 per cent in the effective wage rates index. Although on this occasion the percentage rise in farm income is higher than for salary and wage payments this is exceptional. It must also be realised that at $400 million, farming income is only 4 per cent of total private income which is estimated at $9,890 million. In 1950/51 the comparable figure was 18 per cent and in 1960/61 12 per cent. If farm investment is to reach adequate levels it is essential in the national interest that farming secures a larger share of resources.
My reference to movements in wage payments has I believe special importance to the sheep industry which is very labour intensive. Particularly in periods of inflation and wage escalations this dependence on labour is the sheep industry's Achilles' Heel. I suggest that because of this the industry must take a close interest in wage fixation policies.

In recent years government has taken over the role of the Arbitration Court and has re-introduced the system of wage adjustment by reference to the Consumers' Price Index. Neither change was in my view, in the real long-term interests of the farming industry in particular and the economy in general. In a system of three-year Parliamentary terms, government wage decisions can be too easily influenced by the ballot box. Furthermore, wage adjustments linked to rises in the cost of living, while prima facie a humane system, merely provides the fuel for the next round of inflation and everyone suffers.

Suggestions that general wage decisions should again be made by an independent Court should be supported by the farming industry. This would enable a complete stocktaking of the economy to be undertaken in public and the state of agriculture would be one of the major factors to be considered. The capacity of the export industries to sustain any wage increases would have to be argued in public before a competent Court and adequate opportunity would be provided for the hearing of evidence by experts from the different sectors to be followed by a full cross-examination by all those taking part in the hearing.

EXPORT PRICES

Farm prices in most cases are now at a better level than a year ago, helped, as I have already stated, by the exchange
rate depreciation. Wool prices should average for the 1975/76 selling season about 60 cents per kilo better than the 1974/75 season's average. The Wool Corporation has been able to dispose of a sizeable portion of its stocks.

The export prices for lamb, mutton and beef have all improved and overall the Institute of Economic Research has estimated a price increase of 24 per cent for all meat exports in the 1975/76 season.

The dairy outlook is complicated by the E.E.C. and Protocol 18 of the Luxembourg Agreement, plus the level of skimmed milk stocks. It is expected that greater emphasis will now be placed on cheese and casein production but if this pattern is followed in other dairy producing countries there could be problems ahead for cheese sales. But in virtually every country cheese consumption is rising and this must be regarded as an encouraging sign. The major discouraging news is the determination of the E.E.C. to impose its butter price policy on the United Kingdom. This will push butter prices to the point where consumers will reduce drastically their purchases. As a result, not only will New Zealand suffer but also the dairy industry within the E.E.C. It is difficult to understand that such 'economic masochism' would be practised in the 20th century by a group of governments which are world leaders in many spheres.

FARM COSTS

Despite government economic and financial measures farm costs continue to rise at a high rate. In the 1975/76 season it is estimated that costs rose by about 12 per cent and this reduced the impact of the welcome improvement in the level of prices received. It is estimated that while the terms of exchange for sheep farmers at the farm gate improved by 28 per cent, dairy farmers' terms of exchange deteriorated by about 8 per cent.
MONETARY POLICY

On 2nd March Government announced a series of monetary measures, the significance of which to agriculture has not in my view been fully appreciated. One of the most dramatic of the moves was the decision of Government to abolish controls on interest rates charged by trading banks. Also there was the virtual abolition of controls on deposit interest rates. These two decisions create a situation which has not before existed in Post World War II New Zealand. As a supporter of flexible interest rate policy I would endorse these major moves which are aimed, inter alia, at stimulating savings. But I have an important reservation.

Despite its many policy decisions to improve the state of the New Zealand economy, Government so far has made no decision that in my view gets to the real source of future recovery. I refer to the need for an overall restructuring of the economy to place it on a sounder long-term basis. Such an operation involves, inter alia, overhauling the high levels of protection afforded some of the manufacturing industries. I know that this is not a 'popularity-promoting' task but it is crucial to the farming sector which is expected to compete for the scarce economic resources that these industries are also demanding. Agriculture has to be placed on the same basis to compete for these resources - and this means a drastic overhaul of the advantages some of these other industries at present enjoy.

In announcing the March measures the Prime Minister stated "The change in policy should allow the trading banks to charge a pattern of overdraft rates that more accurately reflects the credit needs and standing of the borrowers...." To ensure 'an accurate reflection of credit needs' it is first essential that no borrowers are placed in an advantageous position - yet until the present levels of protection are reviewed - it is just not possible to achieve
a really 'accurate reflection'. Thus there is a real danger that farmers could be penalised as a result of the measures of 2nd March. The situation will require close surveillance.

The Reserve Bank has been told to watch the position so as to ensure that the trading banks do not increase profits unreasonably. Meanwhile we have had the Ministry of Agriculture Rural Credit Survey which discloses a substantial increase in the burden of interest payments by farmers - particularly younger farmers. One of the 2nd March policy decisions was the introduction of standard rates for the main categories of rural lending. The effect of this decision will be to increase the cost of farmer borrowing from government and quasi-government agencies. The stated aim of such a policy measure was 'to reduce the present dependence on the Rural Bank and other government agencies funded from the Public Account.'

'Rationing by the purse' is often the only satisfactory method but I am an opponent of such a process if some of those with the purses are given an unfair advantage. This leads to misallocation of resources - and this is one of the present maladies of the New Zealand economy. Agriculture has never been afraid of entering a race - it is, after all, engaged in one of the toughest contests - international competition - but it is essential that it be placed on a fair basis from which it can compete.

INCOME STABILISATION SCHEMES

Along with the Government's announcement on 14th May of a wage freeze for the next 12 months there was confirmation that it intended to enact early legislation for schemes to smooth out fluctuations in the incomes of meat and wool producers. This could be a milestone in the many attempts to stabilise farm incomes and reduce the effects of fluctuations on the economy. At this stage it is too early to assess whether
the two schemes will achieve the aims expected of them. Short-term, there are two major points of importance. Firstly the farming industry by agreeing to participate in such schemes now has an undeniable right to expect an early and urgent reduction in the cost pressures exerted on it by other sectors.

Secondly, there is need to ensure that an expansion of farm investment is not frustrated by the operation of the new schemes. In his announcement the Prime Minister has admitted that "an immediate and sustained" increase in export production is necessary. It will be essential therefore that a close watch be kept on changes in farm investment and the build-up of the reserve funds.

We should not delude ourselves into believing that the introduction and operation of the new schemes will remove all the problems affecting the industry. But I believe that operated with skill and with adequate flexibility they could be of real assistance to meat and wool producers.

COMMODITY AGREEMENTS

Over the years the virtues of international commodity agreements or arrangements have been advanced by several authorities and organisations. Whilst not being obstructive New Zealand has never been enthusiastic. Protocol 18 contained a clause in which we undertook to work for the establishment of an international dairy agreement. Although the International Dairy Committee evolved a draft butter agreement, little or no progress has been achieved. There was of course the so-called G.A.T.T.-O.E.C.D. milk powder 'Gentlemen's Agreement'. But at the very time it was really needed it collapsed.

This experience has brought home the weaknesses of such agreements. When the commodity prices are satisfactory the
agreements are superfluous; when the prices are unsatisfactory the agreements cannot usually withstand the strains to which they are subjected. Yet there is continual striving for ways and means of ironing out some of the excessive fluctuation in primary produce world prices. The Commonwealth Group of Ten Experts recently issued a further report in which they affirmed that "There is clearly an urgent need for early decisions on a comprehensive package of commodity policies." A buffer stocks scheme was one of the suggested methods but as yet no agency or country has come forward with the finance necessary to operate such a proposal.

The U.S. Government which traditionally financed food reserves is no longer prepared to do so, certainly not the present administration. The Centrally Planned economies may do so in the future in which case they could exert a greater influence over world food prices. Meanwhile it would appear sensible for New Zealand to re-examine its own ability to hold stocks of its primary produce either within New Zealand or in its overseas markets. Stock-holding can prove a most costly operation but in certain circumstances the advantages can outweigh short-term costs.

AGRICULTURAL PLANNING

In 1963 we embarked on an exercise called 'the indicative planning of agriculture'. Up to 1969 it appeared to be yielding considerable results but thereafter, for a variety of reasons, to some of which I have already referred, agricultural output languished. The new Government is pledged to revive, in some form, the planning of agriculture but before commencing it is wisely considering the alternative methods or systems available to it.

I have long held the view that the major responsibility of Government is to provide an 'economic climate' conducive to growth. This is a basic prerequisite to any sustained
expansion and the formulation of a prescription for such an environment must be the major initial task of any planning body.

The conditions for agricultural growth must first be identified and then adopted for the formulation of an overall agricultural policy. There must be co-ordination between the various elements of policy combined with a resolution on the part of Government to implement the agreed package. Too often in the past the different parts of the policy have been un-co-ordinated and the resulting conflicts have marred the effectiveness of any overall package.

It will be essential, in order to arrive at the appropriate policy for expansion, to devote more resources into researching into the complex problems affecting the industry. A comparison with Australian agriculture would indicate that we are lagging behind in this regard, yet to our economy the agricultural sector is of greater importance.

It has been calculated that to provide the minimum amount of foreign exchange needed by the economy in the remaining years of this decade, an annual rate of increase of 3.7 per cent in the volume of agricultural exports will be required - see Fig.4. This is a very high rate of increase and should be compared with the actual performance of -3.4 per cent in the period 1969/70 to 1974/75!

It took New Zealand the 25 years between 1939-40 and 1965-66 to double its volume of farm production. To double farm output in a 25 year period it requires an annual rate of increase of 2.8 per cent. As we have not been achieving anything like this rate of expansion in recent years it will be appreciated that the suggested target of 3.7 per cent in the annual rate of increase in the volume of exports represents an enormous and, to some, almost impossible level of attainment.
FIG. 4. NATIONAL DEVELOPMENT COUNCIL EXPORT VOLUME TARGETS FOR FARM PRODUCTS

Million Dollars

N.D.C. Export Volume Targets
($m 1969-70 prices)

N.D.C. $1,257m

3+%

Revised $1,139m

2.6%

+3.7%

Actual

THE CHALLENGE TO FARMING

I would wish to conclude on an optimistic note. The economy is in difficulty and an enormous contribution will be required from agriculture if New Zealand is to emerge from its present state. To me this represents a tremendous challenge but I am certain that given an economic climate that provides real encouragement to farming, our farmers will not retreat from this opportunity to show once again that agriculture holds the key to better living standards for all New Zealanders.
THE OFF-FARM COST SITUATION - WHO CAN DO WHAT

P.D. Chudleigh
Deputy Director
Agricultural Economics Research Unit

In discussing this current pressing problem I have been invited, in particular, to review and summarize a seminar on 'Costs Beyond the Farm Gate' held at the College earlier this year.

REVIEW OF SEMINAR

Firstly, I would like to summarize what I thought were the four major issues arising from that seminar:

* The overriding importance of inflation control was recognised.

* A principal issue raised was the interdépendance of the different sectors involved in the marketing chain. Calls were made from nearly all sectors for a higher degree of communication and co-operation between all parties involved.

1 "Proceedings of a Seminar on Costs Beyond the Farm Gate" (1976), J.G. Pryde, W.O. McCarthy, and D.L. Fyfe (editors), Discussion Paper No.32, Agricultural Economics Research Unit, Lincoln College.
Any evening out of the peak demands that farmers make on the off-farm service industries would result in economies of operation of road transport, freezing works, and shipping companies.

There were suggestions that Government should assist some off-farm sectors with easier finance and lower interest rates, and that research and development aimed principally at substituting capital for labour should be increased.

Secondly, I would like to highlight what I thought were the most significant points raised by each of the seminar speakers. In all, there were seven papers presented at the seminar plus a summary.

The Farmer

Mr J.R.M. Wills, Provincial President, Federated Farmers, Hawke's Bay, outlined the problem of costs beyond the farm gate as seen by the farmer; he documented some of the huge increases in costs of marketing over the past decade and demonstrated the effect that these costs, together with increasing on-farm costs and static or declining product prices, have had on farming incomes, especially in relation to movements in incomes of other sectors of the community. Farmers had responded to this situation by diversifying their products, by raising productivity, by increasing farm size, and by a greater involvement in beyond the farm gate marketing activities. Mr Wills made the point that the farmer is losing out to other participants in the marketing chain, most of whom work on a cost-plus basis. He concluded by stressing the need for unity between different sectors of the economy so that the farming industry achieved a fairer share to enable confidence, investment, and growth so that all sectors could benefit in the longer term.
Road Transport

Mr J.W. Habgood, General Manager, W.A. Habgood Ltd., Lincoln, produced figures to show that whilst cartage charges to the farmer had doubled in the past eight years, the prices paid by the road transport operator had very nearly trebled. He claimed such figures demonstrated that greater productivity was being achieved in the industry in order to partly offset vast increases in fuel, labour, and capital costs. Mr Habgood highlighted the high sales tax and duty on new vehicles, and the 18 to 20 per cent interest for finance to purchase new vehicles, as areas where the Government could assist the industry. He stressed an urgent need for more communication between farmers and carriers, especially with respect to some of the 'services' demanded by some farmers. The implication here was that because road transport rates are Government controlled, firms compete for farmers' business through the service they give; certain services demanded by some farmers then get built into the rate structure, resulting in all farmers paying irrespective of their individual desires regarding service. Mr Habgood also made the point that any spreading out of seasonal transport peaks would benefit the industry and the farmer by lowering the capital equipment required in the industry.

Meat Processors

Mr L.A. Cameron, Managing Director, Gear Meat Co. Ltd., Wellington, outlined a number of problems facing his industry including the requirements for huge new investments in processing plant for modernisation and for new hygiene regulations. Associated with this problem were a lack of profitability and a lack of surplus income for reinvestment, and falling labour productivity. He made a number of suggestions for the rebuilding of a modern and more efficient industry, among which were:
It was essential that a breakthrough was made in the chain slaughtering of mutton and lamb to reduce the labour intensity in works. To this end, there should be a substantial increase in research and development expenditure.

Meat processing industries should be given priority for borrowing of investment capital at low interest rates.

More intensive scientific programmes should be adopted to rigorously test current hygiene regulations and findings should be communicated to all concerned.

An active labour market policy for meat workers should be pursued to ensure all year round employment, perhaps by other industries being 'tuned' to the meat industry.

Mr Cameron's paper could be viewed as a further call for unity in the meat industry so that problems identified could be tackled in a more constructive manner.

Dairy Processors

Mr N.F. Reynolds, Chairman of Directors, Rangitaiki Plains Dairy Co. Ltd., Edgecumbe, stated that because 98 per cent of dairy manufacturing plants are owned, controlled, and directed by farmer suppliers, a greater opportunity for cost control and reinvestment existed; however, substantial cost increases had still taken place in the manufacturing sector. Mr Reynolds did not see container shipping as combating shipping cost escalation; to justify the heavy investment in container shipping, loading rates would have to be dramatically improved. Mr Reynolds suggested that the development of processing milk and milk products should be intensified in New Zealand.
Wool Industry

Mr J.D. McIlraith, member of both the New Zealand Wool Board and the New Zealand Wool Marketing Corporation, outlined the recent cost increases in wool handling and transport. He suggested that containers may not be the ideal method of carrying wool and that unit loads may have demanded far less capital investment. He pointed out that the decision to containerise wool was made by the shipping companies and the New Zealand shippers. Mr McIlraith also advocated more involvement by New Zealand in the processing pipeline, in the form of spinning wool in the United States either on a commission basis, or as a joint venture with a United States mill.

Shipping Industry

Mr C.H. Speight, General Manager, New Zealand Shipping Corporation, described some of the huge increases in freight rates faced by shippers. However, he saw containerisation as the shipowners' answer to cost escalation. He went on to show that a conventional shipping service would require a greater capital injection than a container service since the latter would use faster and bigger and, therefore a lesser number of ships.

Mr Speight mentioned that savings in shipping costs could be made if peaks in exports could be reduced. In addition, inaccurate forecasts of the short-term requirements for shipping space for meat are very expensive to shipowners and result in higher freight rates. Like other speakers, Mr Speight called for greater communication and understanding between the various sectors involved in the marketing pipeline.

Labour

Mr W.R. Cameron, President, Canterbury Trades Council, stressed the increased throughput handled by freezing workers over the years with very little new plant and with increasing demands on
processing standards. Mr Cameron claimed that the movement of stock for slaughter is inefficient in the present system since 10 per cent of livestock killed in New Zealand annually are transported away from the nearest processing plant. He advocated greater co-operation between different sectors involved in the production and marketing chain and proposed a Meat Industry Corporation with statutory powers to co-ordinate the entire industry from farming through to the market.

While preparing this brief, and I hope unbiased, review of the seminar papers, I felt that although a number of specific formulae for action had been suggested, and some broad guidelines had emerged, we had not sufficiently, focussed on principles concerning the marketing chain so that we could take away with us a rational framework for further discussion and action.

THE MARKETING CHAIN

A marketing chain has a number of functions: apart from providing a bridge between the sources of demand and supply for a product, the marketing chain accomplishes such functions as grading, assembling, information flow, financing, risk bearing, processing, storage, and transport. In the remainder of this paper I give particular emphasis to the most obvious of these functions, those of handling, and transport. In addition I will assume that we are predominantly concerned about cost escalation in our export marketing chains, and in this respect, I will give particular attention to wool.

To start, I think we need to obtain some perspective of the relative magnitude of different costs in our marketing chains. In the case of wool, nearly half of all costs beyond the farm gate are associated with shipping – see Table 1. With respect to the export lamb industry, by far the greatest proportion of costs is accounted for by freight and duty outside New Zealand.
# TABLE 1. BREAKDOWN OF COSTS BEYOND THE FARM GATE
FOR WOOL: ESTIMATES FOR 1975/76

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>Cents/kg</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport to Store</td>
<td>1.77</td>
<td>5.7</td>
</tr>
<tr>
<td>Warehouse and Broker's Commission</td>
<td>4.50</td>
<td>14.5 *</td>
</tr>
<tr>
<td>Levy</td>
<td>2.92</td>
<td>9.4 *</td>
</tr>
<tr>
<td>Buyer's Commission</td>
<td>2.14</td>
<td>6.9 *</td>
</tr>
<tr>
<td>Delivery from Store and Transport to Wharf</td>
<td>2.58</td>
<td>8.4</td>
</tr>
<tr>
<td>Dumping, Loading, Sea Freight, and Discharging</td>
<td>14.49</td>
<td>46.7</td>
</tr>
<tr>
<td>Marine Insurance</td>
<td>0.31</td>
<td>1.0 *</td>
</tr>
<tr>
<td>Transport - Port to Mill</td>
<td>2.29</td>
<td>7.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30.99</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

* varies with price of wool

(Source: New Zealand Wool Marketing Corporation, New Zealand Wool Board)

# BREAKDOWN OF COSTS BEYOND THE FARM GATE
FOR LAMB: ESTIMATES FOR 1975/76

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>$/head</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport to Works</td>
<td>.300</td>
<td>2.69</td>
</tr>
<tr>
<td>Killing, Freezing, Inspection, Transport from Works to Port</td>
<td>2.868</td>
<td>25.71</td>
</tr>
<tr>
<td>Buying, Administration, Interest and Insurance</td>
<td>0.556</td>
<td>4.98</td>
</tr>
<tr>
<td>Levy</td>
<td>0.105</td>
<td>0.94</td>
</tr>
<tr>
<td>Freight to ex hook, Smithfield</td>
<td>7.325</td>
<td>65.67**</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$11.154</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

** includes duty in U.K.

(Source: New Zealand Meat Producers' Board)
It seems to me that we can attempt to curtail further increases by focussing our attention on one or more of three areas:

1. Improving efficiency within each link of the current marketing chain.
2. Improving overall efficiency of current marketing chain.
3. Improving overall efficiency by changing the structure of the marketing chain.

**IMPROVING EFFICIENCY WITHIN LINKS OF THE MARKETING CHAIN**

Cost Containment

Cost containment or reduction within each link of the marketing chain can be made by the reduction of any excess profits, a better use of existing resources, or the development of new or improved technology. Competition is often put forward as a catalyst in attempting to meet some or all of these objectives. It is noteworthy that the major activities involved in transporting our export produce to markets are not in a state of free competition; one may wonder, therefore, whether this lack of competition does induce 'slack' or inefficiency, or does maintain higher than reasonable profits.

The first industry concerned is the road transport industry. I would like to draw here on some so far unpublished work of our Research Unit at the College. A tentative conclusion from this work\(^1\) is that Government imposed restrictions on entry to the industry and on competition between carriers, and the Government fixing of prices that carriers may charge, do not work in favour of farmers. In a more competitive pricing

---

system, prices would undoubtedly still rise due to inflation, but there would always be pressure on each firm to minimise the increase by improving productivity in order to maintain or improve its market share. The industry would be more likely to fully exercise its potential for productivity increase in this way than through an arbitrary estimation by a Government Department. With rate schedules designed to provide an operator of average efficiency with a satisfactory income, many road transport operators may have been able to achieve above average incomes, since any increases in productivity are not immediately taken into account in rates; this is because rates are based on information supplied in the last regional survey which could be a number of years out of date. Statistics of the average incomes of the self-employed over a period of years show that those in the road transport industry have been among the highest of the non-professional self-employed. However, such figures should be interpreted with caution until information on the highly depreciating capital employed in the industry is taken into account.

The second transport industry in which competition is curtailed for much of our export produce is shipping. Wool, for example, has traditionally been carried from New Zealand by a number of shipping conferences or leagues that operate on the principle that their pooled resources allow them to provide regular and frequent services at a fixed rate for each commodity. The philosophy behind rate setting within such leagues has been to charge what the market will bear. It is most probable that the overall revenue required and therefore generated by shipping companies in the league is set so as to provide a reasonable return for the least efficient member of the group.

Australia is in a similar position to New Zealand with respect to overseas shipping monopolies.

Let me quote from the Australian Financial Review, March 9, 1972.
"The overseas shipping conferences which have dominated Australia's overseas general cargo transportation for many years have already begun campaigning to try to reverse the growing trend towards the introduction of a more competitive element into our shipping arrangements. The Australian Wool Commission has been among the leaders in demonstrating to all Australian exporters that only by the introduction of outside competition can the demands of the conferences for higher and higher freight rates be contained."

It is also interesting to observe that in New Zealand in 1972 South Island wool exporters were paying 40% more than wool exporters from the North Island as a result of competition from bulk carriers loading in the North Island for the United States.

The fact that it is possible that some firms may be making quite reasonable profits is not unduly worrying, since in any free enterprise system this is bound to happen; what is worrying, is the potential inefficiency and inaction that this situation may perpetuate.

New Technology

A second avenue by which the efficiency of individual links in the marketing chain can be improved is the development and introduction of new technology. If we are to gain significantly from this approach there must be a substantial increase in our overall research and development expenditure. If we feel it is the responsibility of the individual links in the marketing chain to finance such research and development, we should first ask ourselves whether they command sufficient resources to do so. I think a good case can be made for greater Government support in this field due to the small size of the firms involved in many of our transport, handling, and processing activities, and the national importance of our farming sector and export markets. Also, if this effort is left entirely to each individual sector, the danger is that technology will be developed to meet the objectives of the
particular sector, which may not be entirely suited to the individual commodity concerned. An example of this is wool in containers.

IMPROVING OVERALL EFFICIENCY OF MARKETING CHAIN

The seminar held here in March clearly recognised the interdependence of the various links in the marketing chain. A cost reduction or greater efficiency in one part of the chain can easily lead to a cost increase or greater inefficiency in another sector. For example, if we try to minimise internal transport costs by always transporting our produce to the nearest port, shipping costs will rise due to more ports of call and longer ship turnaround times.

Co-ordination of activities is another problem; for example, the wool industry has been plagued by low ship loading rates brought about in part by a poorly co-ordinated flow of wool to wharves in which brokers' stores, dumpstores, buyers, scourers, shipping agents agents, and shipping companies are all involved. The wool Flow Advisory Committee reporting in 1968¹, produced figures to show what the gross shiploading rate for wool had declined by over 20% in the 12 years 1954-1966. The apparent lack of integration and poor co-ordination between different sectors, stems partly from the fact that each sector has differing objectives in the management of its operation; and these objectives are not necessarily related to the overall objective of an efficient total distribution system.

One improvement avenue lies in the formation of co-ordinating authorities but it is perhaps questionable whether co-ordinating authorities, such as inter-sector committees or advisory committees, can go very much further than ensuring that all

committees, can go very much further than ensuring that all parties are aware of the problems and interdependencies between sectors.

CHANGING THE STRUCTURE OF THE MARKETING CHAIN

If we think that the overall marketing function can be carried out more efficiently with some other structure such as cutting out the 'middlemen', through economies of scale, or through increased bargaining power, we must first ask ourselves:

To whom does the marketing chain belong?
Who has the overriding responsibility for ensuring its overall efficiency?
Is it farmers, current operators and shareholders in the various sectors, or Government? Ideological and political considerations rank highly, and I will not proceed further. Instead, I would like to quote from the green paper on rural policy, presented to the Prime Minister of Australia just two years ago. I think this applies equally to New Zealand.

"Government involvement in marketing agricultural products reflects to a substantial degree, mistrust by farmers of market forces and private enterprise in this area of economic activity. This lack of confidence is shown in farmers' particular concern for the increasing costs of marketing farm products and the strong support given by many farmers to 'orderly marketing', usually involving some form of collective action to co-ordinate marketing activities. Whilst many farmers support orderly marketing as an economic and social objective, support for collective action is not universal even within the farming community."

Casting aside political considerations for a moment, I would like to suggest three steps we can take towards identifying and evaluating an improved marketing structure for wool:

We must collect more information regarding the structure of the trading and preliminary processing segments of overseas wool textile industries. We must know more about the requirements of overseas wool processors in terms of the kind of supply pipeline they really require. The IWS has devoted disproportionate resources to pulling wool through the textile pipeline by concentrating on the consumer. The IWS does also use the 'push' philosophy but this is directed mainly towards the middle and latter ends of the textile chain. In 1972 and 1973 as little as a fraction of one per cent of the IWS budget would have been expended on pushing raw wool as an industrial raw material to primary processors and in servicing the highly complex raw wool supply pipeline.

The question of providing our overseas customers with an efficient wool supply is of overriding importance in the design of any marketing chain. We have seen that it is currently costing us 31 cents per kg to market our wool - it is probably physically impossible to get our wool in overseas mills for say, less than 21 cents per kg. However, if we marketed wool more in terms of an industrial raw material, we may be able to raise prices by more than 10 cents per kg, on present prices an increase of only around 6 per cent.

We will only find ourself in an improved position to formulate better systems of marketing if we obtain a far deeper understanding of current physical flows, purchasing and shipping lot assembly patterns, and trading patterns within New Zealand.

We should give more detailed and innovative thought to the adoption of new or improved technology, not necessarily within each link of the marketing chain, but technology that may cover various sectors.
Finally, let us not be constrained in our thoughts by the current marketing chain. We need to be bolder and more imaginative in our total outlook if we want to identify and evaluate alternative structures. Let me put to you, as an example, one futuristic possibility.

Let us assume that we have carried out the three steps I have proposed and let us assume the following:

* We have identified that the spinner and topmaker overseas require speedier delivery of wool in terms of time from date of order to delivery date. A current order to delivery time of 12-18 weeks is often quoted as a disadvantage of wool compared to synthetics and a quicker delivery would significantly increase the demand for wool.

* Assume we have identified excessive handling in New Zealand; a large part of off-farm costs are involved in the transfer of ownership process. We have identified excessive packaging, poorly co-ordinated flows to wharves, congestion in ports, and poor shiploading rates in turn creating high freight rates.

* Assume objective measurement, sale by sample and dense baling have all been perfected. In addition, we have noted a movement towards specialised shipping for most bulk commodities.

Now, armed with these supposed facts, let us try and envisage an improved marketing structure.

1. Shearing sheds are modified to accommodate larger bins.

2. The number of classer's lines are reduced; each line is sampled and tested at the completion of shearing.
3. When the test results are available, the contents of each bin are sucked up into a wool carrying helistat of say, 75 tonnes payload.

4. Such helistats visit a number of farms collecting wool of similar type.

5. The helistats are continuously ferrying wool from farms to specialised ocean-going wool ships sailing up and down the coastline.

In this respect, advantage is taken of the long, narrow shape of New Zealand.

6. Ships themselves would be very large, perhaps carrying the equivalent of 100,000 bales of current weight.

Each ship would be equipped with a number of dense bale presses so that on board the wool ship, the wool could be densely pressed into bales and stowed. This could be accomplished while the ship is plying up and down the coast and during the earlier part of the ocean voyage.

7. Wool on board ship could be auctioned or sold directly on the basis of objective measurement and discharged at the appropriate destination. Depots for stocks of raw wool could be maintained in the Middle East, Europe, U.S.A., and Japan. Unsold wool could be held in such depots.

8. Since wool is not a heavy cargo, passage via Suez may be possible thus serving the Middle East, Mediterranean countries, and Europe before returning via the U.S.A. and Japan; the total voyage distance would not be very much longer than to Europe and back. This 'round the world' wool service could also be used to shift stocks of wool from one depot to another if so desired.

1 A helistat is a type of airship that utilises helicopter engines.
I hope I have not misled you - I have suggested this system not because I think it is entirely feasible or necessarily more efficient than the present system but as an illustration of the type of thinking we should be doing if we want to identify and, most importantly, manouevre ourselves into a position to evaluate alternative marketing structures.

ACKNOWLEDGEMENTS

The useful comments on an earlier draft of this paper by Professors Ross and Dent and Mr S. Filan of Lincoln College are gratefully acknowledged. However, any errors remain my own responsibility.
MAINTENANCE LIME AND FERTILISER REQUIREMENTS FOR SOUTH ISLAND PASTURES

INTRODUCTION

In a recent set of papers in New Zealand Agricultural Science (Karlovsky 1975, Middleton 1976) it has been pointed out by scientists that we may be wasting superphosphate in New Zealand. In the period 1950-1970 as the use of superphosphate increased so did the number of ewe equivalents. Between 1970 and 1974 superphosphate usage increased markedly but the number of ewe equivalents remained static. Middleton has kindly allowed us to reproduce a figure to illustrate these facts - see Fig.1. We wonder whether other important factors have not also operated in the last five years, in explaining why stock numbers have not increased. Clearly, however on some farms superphosphate usage has been excessive. We would suggest on other farms insufficient superphosphate has been used. The problem farmers are faced with is how much lime and
fertiliser they should apply to their pastures to maintain levels of production.

With some $70 million being spent in Government subsidies on fertiliser we have a real responsibility to make sure this money is spent prudently. The fertiliser and lime expenditure on a farm budget is a very important item and it is one of the few items over which the farmer has direct control. During and O'Connor (1975) at the Ruakura Farmers' Conference made superphosphate recommendations for North Island sheep and cattle farms and we will do this for the South Island.

FIG.1. SUPERPHOSPHATE USAGE COMPARED WITH EWE EQUIVALENTS 1950-74

(from Middleton 1976)
As Professor Walker and others on this platform have ably informed you in the past, the main reason we use fertiliser and lime on pastures is to obtain maximum nitrogen fixation by clovers, compatible with maximum dry matter production from ryegrass and other high fertility grasses.

We will be confining our remarks to grazed ryegrass white clover pastures on land which has been developed for 10 years and received adequate dressings of fertiliser and lime over that period.

**SOIL ACIDITY**

White clover and ryegrass pastures fail to produce on acid soils for a number of reasons and hence the 'soil acidity complex' is often talked about. Some of the reasons why white clover and ryegrass fail on acid soils are briefly discussed. There are six main reasons why plants fail on acid soils; these are in order of decreasing importance:

1. **Deficiencies of Molybdenum** which affect particularly white clover. Molybdenum is the only trace element which becomes more available as the pH rises through the application of lime. Molybdenum deficiencies are likely to occur at a pH of 5.6 and below.

2. **Toxicity of Aluminium and Manganese.** As the pH declines the solubility of aluminium and manganese increases and these elements can be very toxic to agronomic plants, particularly white clover. Aluminium and manganese toxicities are unlikely at pH's above 5.6

3. **Survival of Rhizobium Trifolii** the organism responsible for the nodulation of white clover. Again this is only likely to be a problem at pH's of 5.6 or less. Furthermore the necessity for lime can be overcome by inoculation and pelleting (Lowther and McDonald 1973).
4. **Impaired Biological Activity.** At pH's around 6.0 to 6.5 the soil organisms responsible for the breakdown of organic nitrogen, sulphur and phosphorus are at a maximum and hence better grass growth is obtained.

5. **Impaired Soil Structural Conditions.** The aggregation of sand, silt and clay into good structural aggregates is brought about by the production of gums from the decomposition of organic matter. Ryegrass white clover pastures could fail on acid soils due to poor structural conditions but this is likely to be very rare.

6. **Deficiencies of Calcium.** These are rare except on extremely acid soils.

What are considered to be low, medium and high pH values for pastures are shown in Table 1. From our experience here at Lincoln there is no advantage in raising the pH of pasture soils above pH 6.0. On most soils a pH of 6.0 would be

<table>
<thead>
<tr>
<th>pH</th>
<th>Olsen 0.5 hr Phosphorus</th>
<th>Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>&lt;5.5</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Medium</td>
<td>5.6-6.0</td>
<td>11-20</td>
</tr>
<tr>
<td>High</td>
<td>&gt;6.0</td>
<td>&gt;21</td>
</tr>
</tbody>
</table>

Table compiled after consultation with Mr J.L. Grigg, Scientist in charge of South Island Soil Testing Laboratory, Invermay Research Station, Private Bag, Mosgiel.

maintained by a dressing of lime of 2.5 tonnes per hectare every five years. In higher rainfall areas higher rates may be needed and more frequently. During (1972) in his text
'Fertilisers and Soils in New Zealand' (pp.18-20) shows clearly the areas where lime and molybdenum should be used in the South Island. Molybdenum however must be used judiciously. The dressing of molybdenum which we suggest for maintenance is 300 g per ha of sodium molybdate every 3 to 4 years. Except on soils where the available copper status is very low, these dressings are unlikely to have any deleterious effects on animal health.

**PHOSPHORUS**

Soils vary widely in their ability to retain added phosphate fertilisers. This is what is known as phosphate retention. The phosphate retaining potential of soils can be measured simply in the laboratory by shaking up a given amount of soil with a phosphate solution of known concentration and measuring the amount of phosphate taken out of the solution. The phosphate retention capacity of a soil is not altered significantly by agricultural practices including topdressing with phosphate fertilisers. In other words once you have determined the phosphate retention value of a soil type it will not alter much in spite of how much superphosphate is applied. Soils can be classified into four groups, as shown in Table 2, according to their phosphate retention values. A large number of farmers are aware of the phosphate retention values for the soil types on their farms. If in doubt consult your advisory officer.

The plant available phosphate status of a soil varies however according to the amount of phosphate fertiliser that has been applied. The most reliable manner of assessing the current phosphate status of a paddock, on a particular farm, under that specific set of conditions, is by a well designed and conducted field experiment. This is clearly an impractical method of assessing the current phosphate status of all our soils.
TABLE 2. MAINTENANCE SUPERPHOSPHATE REQUIREMENTS FOR PASTURE FOR NEAR MAXIMUM PASTURE PRODUCTION

kg Superphosphate per hectare

<table>
<thead>
<tr>
<th>Phosphate Retention Percentage</th>
<th>Phosphorus Status (0.5 Olsen Test)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low 0-10</td>
</tr>
<tr>
<td>Low (0-30)</td>
<td>Variable</td>
</tr>
<tr>
<td>Medium (31-60)</td>
<td>375</td>
</tr>
<tr>
<td>High (61-85)</td>
<td>500</td>
</tr>
<tr>
<td>Very High (86-100)</td>
<td>625</td>
</tr>
</tbody>
</table>

Table compiled from data from Saunders and Hogg 1971, Saunders 1974 and During and O'Connor 1975.

The phosphate status can be assessed by soil testing. Soil testing for phosphate or any other nutrient is of no value unless the soil test results are correlated with a very large number of field trials. This is to ascertain that when a low soil test value is obtained there is a big response to phosphate fertilisers and the converse with high phosphate test values. The only organisation that can do this adequately in New Zealand is the Ministry of Agriculture and Fisheries. The M.A.F. has been doing this type of investigation for 70 years. For example at Invermay Research Station last year 10,000 soil quick test phosphate analyses were carried out on soil samples from experiments on a wide range of South Island soils. Incidentally only 12,000 samples were done for farms and horticulture enterprises in the same period.

The test which has been shown to give the most reliable indication of the phosphate status of soils is the 0.5 hour Olsen test, where the soil is shaken up with a dilute solution of sodium bicarbonate. The range of Olsen test values are shown in Table 1.
It has been found that phosphate retention measurements along with Olsen soil test values give a reliable indication of the amount of phosphate fertiliser required by a soil to maintain an adequate level of available phosphate against the processes of phosphate retention. In Table 2 we have set out some guidelines to superphosphate usage for near maximum pasture production at various levels of phosphate retention and of phosphorus status.

With topdressing and good grazing management you build up the phosphate status of your soils and hence you should be soil testing your farms every four years. You should soil test your farm in the same month that it was done previously; this is particularly important in relation to pH.

SULPHUR

Sulphur has been shown to be a widespread deficiency in relation to white clover growth over vast areas of the South Island (Ludecke 1969, Metson 1969). Almost all these deficiencies have been reported in the initial stages of land development. In a review paper by Walker and Gregg (1975) it was reported that some soils were not responding to sulphur in the initial stages of development. Cullen (1972) when working on Te Anau soils - yellow brown loams - obtained massive phosphate responses but no sulphur responses were obtained. The Te Anau soil has subsequently been shown to be able to retain large amounts of readily available sulphate.

Very few responses have been reported from areas which have been developed and topdressed with superphosphate over many years. It must be remembered that in each 125 kg of superphosphate applied there is 11 kg phosphorus and 14 kg sulphur. For example on the Southland Plain in a number of trials where sulphur was withheld for a number of years no responses to sulphur were obtained. At Ashley Dene no sulphur responses have been reported in field trials (A.F.R. Adams, P.E.H. Gregg,
pers. comm.). Also on a developed Gorge soil in the Rakaia Gorge, no sulphur responses were obtained over two years (Gregg, Goh and Brash, 1974).

Recently we in the Department of Soil Science have completed research to investigate the reasons for this absence of sulphur responses on developed soils (Ludecke, Young, Allison and Risk, 1976) and have obtained some very interesting results. The form of sulphur in soils which is available to white clover is mineral or inorganic sulphate sulphur. The levels of sulphate in soils which are available to white clover are shown in Fig. 2. Both unimproved and highly improved pastures were sampled. It can be seen that the levels increase markedly with increasing soil development from 75 kg SO$_4$-S per hectare in the yellow-grey earth Balfour soil to 980 kg SO$_4$-S per hectare in the semi-podzolised Mokotua soil. The levels of sulphate also increase, particularly in the top 60 cm with agricultural development. The levels of sulphate on a highly developed Templeton soil on the college farm to 90 cm is 225 kg of sulphur per hectare. Gregg et al. showed in the Gorge silt loam that sulphate at 50 cm was available to white clover and grasses. The concentration of sulphate at this depth was 40 to 50 ppm S. In the developed Southland soils the concentrations were very much higher than this.

Till (1974) in Australia has estimated that the losses of sulphur, mainly in animal products, in grazing systems is 10% of that ingested. If we assume that on a highly stocked farm of 20 EE per hectare 12 tonnes of dry matter, containing 0.3% S, is ingested, then the losses are only 3.6 kg per ha per year out of a total uptake of 36 kg. Therefore there is probably sufficient available sulphur in these soils for very many years.

These findings could have two major practical implications:

1. Use and manufacture of high analysis phosphate fertilisers such as double superphosphate which contain little or no
FIG. 2. TOTAL SULPHATE LEVELS

UNIMPROVED

kg/ha/cm of S

IMPROVED

BALFOUR YGE

APARIMA YGE/YBE

GORE RECENT

EDENDALE YBE

WAIKIWI YBE

MOKOTUA - SEMI POD. YBE

0 30 60 90

75

100

191

295

167

405

315

600

1204

1056

981

1021
sulphur. This would eliminate considerably the pressure in fertiliser works for acidulation facilities.

2. Mixtures of calciphos and superphosphate could be used with considerable monetary savings. Calciphos is calcined or heated C grade Christmas Island Phosphate. The C grade rock is unsuitable for the manufacture of superphosphate due to the high sesquioxide content. The calciphos has the disadvantage of having a talc-like texture and thus creating distribution problems. Chemists at the Southland Phosphate Co., are confident they have perfected a way of adding calciphos to superphosphate without any chemical reaction and forming a granule which breaks down readily. Trials by M.A.F. have shown that a mixture of 25% calciphos and 75% superphosphate has given responses equal to superphosphate alone.

POTASSIUM

Potassium may occur in rocks in the form of various minerals such as the micas and felspars. As these minerals break down during soil formation by chemical weathering, the potassium may be lost by leaching, taken up by plants, become attached to the surface of humus and clay colloids as exchangeable potassium or remain as part of the structure of clay particles. This is known as 'fixed' potassium. There is still much of this 'fixed' potassium particularly in the drier, colder soils of the South Island derived from greywacke and schist, whereas little 'fixed' potassium may remain in soils formed in wetter, warmer areas.

The various forms of potassium found in soils are summarised in Fig.3. The soil test which is currently used for potassium only measures the exchangeable and solution potassium. It does not measure the 'fixed' potassium which, as can be seen in the figure, becomes available to plants slowly. This leads to
erroneous soil test results in many parts of Marlborough, Canterbury and Otago where you get low soil test values and yet do not get responses to potassium fertilisers. The M.A.F. soil test values for available potassium are shown in Table 1. If potassium is required on grazed pastures then a dressing of 125 to 180 kg per ha will be sufficient on the majority of soils and maintenance dressings will be less than this.

CALCULATION OF LIME AND FERTILISER REQUIREMENTS FOR RYEGRASS WHITE CLOVER PASTURES

If you know the phosphate retention values for the various soil types on your farm and have had a soil test of the different paddocks within the last four years you will be able to ascertain your superphosphate requirements by studying Table 2 carefully.
To give you some indication of what is involved we have soil tested five paddocks from six highly developed farms; three in Canterbury and three in Southland. The mean soil test values for the five paddocks on each farm and other relative data are given in Table 3.

The pH on all farms is in the medium range and a maintenance dressing of 2.5 tonnes per hectare should be applied every five years.

The potassium status is in the medium to high range on all soils. On farms 4 and 5 potassic superphosphate is used and in view of the soil tests, we consider that the potassium dressings could be eliminated for a year or two without any adverse effects. If this advice is followed considerable monetary savings could be made.

From Table 3 it can be seen that the farms were selected to cover the whole range of phosphate retention values. It can also be seen that the farms vary widely in their phosphate status as measured by the Olsen 0.5 hour test. These data have lead to the various recommendations on the use of superphosphate given in the last column. We will illustrate this by referring to farms 3 and 5.

**Farm 3**

Medium P retention - superphosphate usage 250 kg per ha - Olsen test 9, low. Recommended superphosphate usage from Table 2, 374 kg per ha.

**Farm 5**

High P retention - superphosphate usage 280 kg per ha - Olsen test 22, high. Recommended superphosphate usage from Table 2, 190 kg per ha.
### TABLE 3. CALCULATION OF LIME AND FERTILISER REQUIREMENTS

<table>
<thead>
<tr>
<th>Farm No.</th>
<th>Soil Type and Soil Group</th>
<th>P Ret.</th>
<th>Soil Test Values</th>
<th>Average Superphosphate Usage (kg/ha)</th>
<th>Stocking Rate EE/ha</th>
<th>Recommended Rate of Superphosphate kg/ha</th>
<th>C.P.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Templeton Si.L.</td>
<td>Low</td>
<td>6.0 28 11</td>
<td>250</td>
<td>Seed Production</td>
<td>&lt;125</td>
<td>&lt;1</td>
</tr>
<tr>
<td></td>
<td>Recent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Chertsey Sh.Si.L.</td>
<td>Low</td>
<td>5.8 8 11</td>
<td>none 2 years</td>
<td>9.5</td>
<td>310</td>
<td>2½</td>
</tr>
<tr>
<td>3</td>
<td>Ashley Si.L. Y.G.E.</td>
<td>Medium</td>
<td>5.8 9 6</td>
<td>250</td>
<td>14</td>
<td>375</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Aparima Si.L. Y.G.E./Y.B.E.</td>
<td>Medium</td>
<td>5.9 15 8</td>
<td>250</td>
<td>16</td>
<td>250</td>
<td>2</td>
</tr>
<tr>
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CONCLUSION

In this paper we have attempted to summarise and present a lot of data which will hopefully assist farmers and advisory officers to ascertain fertiliser requirements so that farmers and the country can receive maximum benefit. We are also hopeful that it will remove some of the myths about soil testing.

Finally, if as a result of this paper there is a big increase in the numbers of soil tests required to be undertaken by M.A.F., as there should be, then the facilities at Invermay must be increased to handle this demand.

REFERENCES

FARM MACHINERY SYNDICATION

P.S. Alexander
Farm Accountant, Christchurch

If any of you expect any magic from this word 'syndication' then I suggest you are on the wrong channel.

Our approach to the concept was a business one initially, is a business one now and at this stage I can see no reason why this approach will be any difference in the future. If we had not felt the concept had something to offer in the form of sound farm business economics we would not have started and we certainly would not be standing here today.

THE BASIS OF SYNDICATION

As I see it, a successful farm machinery syndicate is the situation where two or more farmers are co-operating with the ownership and operation of one or more items of farm equipment to the overall benefit and advantage of all concerned. This concept is not new - any number of farmers here today have been co-operating along these lines for many years. The unsuccessful ones are well-known, the successful ones are less conspicuous. Most of these arrangements are small, simple, informal and have stood the test of time. The farm machinery syndicate or group type which my colleagues and I have been working with is a simple extension of this. The only real differences are that our groups are larger, provide a wider
range of services, involve more rigid financial controls and are more formal. The basic principles and objectives however are identical.

CANTERBURY SYNDICATE DEVELOPMENT

For the coming season there will be four such groups operating in Canterbury at different levels of scale and with different responsibilities but essentially of the same mould. Overall these groups will effectively service the approximate 73,000 sheep and 3,000 cattle owned by the group members, make approximately 120,000 bales of hay and harvest nearly 300 ha of grain and seeds. The work involves some 9,000-10,000 tractor hours and some 12000 ha of agricultural work - remembering of course that the same hectare is in some cases covered several times. The overall scale of agricultural operations is larger than this in several areas, with my figures only covering those operations the group is directly responsible for. For example there would be a further 400 ha of grain and seeds harvested which the groups are not responsible for.

WHY SYNDICATION

Our terms of reference today are concerned only with farmer machinery co-operation; however it must be appreciated that the concept of co-operation amongst farmers is much more all embracing than just with machinery.

Why get involved with co-operating with farm machinery at all?

The disadvantages must be appreciated and understood. We have found that:

1. There is a certain loss of individuality.
2. There is some inconvenience.
3. There is some loss of control.
4. Some individuals have to find some cash.
5. The peak and slack periods are accentuated.

So far we have found the advantages to be that:
1. Higher capacity equipment can be purchased.
2. Specialised equipment can be purchased.
3. The equipment is better utilised.
4. The capital costs, overhead costs and operating costs are shared.
5. Monies are being put aside each year to replace the existing equipment.
6. There is increased financial strength.
7. There is a distinct 'bonding' of the individuals concerned.

Different individuals place the emphasis in different areas but we have found that where all the necessary ingredients are present and the members want the group to work the advantages outweigh the disadvantages.

STARTING THE GROUP

The stimulus for starting a group can arise from many sources. In our case the seeds were sown some years ago but did not begin to really germinate until Professor J.D. Stewart arranged for a co-operation expert from the United Kingdom to spend several months in New Zealand. This was the final impetus we required and the first two groups were formed three years ago. It would be wrong to think that the path of transition was achieved quickly, easily or without pain. There were a number of problems; some foreseen, some unforeseen, which had to be overcome. As far as the decision-making process was concerned we very quickly found the groups
were pioneering and there was nowhere and nobody we could turn to for advice or precedent.

Before any commitment of any kind was undertaken or expected of potential group members a very careful examination of the whole proposal was undertaken, with all group members at various stages seeking the assistance of their own advisers to analyse the effect on their own situations. One of the important points about co-operation as it is relevant to farmers and machinery is that each individual before he enters finally into a group activity must be able to see some tangible benefit accruing to himself. This benefit, if present, need not necessarily be financial but in today's economic scene I have almost invariably found that it is.

IS IT WORTHWHILE

How can an individual farmer relate his present machinery capital and operating costs to his share of the costs under a group arrangement? This is an important and obvious question and I find it impossible to answer satisfactorily in most cases. There are too many variables and insufficient real knowledge of the individual farmer's capital and operating expenses.

How, for example, does one compare, measure or value the relative differences between expensive high capacity plant and cheap low capacity plant; the difference between highly utilised plant and poorly utilised plant; the value of the individual farmer's own labour driving his machinery as against working with his livestock and last but not least the depreciation and replacement area. The problem is not so much in arriving at what the costs are under a group structure but in arriving at what the individual farmer's real machinery costs are at the moment. The problem is compounded by the fact that one must look at the situation over a period of years in both cases.
Given then that one feels he could 'get on' with a certain farmer or farmers regarding some form of machinery co-operation, how does he proceed in the light of the comparison difficulties? I suggest that a careful feasibility study be made preferably by an independent person with no farmer member commitment, until the exercise is able to be viewed in its entirety. Each potential group member would by then know the other farmers who still showed interest; would have a good idea how the operation would work; know what his capital costs would be and what surplus equipment he would be able to sell; and finally, what his annual charge out costs may be for the first year. At this point he must, with his advisers, look very hard at his present situation because as I have stressed before, he must be able to see some tangible advantage accruing for him in the group. Usually I find the individual farmer tends to try and look forward rather than backwards when seeking assistance and guidance as to how he should handle and react in this situation. If the farmer and his advisers cannot see any tangible advantage either initially or in the future, he should stop right there. In my experience a farmer who has been though a well prepared feasibility study and decided not to proceed has lost very little.

GROUP VIABILITY

A number of factors need to be present quite apart from the will to make it work. There must be a sufficient volume of operations, the potential members must 'get on', the proposals must be practical, the feasibility study must show that the proposals are economically viable and the financing must be capable of sensible arrangement. The potential members must see some immediate or long term advantage accruing to them. The sequence of events leading from the first discussions of the idea through to the stage where members agree either to proceed further or not can be spread over a considerable time. It would not be uncommon in an involved situation for say ten meetings to be held before a final decision is make. This
often happens because the final proposal on which the group proceeds may differ from the original proposal; also the final number of members would normally be reduced from those who attended the first meeting.

As already mentioned, co-operation amongst farmers can take many forms and the sharing does not have to be on as wide a front as I have outlined. I would think for example that sharing by farmers of high capacity haymaking equipment, silage equipment and other harvesting equipment would be possible or feasible and make economic sense providing the necessary ingredients as mentioned are all present and the 'will' is there.

GROUP STRUCTURE

Again there are a few rules regarding rights and wrongs. In the case of the Waiau and Cust groups both are private limited liability companies with the shareholders being the farmers concerned. All shareholders are directors and all shareholders have one vote. The shares may be owned equally or in an approximate relationship to the estimated work throughput through the company. If important decisions are not unanimous they are deferred, if possible, pending further investigation. The basic structure regarding farmer participation is essentially and deliberately a democratic one.

The working rules are very important and must be firmly established at a very early stage. The rules must cover, for example, the procedure in the event of a dispute and the procedure in the event of a member wishing to withdraw or resign. The capital of the company is in the form of shares and advances by the group members to the company. Shareholders would appoint a Chairman and Farm Secretary in the very early stages and of course an accountant and solicitor. The company has its own bank account and, for that matter, overdraft. All major equipment in our particular case is owned
by the company except for a number of usually specific items of plant owned by each individual farmer. The company employs a company manager and possibly one or more full time employees plus casual employees. In effect it proceeds to offer its services as an agricultural contractor. It should be appreciated that a group could be a simple partnership and in the case of many of the existing often very satisfactory neighbour and neighbour arrangements a partnership is all that is required and in most cases all that would be recommended. The majority of the very successful silage groups in the United Kingdom are simple partnerships.

GROUP OPERATION

At the beginning of each season each group member would provide the chairman and company manager with a schedule of his estimated work requirements. Naturally a certain amount of leeway has to be allowed in the subsequent company estimates to cover climatic and governmental interference. Forward planning for the season can take place once the overall agricultural requirements by the group members are known. Shareholder meetings are important and regular, particularly with a new group. Tight and up to date financial control at all stages is critical.

At the beginning of each season the charge out rates are set for the following period - these being the rates the company will charge the group member for work done. Except in odd cases the charge out costs are on a per hectare basis so that each shareholder, when he has established his forward programme, will know in advance what the company will be charging him. There are a few operations which we would charge out on a per hour basis but we have found that charges assessed on a per hectare basis are better for the shareholder and force the company to operate efficiently. Usually the most important single cost the group will be looking at in setting the forward charge out rates is the amount of depreciation and replacement
allowance required in real terms. This is a 'grey' area at the best of times but one of the financial cornerstones of the group's operations is in attempting to arrive at this figure each year. The objective of this depreciation and replacement allowance is that the group wants to replace its existing equipment when required without obtaining further capital cash from shareholders.

Important financial decisions such as the setting of the following season's charge out rates would always be made by a full meeting of the shareholder-directors. At the beginning of each month each shareholder would provide the company manager with a schedule of work requested of the company for that month with any priority work requested being clearly shown. The company manager then plans his month's work accordingly. At certain times there are peak and slack demands which can tax the company manager and chairman considerably. One of the natural developments of a group is that if any member has a problem concerning some part of the operation he should air it at the earliest opportunity. This is encouraged and although we cannot always solve it, it has been found to be an important part of co-operation.

Lest there be any doubt in anyone's mind, I make it quite clear that the forward physical and financial planning for a group operation is very much more demanding than is required for any individual in the group. The calibre of management at times is severely tested. The records required and paper work are considerable, with the group's machinery operators being required to keep daily records of work done. From these records monthly accounts are sent by the farm secretary to each shareholder. At the end of the season a rebate could be made to shareholders if the company has recovered more monies from shareholders than is thought to be required. This rebate would be based on the volume of work put through the company.
SYNDICATION IN THE UNITED KINGDOM

In 1975 I spent an intensive month in the United Kingdom looking at their farmer co-operation movement and looking very closely at a number of groups in action. I was very fortunate to spend some time with the co-operation adviser who came to New Zealand three years ago and who played such an important part in our formation at that time.

Because of the very important and significant differences between our agriculture and theirs I feel that any comparisons are dangerous unless qualified very carefully. Because of this I have contained my brief comments solely to the farm machinery or production groups as they are referred to there:

1. I would say the concept over there is some 10 years ahead of us.

2. The last official figure I saw was that there were some 1,100 production groups.

3. Many of the groups are small and informal but were almost invariably very effective.

4. The British Government is very much behind the concept.

5. The movement has its own advisory service and funds and is well established.

6. The advisers in the field tended to have a commercial background rather than a 'grass roots' one. This I found very interesting, I suppose because I had not expected it. Their advisers did however have a very strong background of understanding people. Their abilities in the psychological field were apparent to me on several occasions.

7. Several of the European countries were in some fields further advanced in the concept than the United Kingdom.
8. The financial institutions and farming organisations were very much behind the concept.

9. The growth in the movement over the last 10 years has been very considerable although it did seem to me to be somewhat uneven.

10. Very often the groups expanded into other areas once formed.

11. I found the young United Kingdom farmers, whether he be owner or tenant, to be on the whole as independent as the average New Zealand farmer.

12. On the whole I was impressed with what I saw and what the groups had achieved.

13. The concept has had credibility there for some years.

SUMMARY

Farmer co-operation as I have found it is a personal thing. In my own practice I have a number of farmers who would agree with most of what I say but whose personalities and whose wives' personalities are such that they feel the concept would not suit them for various reasons. There is nothing unusual about this and I would certainly never attempt to convince any of them otherwise.

Given however the necessary ingredients and the 'will' we have found the concept is sound from a cold blooded business point of view; and that it does work.

The following are, to me, the critical points:

1. Group members must 'get on'.

2. Group members must have the 'will'.
3. The feasibility exercise is critical.

4. The chairman and farm secretary bear a very significant load particularly over the formative years.

5. The company manager plays a strategic role.

6. The group is a business and must be run as one.

7. Financial control and communication must be a continuing saga.

8. The forward planning is a key area.

9. A really successful group will get participation from its members rather than loyalty, and responsibility rather than duty.

10. A good potential group member will invariably have already had a searching look into his own backyard.

11. To a significant extent a platform for the future is being built.

12. A good group develops a real 'bond' among its members.

13. The group member's wife usually plays a quiet but nevertheless critical role.

14. A good group makes sound economic sense.
Before I go into details about our group I would like to compare current machinery prices and those ruling in October 1974.

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May I suggest that the objective of all of us dedicated to our magical way of life should be to thoroughly analyse all situations and keep cash to support our way of life, anticipate all price rises prior to their occurrence, and to be prepared to move swiftly into overdraft having bought a new tractor. However, when we are up to our waists in alligators it is difficult to remind ourselves that our initial objective was to drain the swamp.
Probably a very good starting point is why I went into a group, or why I was interested in a machinery group. I bought a property 10 years ago which had had very little cultivation for some years. In fact, the average pasture age was about 30 years. It would be fair to say that, although well manured, the majority of the paddocks were due for the pension in terms of production. This entailed working and sowing down about 280 ha as quickly as possible, certainly before any major stock improvement could take place. Being a typical, very well committed young farmer, the purchase of machinery of any consequence was just not on. For the first 4 or 5 years we boxed on with tractors that were far from satisfactory and implements that had seen many years come and go.

We were still increasing stock at this stage and the labour force - myself and one man - seemed to be kept very busy with stock work and repairs and maintenance without any tractor work. At this stage I decided that rather than purchase bigger and better gear, and employ casual labour, I would be much better advised to put what capital I had invested in machinery into fencing and use a contractor already established in the area.

After using the contractor for two years, with whom I may add I was very satisfied, I read with growing interest of co-operative development in the United Kingdom. I became very interested in the savings so obviously achievable by a group of farmers and it seemed that if I co-operated with other farmers we would all have a say in the type of machinery being bought and the labour being employed. The thought of farmers co-operating was exciting with plenty of potential for many other avenues of development. But first things first, we had to see if a machinery group would work.
At this stage the idea was to gather some facts and talk to neighbouring farmers to see if there was any interest. This didn't happen overnight, and from the time I originally talked to Pita Alexander until the date the company was formed, eight months had elapsed. The shareholders in the group very kindly say that I bluffed them into it. Let's face it, the spadework in forming the group coincided with the 1972/73 cash surplus, now long forgotten by all of us.

During this period the Cust group was being formed and we in Waiau were very fortunate in being able to gather advice from them and from a United Kingdom adviser in co-operative development. In September 1973 the group, or Waiau Enterprises as it is registered, was formed with Messrs J.R. Gardner, I.K. Dunbar, K.W. Stace, C.H. Gray and myself becoming shareholders. In 1974 two further shareholders joined the company – Messrs A.G. Burbury and N.G. Ferguson. Geographically the group is in two areas, the distance between the outside shareholders being about 16 km.

In total the shareholders farm about 2600 ha which supports 19,000 sheep, 1,400 cattle, 200 ha grain and seeds, 250 ha of winter feed and sow downs, and together make about 50,000 bales of hay. To give a comparison:
Each shareholder still has a small 25 kW tractor for raking hay, feeding out in the winter and pulling the group tractors out if stuck. Apart from the small tractors, we as shareholders own the usual general plant, such as chainsaws, Landrovers, motor bikes and golf clubs.

During this financial year the company will have completed the following operations for shareholders:

- 320 ha Ploughing
- 470 ha Discing
- 220 ha Grubbing
- 120 ha Rolling
- 420 ha Harrowing
- 420 ha Drilling
- 380 ha Mowing and Windrowing
- 48,000 bales Hay
In September each year each shareholder estimates as accurately as possible the work he envisages the company doing for him over the following twelve months. This estimate is written on a company worksheet which then becomes a master copy. The completing of this master copy takes a deal of concentration as farmers are not generally known as good forward planners, certainly not on paper. As far as I am concerned, I think that committing my programme to paper has tended to make me more efficient both in management and cash flow budgeting.

The estimates given by shareholders detail the name of each paddock, the area involved, and the cultivation envisaged. For example, for each paddock shareholders detail whether they want

1 plough and 1 discing or 1 disc and harrow and
1 harrow and roll and 1 drill.

When these initial estimates have been completed by the shareholders they are handed to the chairman of the company. By totalling the areas to be ploughed, disced and so on it is possible to see just what the work load will be, as the shareholders also detail the months when these cultivations are likely to take place, we can judge when extra labour will be required. Not only can we determine the total workload, but we can tell when the 'peak demand' period will occur. This period is a time when everyone wants everything done the day before yesterday. By estimating in September just when this peak demand will occur, it is possible to employ casual labour in advance so that at least we as a company can attempt to get everything done tomorrow, rather than the day after.

So far, we now know the labour requirements and the total workload. The next step is to establish conversion rates, or hectares per hour, for each cultivation; for example, ploughing at 1 ha an hour discing at 3 ha per hour, harrowing at 4.5 ha per hour. By dividing the totals of each cultivation by the relevant conversion rate, we can then determine
the number of hours involved in the group activities for the coming year. Once we know the total hours, it is an easy step to the per hour cost, and finally to the charge to shareholders for each particular cultivation on a per hectare basis.

Each month the farm secretary, James Gardner, sends out accounts for the previous month's work. This account is accompanied by a blank worksheet which the shareholders fill in, detailing the work they require to be done for the coming month. It is essentially reviewing, each month, the original estimate made out in September. The only difference is that on the monthly estimate we detail the approximate date of the month that the work should be done. These monthly worksheets must be in to the company manager by the first of each month to enable him to plan his workload.

Each month the shareholders meet in one of their homes and in most cases Pita Alexander has been present. Problems that have been experienced, or those that are foreseen, are discussed and resolved if possible.

You as farmers, advisers and financiers, would not be on your own if you consider that we as shareholders in a group such as this are candidates for communism, guinea pigs, or plain crazy. We have been called many funny things, and this has inadvertently helped form a very strong bond among us all. It has been these comments that have made us strive, and succeed, in proving the sceptics wrong. I am not saying the system is perfect, but then the cattle prices are nothing to jump up and down about, and there still seem to be a few of those about.

Before the group was formed, we all knew each other well as farmers farming in the same district. Although not necessarily friends socially, we all got on well together.
Together with the bond to make the group work, and work well, all of us are prepared to play a very important part in peak periods, namely "manning the buckets".

Our normal labour force is one man, the company manager, Brian Dunbar. If he requires help we can, as a company, employ single men already employed by individual shareholders, these shareholders then being reimbursed by the company.

By this stage, you are all totally convinced that this co-operative deal is just the answer. You must admit that it sounds easy, but I am sure that you all have a gut feeling that there must be problems. There are Big Ones!

The first and foremost problem in our group is the weather. There are a range of soil types between one side of the group and the other, and this tends to alleviate some of the pressure. If conditions are wet in the early spring then the cultivation programme starts late. This happened this year, and the resources of the group and the patience of the shareholders was put to the test, to put it mildly.

During October, November and December the three staff employed by the company put in 940 hours with the shareholders contributing another 50 hours. Over these three months the company completed:

- 142 ha of Ploughing
- 138 ha of Discing
- 137 ha of Grubbing
- 211 ha of Rolling, Harrowing and Dutch Harrowing
- 113 ha of Drilling
- 321 ha of Mowing and Windrowing
- 30,182 bales of Hay
- 26 hours of heavy rolling
- 30 hours of servicing
While we were pottering about doing this, we as shareholders decided to help one another cart hay and we, along with some outside labour, put all the hay baled in the shed for about one third of the local transport price.

By the end of December it was quite obvious that all of us had been under considerable pressure and it manifested itself in a loss of sense of humour. However, a couple of weeks in the surf restored that which had been lost, and it seemed safe for me, as chairman, to call a meeting about March.

At this meeting all shareholders commented objectively about the problems, and several areas have since been replanned for next year; namely labour and hay mowing.

Probably the most critical area both physically and emotionally is haymaking. This area is a problem alone, without adding hay carting to it. Over the last two years we have experienced chronic haymaking weather. Actual rainfall during haymaking has not been the problem. The problem has been that the lucerne and meadow hay crops have ripened together.

The system that we have adopted is this. We cut blocks on both sides of the group, probably about 40 ha in each. As the hay ripens we have two alternatives, we can put a baler on each side of the group, or if one block is ready before the other, we can charge in with two balers. As soon as we have the baling under control we mow some more. The point is that we do not get carried away with the mower.

In a very wet season the problem is simple but at the same time difficult to solve. Cultivation is put back, the lucerne hay is ready to cut at the usual time, and the meadow hay comes in early. There is no answer to the weather as we all know, but the physical problems such as labour and machinery can be alleviated by a sense of resolve and a single-mindedness to
help. It is during these peak demand periods that the chairman of any group wishes that he had completed a degree of psychology.

Apart from the stresses caused by the weather, the hay mowing and baling is left to the discretion of the company manager. It is his job to cut the hay as soon as possible after the shareholder decides that it should be cut. The shareholder then rakes and turns his hay with his own tractor, and when ready to bale he contacts the company manager.

It is the company manager's task to bale the hay when he considers that a quality product will result. The reaction to the idea of the company manager being responsible for actually making the hay is predictable. Every farmer knows for a fact that he can make better hay than his neighbour. Conversely, every contractor knows for a fact that his farmer clients tend to ring a day early to make sure that he, the contractor, is there on time. We as shareholders all had, without doubt, the best system for making hay, and for hours we all tried desperately to get the group as a whole to adopt our own particular method. Needless to say, no particular method won, and all the shareholders freely admit that our company manager is making as good, if not better hay than we as individuals made. I, as chairman of the company, can pay our company manager no higher compliment.

I have been asked several times if the Waiau group envisages branching out with other forms of co-operative development. The short answer is a cautious yes. As more groups are formed, the potential, for instance, of group marketing seems unlimited. Not only is quantity of the product available, but also climatic differences between groups would tend to spread production of that product. Therefore it seems logical to suggest that a marketing co-operative, involving all the established groups, could supply a lucrative market over a reasonable period of time.
Many other areas could be developed; bulk purchasing, inter-group trading, the importation of machinery in packing cases to be built up by employees, and stock feed processing to name a few.
I suppose I first started thinking about groups of farmers owning and operating farm machinery jointly about ten years ago. This group idea is really a stage farther on than what is normally meant by syndication. I will skip most of the historical side and just give you my personal approach to the problem.

To begin with I do not like machinery - I never drive a tractor or fiddle with a motor if I can get somebody else to do it; so I look on tractors and that ilk as necessary evils. This gives me a pragmatic, unemotional approach to them.

Given that approach it would seem obvious that I was principally interested in lowering operating costs and utilising plant more efficiently. I also thought that with greater usage it would be possible to have better and more efficient plant. At that time it also seemed probable, unfortunately proved correct, that the price of machinery would rise at a quicker rate than the price of produce. I was hopeful that by working in with my neighbours we would be in a stronger position to meet this problem.

Rather hopefully I felt that it would lighten the load on me personally and give me more free time - like time to sweat over this paper.
It also seemed possible that if stage one worked the idea could be developed further to mutual advantage.

To put it briefly I was hoping to get the advantages of scale without its disadvantages. Perhaps only some such approach would preserve the family farm from the alternatives - state or big business control.

After three years operating in a group I can consider these ideas and see how they have worked out - helped by a bit of guesswork.

It is not easy to say how the idea is working out - particularly when we are asked about cost comparisons. Farm costing particularly costing in the machinery field would seem to be in its infancy. It would be nice to produce two present day costings - one as individual farmers and the other as farmers operating in a group. But to do this would involve too much guesswork; too much plucking of figures out of the air. Consider, for example, the amount necessary to load onto operating charges to cover the cost of buying a new tractor next year. We have to have a go but it is just a guess. The alternative is the historical basis - then and now - but costs are moving far too fast to make this a profitable exercise. However some facts are showing through.

So what can we say after three years operating experience? The first thing is that it is working - the work is being done, perhaps not quite as the individuals would have done it - this is not necessarily good or bad - but it is being done. The members are still friends and if anything they know and understand each other better than they did before. The problems like 'who should get their hay baled first?' have either not materialised or have proved to be soluble with a mixture of fairness and discussion. We can say that our group can work together and I see no reason why other groups cannot, given the will and motivation. I do not think we have lost our
individuality. After all we are still individuals combining in a business proposition for a specific purpose. Certainly it has put certain limits on our freedom of action but that is life. The question is whether it is worth the 'candle'. This is a straight out business proposition rather than an experiment in socialism.

What else can we say. Before we started the four in our group had seven tractors of medium size, say around 50 kW, engaged in cultivation and work of that ilk. These excluded the farm hacks which never went into the group anyway. You have to have something to tow the car when the battery is flat. On starting we immediately reduced the number of working tractors to four and have since then replaced two of them with one large tractor. The total plant has been reduced by half though admittedly we kept the best half. But in general it means that we have halved our overheads for the area worked or at least come very close to halving it. And we have better and more efficient plant. If you look at overheads with the present high price of machinery you will find them very significant. The costs involved in depreciation and replacement and interest on capital involved are very considerable, and they are not getting any less.

We seem to manage the replacement problem better than the individual farmer, not that we like it any more than other people. As a group we have greater economic strength and the cost can be spread wider. We try to cover the replacement of existing plant out of operating charges; new plant over and above that and expansion into other activities has been financed by capital from members. This is our ideal but in the tight position up to the present we have used whatever cash we can get our hands onto. But that is our policy and it is starting to work.
To offset these advantages and savings we have incurred extra overheads in running the group; but more about these later. Suffice it to say that though significant they do not invalidate the saving we have made in other areas.

There is also a loss of flexibility. It is no good wondering what you are going to do while you are eating your breakfast, looking at the weather and then deciding what to do. If you are going to double the amount of work which each tractor is doing, and this is effectively what we have done, there has to be a lot more planning and more paper work.

Summing up, we have on the credit side:
* We are getting the work done.
* The group members get on together and the problems are not insoluble.
* By halving our plant we have reduced our overheads.
* We have more efficient plant.
* We are coping with replacement and expansion problems.

On the other hand we have on the debit side:
* The group has incurred additional overheads in running the group.
* We have a paper war on our hands.

Overall, to me, this adds up to a profit on the operation.

From my own personal point of view I have had no trouble occupying all that extra leisure time. I have not been able to reduce my golf handicap or fill the deep freeze with salmon. In other words, the more leisure time idea has not worked out.
So much for a general look at the past few years. I thought you might be interested in a detailed look at some of the problem areas and at whatever is the opposite to problem areas. Probably some of these are only seasonal and will come and go; others may require definite action to correct them.

Harvesting has given us the most headaches. We tend to blame the weather, but looking back there has always been a shortage of weather when the moisture goes below 14% - in our area anyway. The group would appear to have a harvest which is somewhere in the 250 to 325 ha range - mainly white crops - wheat, oats and barley with some small seeds. We set out to harvest this area with one modern medium sized header and one old PTO model. The latter was left on our hands when it failed to reach the reserve at the clearing sale; the would be buyer was proved to be correct. So effectively we had one header which is quite capable of doing the work provided it gets a break from the weather. But it did not, and the tensions started to build up. This year was by far the worst. In our system of priorities, barley has preference over wheat. But most of the wheat was mature by late January and still not harvested when the late barley matured in early March. We engaged a neighbouring farmer and his header and though it did help matters a bit it did not improve the weather. Buying another header at an unknown but high price would have helped the problem but not solved it.

As an emergency measure, but also a considered long term one, we bought a second hand continuous flow dryer. Pulling every string we could it arrived here at express speed and we hoped to have it working for the present season. But we ran into trouble. We could not get temporary electrical connections. Before we got the permanent installations finished the weather came right and the harvest was finished. However, we are
pleased with two things - the first that we have have got the
harvest finished and the second that we do not think we will
get into this position again.

Next year the one header should manage quite comfortable
because we will dry from the word 'go'. All those days which
were not quite good enough will be harvesting days. The cost
of drying will be spread over the entire heading operation so
that the member who gets the lucky break with the weather will
pay his share. In addition there will be surplus capacity
which we hope that neighbouring farmers will use. This
should be of mutual advantage. Not a very exciting story but
it does show the problem and how with greater strength and the
necessary organisation we can attack and hopefully solve these
problems.

On the organisational side there are two problems; the over­
heads and the mass of paper work which is generated.

Perhaps we tried to run before we could walk but we started
off by buying a few hectares in a very suitable situation and
setting up a manager's house and headquarters depot on it.
This, as you can realise, cost quite a lot of money. Finding
this and servicing the necessary loans was, and is, quite a
burden. But I am certain in the long run we will look on it
as an action showing foresight. It is pretty obvious that
this sort of operation cannot be permanently housed on a
member's farm. Having our own property has made such things
as a permanent setup for the dryer possible. And it will
never be as cheap again.

There are also administration expenses such as accountancy
fees and chairman and secretary's honoraria to be paid. We
employ a manager; a working manager because in this type of
setup there are staff to direct, gear to maintain, decisions
to be made and members to be kept happy. The manager plays a
very important part and we are largely dependent on him for the smooth running of the whole operation. But the point I make here is that his salary is higher than that of any ordinary tractor driver, which is another of those extra expenses. It is probably these overheads which effectively set the minimum and maximum size of any group. In other words the savings have to be large enough to cover these expenses and when expansion looks like increasing these overheads it is probably time to consider if you have reached the optimum size.

Because the operations have to be more efficient there is a need of greater management skill. Management should not only be effective but it should be clear to members. This all results in the paper war. Most of those things the ordinary farmer does not do; he would probably be a better farmer if he did but, lets face it, he does not. So it is an extra. I will try and give some idea of what is involved.

We start off with the members preparing what is known as an annual forecast. This lists the cultivation, crops, hay and so on expected for the coming year. Of its nature this schedule is changed a lot during the year but it does give some idea of the annual group workload. The important figures are those for drilling, heading and baling.

From this the member prepares a monthly forecast, varied naturally by changes of plan and climate. This lists the work he wants done during the month. All this is then graded for priority and set out week by week in a work plan. This hopefully shows how you will cope with the work and whether you have got too little or too much for the coming month. You then take the appropriate action - which the weather or something else usually proves to be wrong.
At the same time the tractor drivers are keeping work sheets which show the hours they work and what they have been doing. These sheets are the basis for paying wages and for charging members. After extensive checking and the members agreeing that the work has been done as shown the monthly accounts are made out and members pay on these.

Finally, at the end of the year, the cost of operating each item of plant is worked out. These are then put into a large pot to which we add wages and overheads and pinches of anything we can think of, give a good stir and out comes the actual cost to the group of doing any of the various operations. From these, with a bit of give and take and a glance at the crystal ball, the charge out rates for next year are set.

And then the whole thing starts again. Probably we are the better for it and probably it is necessary for the running of a group but I wish that a way could be found round it.

But there is another side to the picture; some things which seem to have worked particularly well.

The first and most important is that members have been prepared to give and take - to discuss problems and work out ways of solving them. This is terribly important and is probably the keystone on which the whole operation is based. This and keeping it a business proposition.

On the operational side, the haymaking has been a success story. The first year - the last of the drought years - was light in hay and we got through alright but with nothing to spare. But it was obvious that unless we beefed our gear up we would be in trouble. The outcome was the purchase of a second hand windrower and a high capacity baler. We kept the old one as a second baler. The next year was a good one; good growth and good haymaking weather. We baled about forty
thousand with hardly a cross word. The only grumbling was about the cost of carting - fortunately not levelled at us. Much discussion went on through the winter and all sorts of ideas were thrown in. Finally we opted for the simple one and the cheapest - a front end loader and two buckrakes. This season the weather was good and so was the growth but the sheds tended to be full and we baled a bit short of thirty thousand; again without a cross word. And the carting worked like a charm.

With one man in the shed and one on the tractor we were shifting about 250 bales an hour with a cart of up to a kilometer. This worked out at about 7.5 cents per bale and everybody was still happy. At least we know some of the formula for haymaking - good weather, good gear and good luck; and not too much else to do at the same time.

Moving into the big tractor world has I think been successful. I would emphasize that the big tractor is not an essential part of one of these group enterprises. It has to be shown that it can do the work more economically than other tractors. The most difficult part was to find sufficient work to warrant such an expensive piece of ironmongery; no good just giving it the same load as the other smaller tractors possibly going faster. To do this we concentrated on two things - a large grubber and in line cultivation. The grubber or chisel plough we built ourselves by joining two smaller ones together and reinforcing them. This gave us an implement about 6.5 metres wide which loaded the tractor and if conditions were good could cover up to four hectares an hour. The in line cultivation was mainly a combination with many variations and usually about three in number - anyway a combination of grubber, leveller, Cambridge rollers and drill. These covered only three metres at a time but then we were doing several operations at once. While this had certain disadvantages it certainly does keep costs down.
For ploughing we retained the six furrow ploughs we used with the medium sized tractors. This was mainly because we could not face the problems and the cost of say a ten furrow plough.

Also, costwise, ploughing seemed to be phasing itself out. However we did find that factors like fuel consumption did drop quite considerably under lighter loads - it was only idling when ploughing. So the big tractor performed not too badly when there was no heavy work for it. The important thing however was that the big tractor replaced two medium sized tractors and we reduced staff by one for most of the year. And the costings for the big tractor operations worked out better than for the other tractors.

Looking back, if we started again I don't think we would do anything very different. I would like to have postponed setting up the depot but it was probably wise to have done it when we did. It certainly would not have got cheaper by waiting. Perhaps we should have had more members but four was a good number to work out the ground rules. I think we would expand this number if everything was right but there would be limits.

I often wonder where we will finish up. We could develop further in a number of directions. Everybody is looking for an alternative to the present inefficient high cost method of making and handling hay. Satisfactory alternative methods will be expensive in plant and will require high throughputs. Possibly the group could not only make the hay, silage, or whatever it is but also do the feeding out. Perhaps there will be a future in some form of marketing. Perhaps something else. Time will tell.
In discussing wool's sale by measured sample we are looking at the scientific determination of yield and fibre diameter prior to sale and the representation of a line of wool by a sample. It is a subject which has evoked considerable controversy in the industry in recent times so perhaps I could give a little background before plunging into the debate.

BACKGROUND

In New Zealand we first started talking about sample selling around 10 years ago with the initial moves towards the development of sale by objectively specified sample made in 1967/68. In that season the Wool Research Organisation here at Lincoln established a Measurement and Marketing Group charged with the development of type standardization, sale by sample, dense baling and other marketing reforms. I regret to say that in the eight seasons since that first positive move, sample selling has grown about as fast as winter pasture. Without the supplementary fodder supplied by the Wool Marketing Corporation, the beast may have faded away! In saying that I am in no way implying any failure on the part of the Wool Research Organisation - in fact if it had not been for the strenuous efforts of the Measurement and Marketing Group it is doubtful we would have seen the development we have. What I am in fact
saying is that changing the attitudes of many in the wool industry is a little like trying to convince John Walker that he should be a racing driver - why change from something you know and do better than other beings to placing dependence on a machine?

But man unfortunately is slowly being superseded in many areas by machine. We must now accept that modern technology and its machines have a definite part to play in our traditionally conservative industry. This really presents no earth-shattering change as exporters have been objectively specifying their wool at time of sale for some years and in fact probably more than 80% of the wool shipped from New Zealand is now tested in some way prior to export.

What we are here to talk about, however, are the pros and cons of objectively specifying a lot of wool prior to sale and offering that wool on sample.

Within our industry we have two distinct camps - those favouring the concept and those against it - plus a few fence-sitters. When analysing who is in each camp on this issue we find that in general terms those advocating the change are buyers who are in the habit of testing all their purchases anyway, brokers, and the scientists. On the other side of the fence we have those who undertake a significant volume of further processing in New Zealand prior to export, be they mills or merchant scourers, and a few arch conservatives. But both sides have a reasonable case to put.

WHY NOT SAMPLE SELLING

First perhaps we could look at why we shouldn't be sample selling, a case which can be quickly stated. And it is this:

* We are rapidly approaching the stage where 50% of our exports will be scoured prior to export - 49% this
season to the end of January, 44% in 1974/75. Any pre-sale test on these wools was negated at the time of scouring with pre-sale testing costs down the drain with the scour effluent.

Seventy-five per cent of New Zealand wool production is marketed without the need to objectively specify fibre diameter at any stage of the distribution chain. That is, it goes to end uses where fibre diameter is relatively unimportant. This is in direct contrast to Australia where the great majority of their production must at some stage be objectively specified for fibre diameter as well as for yield.

So the argument against is, why add a cost which for about half the clip is not recoverable? If the need is to test it can be done prior to export as is current practice.

That argument, unfortunately, takes no account of the 50% which is exported greasy, but more importantly it takes no account of the efficiencies in wool flow that could be achieved through sample selling. Surely any avenue which presents the possibility of containing costs to the woolgrower must be thoroughly explored before being discarded. The status quo is all very well, provided it does not lead to cost overtaking income.

CORPORATION SUPPORT

It was with these latter points in mind that in 1974 the Wool Marketing Corporation offered moral and financial support to the concept in order that a volume sufficient to establish true cost relationships was sold by sample.

I expect that later speakers will detail the mechanics of sampling and testing and outline the benefits to wool flow which can be achieved. So from this point I should like to
detail the part being played by the Corporation in developing sample selling, with a few general observations.

**Moral Support**

The moral support which has been lent to sale by measured sample has principally been active encouragement of woolbrokers to embark upon grab-sampling programmes. To date these efforts have been directed chiefly towards Auckland and Wellington where brokers have the required equipment. In recent weeks, however, we have been encouraged to see brokers in both Napier and Invercargill also making moves towards the implementation of sample selling. We shall be extending assistance to them in their endeavours wherever possible.

**Financial Support**

The more important aspect of Corporation support, however, has been financial. This has been in two forms. Firstly, the Corporation has to date met all testing costs. At approximately $17 per lot this has added up to nearly $40,000 in the current season alone. This initially was one of the stumbling blocks in getting sample selling under way. Buyers did not want to have to pay $17 for a certificate on each lot they purchased. The broker wasn't sure if there was a $17 efficiency for him in sample selling, and he didn't feel inclined to pass it on to his grower client. As there was no obvious compromise of these positions apparent the Corporation came to the rescue, if I may call it that, and offered to meet testing costs in the initial stages. Clearly this situation cannot continue for ever and before very long some decisions on who bears what costs are going to have to be made if we are to see sample selling as a regular feature of our auction scene.

The second aspect of financial support is less direct but of equal importance, particularly to the grower. The Corporation has given an undertaking which, in short, ensures no grower is
financially disadvantaged in selling by sample. In times of depressed demand at auction buyers tend to concentrate their interest on smaller lots than when the market is advancing. Admittedly the reverse applies in a bullish market. However, as sample sold lots are of a 20 bale minimum, growers who amalgamate to form a sizeable lot at times run the risk of their wool selling at a slight discount to similar wools of smaller lot size offered conventionally. The Corporation undertaking, therefore, is to support sample sold wool to market values on the day by bidding where necessary.

The fact that there is a need for the Corporation to be so involved financially must, unfortunately, put the future of sample selling under a cloud. I said earlier that this commitment cannot continue for ever and sooner or later sample selling is going to have to stand on its own feet. If all sectors, but particularly buyers and brokers, commit themselves wholeheartedly to the principle I am sure sample selling could be made to function to the benefit of all.

'SALE BY SEPARATION'

In the past few years we have seen a drift away from the industry of skilled personnel. Ten years ago the wool diploma course at Massey University regularly attracted between 50 and 60 students. Today they are down to intakes of less than 20. Few young people are coming into the industry, principally I feel because of the social conditions encountered. What other industry requires its senior executives to work the hours a woolbuyer does, and over 100 days of them away from home at that? Certainly the rewards are there for some, but that has largely been because of salary escalation due to the severe shortage of qualified staff. You can imagine the overheads involved for those firms with representatives trotting around the country for two-thirds of the year chasing after wool sales. I can only guess at the figure that would result if we were to calculate the total buyer overhead per kilo that would emerge
for, say, 40 buyers and 10,000 bales away down in Invercargill. But Australia is beginning to overcome this problem and I foresee the day when in New Zealand the mountain - in the form of wool samples - will come to Mohammed - the woolbuyer. The wool could continue to be assembled in the various centres but the samples would be centralised to, say, Wellington and Christchurch, with a more regular schedule of sales. This system of 'sale by separation' as it is known, is obviously some way off in New Zealand but the improvements in wool flow and some social aspects of our industry would be considerable.

OVERSEAS EXPERIENCES IRRELEVANT

In Australia the concept of sample selling, supported by objective measurement, has wide support and considerable progress has been made in the application of this technique to the marketing of Australian wool. This season I would expect more than 60% of Australia's auction offerings to be sold on sample. This compares with a peak level of 37% at a Wellington sale earlier this year. Unfortunately this figure has since dropped back to zero again. But let us not try and compare ourselves with Australia as in this case what is good for the Australian goose is not necessarily good for the New Zealand gander. Our respective productions are poles apart and therefore our marketing techniques should be considered separately.

SUMMARY

As with all innovation there is understandably a natural hesitancy apparent until such time as full confidence is established in the new process or product being superimposed on traditionally accepted practices. Recognising this fact, the Corporation has acted as a catalyst in the development of sale by sample; it has assisted with finance, but it has not
endeavoured to dictate the rate of progress. I expect we will continue to influence the direction of progress, however, in order that growers costs are contained wherever possible.

Despite our clip being coarse and generally not requiring fibre diameter specification; despite such a large percentage of our wool being scoured prior to export; and despite the conservative nature of our industry, I feel sure sample selling will increase in New Zealand. I would anticipate progress being dictated by cost considerations. This progress will be rapid as soon as the cost of certification is overtaken by overall wool flow efficiencies achievable by sample selling. How far away that day is I am not sure. But I am sure we will be seeing a major part of our wool production sold by sample within five years.
THE BROKER AND SALE BY SAMPLE WITH CERTIFICATE

H.G. Rix-Trott
Wool Manager, Dalgety N.Z. Ltd., Wiri

PAST

Sale by sample was first mooted in 1968 in Australia following a tour by the Australian Wool Board, who realised something had to be done about in-store costs. The first sale in New Zealand was held at Wiri in May 1970. It was conducted under the auspices of the New Zealand Woolbrokers' Association. I quote from the New Zealand Herald a report by the agricultural correspondent covering the exercise.

"The experiment is being done with two main objectives:

1. To put a brake on the steadily rising cost of handling wool in stores.
2. To present wool to the buyer in a form which should enable him to determine much more readily its suitability for any particular end use."

The samples were drawn by hand and the cores required for testing were also hand cored. In this initial trial, it was absolutely essential that the sample and the core were absolutely true to label. As this was a three way deal involving the grower, the broker and the buyer in a radical change, CONFIDENCE was the key note.

Many seminars were held for all interested parties and company staff alike and a booklet was produced on the subject.
PRESENT

Experiments are still continuing with varying types of wool, both at Wiri and Gracefield. However, samples are now machine drawn as also are the cores. Throughput would be 800 to 1000 bales per day.

It is understood that approximately 60% of the Australian clip is sold on sample plus a micron reading which is so important where wool is the main consideration and fineness of fibre is essential in the selection of rams. The Australians have taken a complete sale by sample to the continent to let the trade and end users in particular see the complete setup, the information available and the advantages offered.

FUTURE

It is conceivable that in the not too distant future, and as confidence is gained by the interested parties, the quantity of wool being sold in New Zealand by this method will increase quite dramatically.

Although six years have passed since the initial experiment, there has been a lot of work done by the parties involved; mainly the brokers and the buyers. The broker has to convince the grower that this is a system which has advantages to him and the buyer has to convince his client with confidence that this also has advantages to the trade.
WOOL SALE BY MEASURED SAMPLE

M.E. Moss
New Zealand Woolbuyers' Association

The New Zealand Woolbuyers' Association represents the majority of the wool exporters of New Zealand and its members uplift well over 90% of the wools sold at auction throughout the country. Our members sell to all the well-known wool consuming countries of the world, and also to some of the lesser known ones, and most of the New Zealand local mills are members.

From this you will be able to judge that we are a strong body; equally as important in our opinion, as the grower, the broker or the Wool Corporation, in the marketing scene for New Zealand wool. Also, in the contacts we have built up over very many years with the host of mills and clients overseas, we have a wealth of knowledge of the specialised requirements needed of which no other body can boast.

For many years, wool has been shown by displaying the bales on the show floor for the inspection of the buyers, as many of you will have seen, and this method gives the buyer a fair percentage of the wool in that clip to look at and make his assessment for quality, colour, length and so on. He can also make a judgement on the evenness of the clip by comparing
bale for bale, as generally there would be more than one bale opened for valueing. Indeed, in a large clip, as many as 12 bales could be opened from one line.

The very exacting levels of technical measurement that we as buyers have to meet in our valuation of each lot is not generally realised. People often ask us what we do all the time before a wool sale, but when I tell you that we are assessing quality to .5 microns which is 0.0005 mm, and we get requests to deliver length to within 1 mm, you will begin to realise that there is a considerable measure of skill necessary; especially when our firms can be penalised by the client when these assessments are not conforming with the contract.

When you realise these exacting levels we have to meet, it is not surprising that for the majority of buyers, the traditional method of looking at wool in the bales is the most popular, as one can see the wool in its original state — whether it has been skirted or classed evenly or from one breed. And there is more wool to look at.

However, over the last few years we have seen this method of showing coming more and more under fire from some sections, especially as costs continue to climb and space become a premium. We realise that new methods must be tried in an endeavour to keep costs at a manageable level and we have always given the brokers every assistance in looking at ways to improve and upgrade the methods of showing wool. But at same time we must be conscious of our duty to protect not only our own interests, but those of our many clients overseas.

Wool sale by measured sample is one of the methods which is being tried in an attempt to meet these standards. This has met with considerable success in Australia, and it was thought that it should work equally as well here in New Zealand.
However, whereas it is undoubtedly now being used extensively in the auction selling in Australia, it has not been so readily accepted here - in spite of its two year trial.

I think this is mainly because the Australian clip is from a basic Merino breed, and a lot of the clips being sampled for sale are fairly even for length and quality. Also there are no excessively long wools among them. In New Zealand on the other hand we have quite a number of different breeds which can give a far greater variation in length and quality. This is always more pronounced when seen in a sample than when seen in the traditionally opened bales.

I will now come to what I believe is the crux of the matter, and that is buyer confidence. If you have something to sell, you must first get a buyer and then find a method of selling which the buyer can accept. Now before anyone starts to accuse me of downing sample selling, let me say that this method has so far met with general acceptance from the majority of the members of the Woolbuyers' Association, with certain reservations.

I think I can safely say that certain categories of wool - second shear and lambs for instance - have been fairly well accepted for sale by sample; but when we come to full fleece wools, which, let's face it, are the vast majority of our clip, some problems occur in the visual assessment of the sample by the buyer. These are the length and quality variation I mentioned earlier, as against the evenness of the second shear and lambs wool.

Along with the sample displayed for the buyer, there is also the certificate which tells him the yield and sometimes the micron, or quality count. In most cases the certificate shows only the yield which is the only adjustable factor of the wool that can be changed on paper, and is therefore probably the least important assessment of a lot; although of course it is
very important from a financial point of view. Colour, fineness, strength, handle and length, and all the other factors are quite unalterable, so must be adequately displayed for the buyer's assessment. How would a grower like to buy his rams with the only certified point being the weight of the animal, and only a restricted opportunity to inspect the bone conformation, fleece structure and other factors.

Colour, handle and fineness can be critical to certain orders and has to be carefully watched; but length in the coarser New Zealand wools for carded sliver, has now become, along with strength, the most important category. The buyer must be able to assess the length that the lot of wool he is valueing will run to after it has been through the scouring and carding machinery, taking into account tenderness and length variation. And let me tell you that there is no machine capable of doing that.

It has been levelled at the buyers, that we are a conservative bunch, who don't like change and that it is only a question of adjusting to a new method of assessment. While to a certain extent I go along with that, we must still consider the position of our many clients overseas. Are they going to get a better service, or will the standard slip? This is an area that does concern the buyer. We are being asked to assess the wool clip on a sample, with a more restricted quantity of wool to view, while at the same time the grower is being encouraged towards a minimum of shed preparation. Consequently, we are seeing clips on the show floor, sometimes badly skirted or even completely unskirted, with practically no attempt at even adequate shed preparation of length or quality. Yet we are being expected to value on a sample. In my opinion, for wool sale by measured sample, clips should be well skirted and classed in the shed, so that a well prepared and even line is sent forward to the broker.
We are not against sample selling - all we ask is the ability to fairly and accurately value the wool we are asked to buy. We have come a long way already and the only seriously adverse comment we have to make on our progress is that it appears to us that the importance - the tremendous importance of correct sampling and accurate sampling, is not clearly understood by many of the people who do the practical work of drawing the sample and preparing that sample for display. I do not doubt that store managers do realise well enough how important this is, but I wonder how many of the people who actually do the physical work, have any idea of how vital complete accuracy is to the buyer's assessment. Here we come back to buyers' confidence; for until we have complete buyer confidence in the method of display, we will always have the doubtsters and uncertainty.

Finally though, let me say that the buyers are very conscious of the problems of costs and space in wool stores, and if it can be shown that there is a saving to be made from the sale of wool by sample after any other comparable areas have been explored, then I am sure the buyers will be very happy to help in every way to overcome our inhibitions. Further, don't lose sight of the fact that we are New Zealand orientated - this is our country, our job and as such our wool also. We need to make the marketing efficient for our own needs.
NEW ZEALAND'S WHEAT PRICING POLICY

A.L. Mulholland
Farmer, Darfield

Wheat is probably the oldest known cereal plant in the world. It dates back at least 3000 years in China and was the principal food crop in ancient Egypt. Grains of wheat were found buried with the Pharaohs in the tombs under the Pyramids. Some of these grains on being rediscovered were planted and actually grew. Throughout history, wheat as the basis of our daily bread has been grown in most countries of the world. Governments look on wheat as a stable form of currency and often use it as a powerful weapon for barter.

One of the first seeds sown by the Deans Brothers at Riccarton in the early 1840s was wheat, and from this, flour was subsequently baked into New Zealand's first home grown loaf of bread. From then until the present day, bread has been looked on in this country as the staff of life. Areas in wheat fluctuated throughout the years but was consistently high in the 1880s and 1890s. Areas of 162000 ha in 1892 and 161000 ha in 1899 have never been equalled. There may be some significance in the fact that in the last 20 years of the 19th century wheat was regularly exported.

Wheatgrowers have felt for some time that given a fair price, valuable overseas exchange could be earned for New Zealand by growing in excess of local demand. It is interesting to note
that one of the recommendations of the 1963 Committee of Inquiry into the Wheat, Bread and Flour Industry was that Government accept not only self-sufficiency but also encourage the growing of an exportable surplus. With this in mind the recommendation was for at least 162000 ha per annum (page 14 of the Report) to be grown.

There can be no doubt that one of the major influences on wheat growing has been the profitability of the livestock sector in relation of wheatgrowing. This relationship was never more obvious than in the 1950s when meat and wool were at consistently high prices. Inflexible pricing policies have meant that wheatgrowing, over the last 25 years, has been subject to quite violent fluctuations in area.

Over the years successive Governments have consistently failed to fix a price which will give both an adequate return to the grower, and enough wheat for New Zealand's needs. The apparent reluctance of Governments to increase the price of bread to the consumer has been one of the main inhibiting factors. Until very recently, the price of bread virtually remained static for a number of years in spite of the massive increases in production costs. Rather than setting a price that will ensure that New Zealand's requirements are grown domestically and ensuring that the grower is adequately compensated for growing it, Government's attitude in recent years has been one of obtaining New Zealand's requirements at the least possible cost. This short-sighted policy has resulted in New Zealand having to import large quantities of wheat in each of the last three years at prices substantially greater than that paid to the New Zealand growers. This has been the major reason for the $23,000,000 deficit in the Bread and Flour Equalisation Account. In Australia, there have been eleven increases in the price of bread since 1973 and a 1 kg loaf in that country now costs 50.8 cents (New Zealand currency) opposed to 25 cents for a 750 g loaf in New Zealand.
What I am really trying to say is that the price of wheat is a political issue. With such a capital intensive industry that wheatgrowing now is, the country cannot afford the luxury of switching the wheatgrowing industry on when the world price is high and off again when the world price is low. What we are now trying to do is devise a mechanism or formula to remove price setting from the realm of politics.

One is reminded of the comment made in 1951 by the late Harold Wincott, a noted contributor to the London Financial Times. He was commenting on the fiscal policies of the British Government and said:

"If democracy has come to mean that everything is decided on the grounds of political expediency and not on what is economically desirable, there is nothing we can do but preserve our sense of humour and get a good laugh out of the spectacle of a nation destroying itself."

I would suggest that the laughter has been of a somewhat hollow nature in recent times.

This leads me to the subject matter of my paper - Wheat Pricing Policies. I have been involved in price negotiations since 1968 and I can think of nothing more frustrating than the annual haggle which takes place. We, as representatives of the growers prepare to the best of our ability a case supporting what we consider to be the price necessary to achieve self-sufficiency. Government in its turn listens to the advice of three of its Departments: Trade and Industry, Ministry of Agriculture and Fisheries and Treasury. In between we have the New Zealand Wheat Board which deliberates directly on behalf of its Chairman, the Minister of Trade and Industry. The Board, which is made up of all facets of the industry has more often than not come close to agreement with the growers and has made recommendations to the Minister of the day on these grounds. In many instances the Board's recommendations have been turned down.
The growers price of $140 per tonne for the 1976-77 season was countered by the Wheat Board with a price of $125. In view of the economic conditions I believe the growers would have accepted this figure. But they are certainly not happy with the price announced by Government of $110 per tonne.

PRICE SETTING ALTERNATIVES

Outlined below are various practical ways the wheat price setting system can be altered to make it more equitable to all involved.

1. Decision by a joint committee of the New Zealand Wheat Board and growers, having regard to a set criteria laid down by the Government.

2. A variation of the above could be a decision by a pricing authority comprising representatives of the New Zealand Wheat Board and representatives of growers, chaired by a Government nominee. The criteria for decision would be laid down by Government, after consultation with the growers.

3. Decision by a reconstituted New Zealand Wheat Board, according to criteria laid down by Government, again in consultation with the growers.

4. Wheat contractual system.

5. New Zealand Wheat Board proposal of relating the New Zealand price to growers to the Australian f.o.b. price.

6. New Zealand Wheat Board proposal with modification.

Price Fixing Authorities - Composite

The first two alternatives are mechanically similar - the price fixing authority is a more formal arrangement. It is envisaged that a price fixing authority would be modelled along the
lines of those already in existence. For example, both dairy produce and apple and pear prices are fixed by price setting authorities. The general function of these price fixing authorities is to determine the price. In both cases, the Authority must consult with the Minister before it establishes prices. The Authority sets the price by a particular date and according to criteria laid down in the Act.

In the case of dairy products, only the New Zealand Dairy Board can make submissions to the Authority. In the case of apples and pears the Authority considers submissions made by both the New Zealand Apple and Pear Marketing Board and the New Zealand Fruitgrowers' Federation. The decisions of the price fixing authorities are binding on the respective Boards.

Price Fixing Authority - Wheat Board

This alternative makes mention of a reconstituted New Zealand Wheat Board. Reconstituted in this context means increased grower representation. It it were to assume greater powers in terms of price fixing, then grower representation would need to be expanded from the present number of two members.

Wheat Contractual System

The fourth alternative is a wheat contractual system. Such a proposal has been mentioned by Mr Moyle, the then Minister of Agriculture and Fisheries, and more recently by a group of South Canterbury wheatgrowers. A contract proposal was also examined by the New Zealand Wheat Board in 1969 and found to be difficult to administer. The aim of the latest suggestions of a contract system would be to encourage, by way of price incentive, the regular wheat grower to continue in the production of wheat.

Basically, the system proposed was along the following lines:

* That the price should be set at $110 per tonne.
That $10 per tonne be held in a retention fund and credited to each farmer; actual payout will be $100 per tonne.

That the $10 per tonne retained be paid out in the following year on the amount of wheat supplied.

If a farmer produces 100 tonnes in 1975-76 season, his return at $110 per tonne would be $11,000 minus a per tonne retention of $10, or a total of $1,000. In order to draw that $1,000 he must next year supply 100 tonnes. If he supplies less (say 80 tonnes) he draws only $800. If he supplies more (say 120 tonnes) he draws only $1,000 which is the total in his account. The 120 tonnes will produce for the following year a retention sum of $1,200.

The price should be decided at a fixed time each year.

Price Related to Australian Price

This alternative is one advocated by the New Zealand Wheat Board in the last two years. The proposal is as follows:

1. That the basic price of milling standard wheat for the next season be fixed at the average of the Australian export prices for Australian standard white wheat, bulk basis, f.o.b., over a three monthly period.

2. That the price be the average of the Australian export prices that have operated, weighted by the number of working days for which each price has applied for the three months ended 31 October.

3. That the average Australian price, so obtained, be converted to New Zealand currency at the rate of exchange applying on 31 October and that alterations in the rate of exchange subsequent to 31 October be ignored for the purpose of calculating the price to apply to the next
seasons harvest. The price so determined, rounded to the nearest dollar, will be the basic price per tonne for New Zealand wheat as for delivery to the growers' trucking station.

4. A floor price of per tonne to apply in the event of the average Australian price falling below the equivalent level - such as $110 per tonne for 1976-77.

5. That no differential be paid for North Island grown wheat.

6. That prices be subject to a provision for retention of an amount up to 10% of the basic price to cover losses and costs of handling, marketing and/or storing surplus wheat. The actual determination of the amount of the retention, if any, to be made in advance to the 1977 harvest by the Board in consultation with the Wheatgrowers Subsection of Federated Farmers.

The Board gives the following reasons in support of its proposals:

* The alignment of the New Zealand growers' price with the cost of imported wheat has an analogy in the prices of other farm produce and the public at large is used to paying the equivalent overseas price for meat and dairy produce.

* The proposal is an answer to criticism that New Zealand growers are being under-paid while the country is importing dearer wheat.

* Future escalation of costs and other inflationary factors cannot adequately be taken into account when setting a price for wheat that has to apply for a period of between twelve to eighteen months in the future.
If the wheat price was set within a few months of harvest based on the Australian price, it would take into account world conditions as reflected in grain prices.

In other types of farm production, farmers accept a commercial risk based on their judgment of the future price levels and it is considered that the New Zealand wheatgrower should be prepared to accept some of the risks taken by other farming enterprises.

For each of the last three years which we have in total imported about 300,000 tonnes, the proposed system would have meant a much higher price to growers. For instance, based on the system outlined above, the price for milling standard wheat from the 1976 harvest would have been $152.34 per tonne - that is the weighted average Australian f.o.b. price for three months ended 31 October 1975.

**ILLUSTRATION OF NEW ZEALAND WHEAT PRICES RELATED TO AUSTRALIAN EXPORT PRICE - WHEAT BOARD PROPOSAL**

<table>
<thead>
<tr>
<th>Year</th>
<th>Floor Price $ per tonne</th>
<th>Australian Export Wheat (NZ$ F.O.B. $ per tonne)</th>
<th>New Zealand Price to Growers $ per tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976/77</td>
<td>$110</td>
<td>$150.00</td>
<td>$150.00</td>
</tr>
<tr>
<td>1977/78</td>
<td>$120</td>
<td>$115.00</td>
<td>$120.00</td>
</tr>
</tbody>
</table>

An area the Board's proposal would fall short on, is that it does leave in the political arena an annual haggle over the floor price. In order to improve the Board's scheme on this point I suggest that for subsequent years the floor price be the price paid to the grower the year earlier. In addition, to improve the likelihood of acceptance of the scheme by Government, rather than the f.o.b. price of Australian export wheat becoming the price to the grower, I suggest that the price to
the grower be the floor price plus 50% of the increase or
decrease of the Australian f.o.b. price over or below the floor
price. Thus, the Wheat Board proposal could operate in the
following manner:

<table>
<thead>
<tr>
<th>Year</th>
<th>F.O.B. Price of Australian Export Wheat $ per tonne</th>
<th>50% of Increase/Decrease Over Floor Price $ per tonne</th>
<th>Price to Growers $ per tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976/77</td>
<td>$110</td>
<td>+$20</td>
<td>$130</td>
</tr>
<tr>
<td>1977/78</td>
<td>$130</td>
<td>-$5</td>
<td>$125</td>
</tr>
<tr>
<td>1978/79</td>
<td>$125</td>
<td>+$20</td>
<td>$145</td>
</tr>
<tr>
<td>1979/80</td>
<td>$145</td>
<td>-$20</td>
<td>$125</td>
</tr>
<tr>
<td>1980/81</td>
<td>$125</td>
<td>+$15</td>
<td>$140</td>
</tr>
</tbody>
</table>

I believe that any future pricing policy should be designed to
give long term stability and confidence which will ensure that
New Zealand's wheat requirements are never again placed in
jeopardy.
NEW ZEALAND'S WHEAT PRICING POLICY

J.T. Gould

Executive Member N.Z. Assn of Bakers Inc.

I am sure some of you will be saying to yourselves, "Why on earth is a baker talking to us about wheat pricing?" "What does he know about farm costs and an adequate return to farmers for their efforts in growing wheat?" And the short answer is 'nothing'.

But having been associated with the baking industry for most of my life I know something of the consequences of an inappropriate wheat pricing policy and the resulting effects on the bread baking industry and the New Zealand bread consumer. Further, having been a member of the Wheat Research Committee for 16 years I do have some knowledge of wheat growing with the result, I hope, that what I have to say will at least make sense, and at the best, result in a better appreciation by farmers of some of the "off farm problems" associated with wheat growing, and resulting from that, a will to do something about them.

WHEAT QUALITY

This year it is particularly appropriate that we should be discussing these problems because it is a direct result of inappropriate wheat pricing policies that consumers from the North Cape to the Bluff are complaining about bread quality
and hence by inference they are complaining about the product which you as wheat farmers grew last season.

In saying this I have not forgotten that it was an unusual season for wheat growing and this had a detrimental effect on baking quality. However it is my contention that if there had been a more appropriate wheat pricing policy, then in all likelihood there would not have been as much Karamu grown and thus flour quality would have been much better and more consistent than it is at present.

These consumer complaints are about something for which you and the people I am representing today are responsible. Thus we have something in common - we are both - farmers and bakers - being 'got at' not just by consumers but also by Government. This is not something new. Ever since I can remember, farmers and bakers, and let's not leave out the millers, have been subject to periodic criticism about the quality of the product which we produce, and this is despite quite amazing efforts over a number of years by our wheat breeders and staff at the Crop Research Division and the Wheat Research Institute. In many ways the efforts of these people have been wasted because of an inappropriate wheat pricing policy.

Well what can we do about it? It is my opinion that in the past wheat growers and bakers have not sufficiently recognised their common interest and have tended to talk from opposite sides instead of the same side of the fence. A very positive step has been taken today by having me here so we can talk about this subject. I would like to congratulate those responsible for bringing this about and say how pleased my Association is and I personally am that we have been given the opportunity of putting forward our ideas on wheat pricing.
ASSOCIATION OF BAKERS POLICY

Before going any further it is necessary to set out the aims and objectives of the New Zealand Association of Bakers with regard to wheat and flour. These can be stated very simply as follows:

1. "To have wheat available to flour millers in order that they can produce flour of the best possible quality for bread baking."

2. "The minimum acceptable quality of flour supplied to bread bakers to be such that they shall not experience difficulty in producing good bread in the normal course of manufacture."

For the purpose of achieving these aims it is our policy that:

1. "The quality of flour shall be determined according to the process in which it is used." In existing circumstances this means separate minimum standards for the Bulk Fermentation and M.D.D. processes.

2. "These minimum standards should be score of 34 using bulk fermentation or 15 on the new scale using the M.D.D. process. In both cases the flour should have good dough strength, a nitrogen level not less than 2.1%, sprout index not exceeding 51 and a colour grade not exceeding 4.5"

Having stated these basic aims and policies the next question is, what further policies do we as bakers adopt? In other words, what do we see as the best ways of achieving the aims and implementing the above policies, and in the particular context of today's discussion what do we see as the most appropriate pricing policies.
COMMON AIMS

Well, we see the best possibility of achieving our aims and of having our policies recognised as coming from a stable wheat growing industry. Therefore we say that:

"The overall price paid for wheat should be such that it will encourage farmers to grow wheat consistently year after year."

Obviously there will be variations from one year to the next but these should be of a relatively minor nature and must not be allowed to be as large as has been the case in the past. We recognise just as you people do that variations of up to 50% in wheat area from one year to the next cannot possibly be efficient either economically or in the physical sense. Also there would be much less likelihood of bakers being able to achieve our aims regarding quality.

For anyone, from the farmer to miller and all the people in between, contractors, transport operators (both local and national), and the people who provide storage facilities (on or off the farm) to be expected to make a capital investment then they must be able to anticipate a reasonable return on that investment not just now and again but consistently year after year. Therefore they must be able to anticipate consistent use of the facilities, and this means (seasonal variation apart) a consistent area of wheat grown each year in New Zealand and probably in the same areas.

Coming as I do from the North Island I am very conscious of the fact that up there we are 'importers' of wheat even at the best of times. But it makes a great deal of difference from a transport point of view if that wheat is to be 'imported' from the South Island or transported from Australia or North America.
An efficient industry requires at least a degree of stability and this can only be achieved by an appropriate pricing policy.

Notice I haven't said how much wheat should be grown but if, as good New Zealand citizens - which I hope we are - we subscribe to a policy of self sufficiency, which we do, then it must be self sufficiency with regard to quality as well as quantity. In other words, in accepting a policy of self sufficiency we say that there must be sufficient wheat grown to enable the quality standards, which we aim for in bread bakers flour, to be met. Or stated in yet another way, there must be sufficient wheat available to millers to enable them to exclude from their grists wheat which would result in their bread baking flour falling below the minimum standards. Having concluded that overall price should be such that self sufficiency can be achieved on a quantity basis how do we see baking quality requirements being met?

Well we can see this being done by either one of two ways:

* Contract growing or
* Payment for quality.

Both these I know raise very contentious subjects but let us examine them briefly in order that we can determine which is the more appropriate for our circumstances and which is likely to achieve the results we are looking for.

Contract Growing

First of all, contract growing. This is one way by which the right amount of wheat may be obtained, and by including in the contract appropriate clauses relating to quality or variety, it may also be possible to achieve the quality criteria we wish to obtain.
The major drawback to this system is that it imposes on farmers a system of controls which would mean a restriction on your choice of area or variety. Now, you as farmers, just as we as bakers do, have as one of your strongest platforms the concept of private enterprise. Controls by outsiders do not fit readily into such a concept nor does contract growing; so let us accept that at the present time the inclusion of such a system in a wheat pricing policy would be inappropriate.

Payment for Quality

However, one of the basic principles of free enterprise is that whatever is produced must meet market requirements before it can be accepted. With regard to wheat growing a large proportion of what you produce, and this was particularly so last season, does not meet market requirements. Therefore, if you are true to your principles, you should not expect it to be accepted by the consumer. On the other hand you should be entitled to expect a price increment if you produce a product at a higher level of quality than the minimum required.

Neither of these situations is the case at the moment and the end result is that the New Zealand consumer is suffering.

FUTURE POLICY

Take our present bread quality for example. New Zealand families this year are being asked to pay substantially more for bread. This is not necessarily a bad thing but at the same time as being asked to pay more, people are receiving bread of much poorer quality than they have for some years, mainly because insufficient emphasis is placed on the question of quality at the wheat growing stage.
Now I know that what I am suggesting would result in a change from the status quo, any such change whether it be in wheat growing or wool gathering will be resisted because there can be found reasons why it is better to stay as we are. But I suggest to you that there are very many more good and positive reasons why we should change to a system of payment for quality. These are:

1. It would provide an incentive to farmers to grow wheat of better quality.

2. We hope it would establish more firmly in everyone's minds the necessity to consider quality as well as yield.

3. It would obviate the necessity of setting variety premiums and discounts.

4. It would lessen the chances of a situation arising in New Zealand similar to that which has arisen in Britain and the E.E.C. whereby high yielding low quality varieties have displaced better quality varieties to such an extent that better quality wheats have had to be imported to maintain bread quality. Indications that this could happen have already been apparent this year.

That the present system of premiums and discounts is inadequate is demonstrated by the decline in the growing of Hilgendorf. This variety has dropped steadily as a percentage of the crop over recent years and last season just when we needed it most it took a plunge to below 10% of total wheat grown.

On any scale set for payment by quality we would see as the first step that which achieved the minimum standard to which I have previously referred. Obviously milling quality would have to be taken into account as well as baking quality.
It is not often that I agree with Dr Harvey Smith but I would like to quote him on the question of payment for quality, and he said: "I feel that a new system of payment for wheat on a quality basis would be in the best interests of bakers, millers, farmers, consumers and also research workers."

It was nearly six years ago that Dr Smith made that statement at a meeting of bakers here at Lincoln College. If it was true then, and I believe it to be so, how much more true is it today?

We recognise that payment for quality will not by itself result in better flour being received by bakers and better bread by consumers. However we do see it as a major step in the right direction and I certainly see it as appropriate to discuss under the heading 'New Zealand Wheat Pricing Policy'.

Further it would be equally possible to introduce a method of payment for quality under the present system of determining the area of wheat to be grown or under a contract system of wheat growing if that were to prove more appropriate.

I have not attempted to discuss all the implications of such a move and all the necessary subsequent changes in regulations; time will not allow this. I can say however, that we as bakers will tend to be more demanding in our quality requirements in the future. This is because like all other industries we have of necessity taken advantage of advances in technology. A result of this is that baking, like other industrial processes, has had to become more specific in its requirements regarding the quality of its basic raw material. Just as wool growers are having to consider selling their produce under stricter specification so are you as wheat growers faced with the same situation. Just as modern high speed spinning, weaving, and carpet making machines require the wool which they process to be of standards undreamt of
years ago so too today do modern high speed mixers, dough dividers, and slicing machines require flour to meet much higher specifications.

When I say that bakers will be more demanding I do not mean this in an intolerant or dogmatic sense. What we require is in your interests as well as ours and it can be best achieved by dialogue - we hope we can create a climate whereby this can be achieved with the required changes being implemented with the full co-operation of all concerned.

SUMMARY

The New Zealand Association of Bakers subscribes to the following policies regarding wheat pricing:

1. The price structure to be such that it encourages the growing of wheat which will result in the best possible flour for bread baking.

2. We feel that this would be best achieved by a system of payment for quality.

3. The price structure must be one which promotes stability in the wheat growing industry.

4. It would be desirable that this stability be at a level which would result in self sufficiency of wheat for New Zealand both with regards to quality as well as quantity.

As an Association we would like to see more positive steps taken towards establishing a more meaningful dialogue between our respective branches of the industry.

We both have representatives on two organisations, the Wheat Research Committee and the Wheat Board. I would like to suggest that we encourage those representatives to get
together, apart from the meetings of those particular bodies, and discussing, with a view to solving, problems of mutual interest and in particular some of those we have raised today. By doing this I am sure we could help achieve what we all want - an adequate return for our endeavours and satisfied customers.
About a month ago I was discussing this paper with a friend of mine down from Hamilton. His comment was, "Well, you should know what you are talking about - it's winter all the time down there!" An exaggeration, of course, but it is fair comment that farmers in the southern half of New Zealand have to plan to conserve feed for stock over a considerable period of time and I feel that overall they do this in a most efficient manner.

**REQUIREMENTS OF WINTER FEED**

You will appreciate that winter feeding is done in a wide variety of ways. Whatever the system the aim is to provide sufficient feed as cheaply as possible to maintain the animal in a healthy and productive state. With ewe hoggets the aim is generally to aim for a small growth increment through the winter. This applies also to weaner cattle. Of course, the breeding cow or breeding ewe requires maintenance through most of the winter, but a build-up in feed before parturition.

After parturition there should be sufficient winter or spring grown feed available for the animal's requirements and those of her young.
I firmly believe that each of the wintering systems has a very important place in the scheme of things, and if used in the right situation efficiently is the lowest cost system of wintering on that farm.

**TWENTY YEARS WINTERING IN SOUTHLAND**

Which wintering system to use? I feel this is determined largely by the stage of development the property has reached. I want now to look at what has happened to wintering systems in Southland over the last twenty years to illustrate this point.

*The Low Fertility Past*

Under low fertility conditions, ryegrass/white clover pastures have a very limited life span and reversion occurs very rapidly to a browntop dominant situation – see line 'B', Fig.1. This situation shows low total production, very seasonal production, and little autumn growth. In this situation run out pastures have to be ploughed and regrassed. If this is being done a winter fodder crop can be grown relatively cheaply as an adjunct to regrassing. The break for a fodder crop assists in regrassing as it gives a period of time for the browntop mat to break down. In this situation the swede crop is relatively cheap to grow. Costs incurred are those of cultivation, ridging, seed, fertiliser and scuffling or spraying for weeds, as well as a cost of feeding out. When all these costs are considered, a kilogram of dry matter as swedes costs 1.5 cents, so that, maintenance for a 55 kilogram ewe costs about 1.3 cents per day.

If, however, the majority of the property is in this low fertility situation there is a large deficit in winter feed – the traditional Southland 120 day winter. As I mentioned before, low fertility browntop dominant pastures produce poorly, especially in the autumn. What has happened to the Southland 120 day winter?
The High Fertility Present

Fertiliser usage has increased four fold, as figures from Southland Co-operative Phosphate Company show - see Fig.2.

The area of topdressed grassland has increased and has in fact almost doubled - see Fig.3.

Sheep numbers have increased from under 5 million to over 8.3 million - see Fig.4.

These are indicators of the tremendous build-up in soil fertility over the last twenty years. Instead of a situation where pastures rapidly revert to browntop dominance, vigorous rye-grass dominant pastures can be retained almost indefinitely.

Line 'A', Fig.1 shows the sort of production measured in Southland under high fertility conditions. Although there is still tremendous variation in seasonal production, the total
production is two and a half times as much as the browntop dominant situation - see Fig.1. There is a marked autumn flush of feed and significant growth throughout the winter.

High Fertility Affects Fodder Crops

This improved fertility situation has had a marked effect on fodder cropping - see Fig.5. The area in crop has dropped to under half the 1956 figure.
This reduction in fodder crop area has come about for two reasons:

* The average farm now has a high percentage of improved pasture. This grows further into the autumn, has significant winter activity and produces more spring feed. The winter has effectively been shortened from 120 days to what? In the all grass wintering situation the conserved feed is insignificant. Farmers in all grass wintering situation on average use less than one bale of hay per ewe for the winter. This on a hay only maintenance basis would feed the ewe for twenty-one days - is this what winter has been reduced to?

* Costs and cost cutting are vital to any businessman and farmers have become very conscious of the cost of growing winter fodder where good pasture must be ploughed to give a crop area. This problem of finding a suitable
paddock to plough has caused a major reduction in the area under crop. My calculations suggest that if regrassing and loss of production while in crop are added to the cost of growing fodder crops the per kilogram cost of say swedes, goes up from 1.5 to 5.3 cents per kilogram dry matter.

These two factors of better pasture growth and increased cost have drastically reduced the use of fodder crops for sheep - see Fig.6. The area grown per 1,000 sheep has been cut back from 13 hectares to a mere 4 hectares.
There has been a definite swing also to more double cropping of fodder crops - following swedes with one or more crops of kale. This, of course, spreads the cost of regrassing over more crops and reduces the cost of the crop to 4 cents per kilogram of dry matter.

THE PRACTICAL POSITION

I have in this analysis of the situation traversed from one extreme of winter feeding to the other - from almost total dependence on fodder crop to a situation where mainly in situ pasture plus hay is all that is required.
Obviously there are many farms somewhere in between. Properties on hill country, at higher altitudes or in colder areas will never be able to cut their winter period down to as little as twenty-one days. For example, in the West Otago district we aim to conserve sufficient feed for sixty days as a combination of these factors of climate, altitude and contour render it impossible to make do on much less. But even in this situation crop areas are minimal and greater use is made of conserved grass, either hay or silage, and the judicious use of grain in extreme weather conditions are at important nutritional times, particularly near lambing.

Table 1 shows typical feed costings under current market situations in Southland.
TABLE 1.

<table>
<thead>
<tr>
<th>Fodder</th>
<th>Cost per kg Dry Matter (Cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swedes</td>
<td>1.5</td>
</tr>
<tr>
<td>Swedes with Regrassing and loss of production</td>
<td>5.3</td>
</tr>
<tr>
<td>Swedes followed by Kale</td>
<td>4.0</td>
</tr>
<tr>
<td>Hay farm produced</td>
<td>3.3</td>
</tr>
<tr>
<td>Silage (self fed)</td>
<td>2.0</td>
</tr>
<tr>
<td>Oats farm produced</td>
<td>5.43</td>
</tr>
<tr>
<td>Hay at $1 per bale</td>
<td>5.5</td>
</tr>
<tr>
<td>Oats at $1.90 per bushel</td>
<td>12.14</td>
</tr>
<tr>
<td>Pasture</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Dry matter figures are based on metabolisable energy but brought back to the equivalent of pasture.

Fodder Crops and Silage

It is obvious that if you as a farmer have pastures that need renewing, a winter fodder crop such as swedes will give the cheapest form of winter ration for stock, and will also help clean up the paddock ready for your new grass pasture. If, however, your property has been developed to the stage where pastures are all of a good standard, then alternatives must be considered. I am positive there is a potential for greater use of self fed silage for sheep or cattle, particularly on hill properties. Cultivation is often difficult and expensive, haymaking can be risky, but silage machinery can operate and conserve feed cheaply even on relatively steep areas. In these circumstances silage must be considered for ewes and for cattle, provided it is self fed.
**Hay**

Hay will always have an important part to play in wintering. Despite increasing costs it has the virtue of being readily transported to the animals. It can be traded from farm to farm and amounts being fed can be varied easily. It fits in well as a supplement to a rotational grazing system. Recent developments in baling and handling will help keep hay costs down.

**Grain**

Grain has many virtues which make it a potential feed in spite of higher costs. It is even more readily transportable than hay and can be fed out on the ground or in troughs. It can be regarded as a source of 'instant energy' and can be used in climatic extremes, such as snowfalls, or as a booster before lambing. Grain can be specially valuable in situations where pasture or hay is of poorer quality. Several tussock properties in West Otago use oats as a supplement to ewes being fed on tussock blocks for the majority of winter.

**CONCLUSION**

Southland farmers have developed systems of wintering sheep almost exclusively on grass grown in situ. This is the cheapest form of winter feed. Whatever your farming system, and wherever you come from, your aim must be to use your pastures to best advantage in every season of the year, but particularly winter to hold wintering costs to a minimum.
GENERAL SETTING

I come from the Aparima district of Southland; about 8 km north of Otautau and 50 km north west of Invercargill or half way on the direct line between Manapouri and Invercargill. Aparima is on the Western Southland plains 80 metres above sea level with a typical Southland climate. Our rainfall is about 890-1020 mm spread evenly throughout the year. This gives good growth over spring, summer and autumn and although some locals don't realise it, there is good growth in winter also. Winter periods have cold and frosty weather and periods of rain, hail and snow showers, although not deep enough for skiing. The soil in the area is Aparima silt loam which is a yellow grey to yellow brown earth integrade. This is typical, fertile Southland Plains soil being heavy silt and clay needing intensive draining. Fertiliser applied is usually 370 kg per ha of 25% potassic super applied in the early autumn. Lime was applied frequently by the previous generation at 5 tonnes per ha but since then little has been applied. The pH's are dropping low enough now to require lime and the policy is to apply this as the land is regrassed at 2.5 tonnes per ha.
FARM SETTING

My farm consists of 250 ha with 174 ha in grass and 75 ha in cereal crop and 2.5 ha not used. On this there are 2300 breeding ewes, 700 hoggets and 34 rams and others which gives a stocking rate of just under 16 ewes per ha. I should explain that this stocking rate was about 17.5 ewes per ha until 1973. In 1974 the neighbouring farm of 110 ha was purchased. The pastures on this farm were in very poor condition and reduced the stocking rate to 14.5 ewes per ha; this winter we are again back to just over 17 ewes per ha.

WINTERING SYSTEM

Sheep are rotated from weaning one year until lambing the next. Preparation for wintering really begins at weaning. Over the summer ewes are shifted slowly, cleaning out paddocks as they go, sometimes with the help of the topper. This gets the pastures growing again as plants with seedheads will quickly stop growing. As flushing approaches the ewes are speeded up and fed the best feed available for three weeks prior to tupping with the rams going out around 11 April. They only eat the top of the pasture leaving more grass behind them which in turn grows faster.

After flushing and until the last three weeks before lambing, the objective is to feed the ewes a maintenance requirement on grass. I aim for a 70 day rotation which is I think ideal for the grass growing conditions over the winter in our area. I have found in the past that winter regrowth is not improved if spelled for longer than 70 days. Therefore the period from 10 May to three weeks before lambing involves one and a half rotations around the farm. The burnt stubble area is included in this rotation but only provides 4-5 days grazing as there is next to nothing growing on these paddocks anyway. Ideally the sheep should be daily shifted right through the winter in order to get the best regrowth; regrowth is much
better if a paddock is split into four daily blocks than if
the whole paddock is grazed for four days. Daily shifting
is noticeably better than two or three days shifting.
However on most farms there are not enough paddocks to fit a
rotation like this.

In order to get 70 daily shifts at over 740 sheep per ha you
either have to split the paddocks up with an electric fence
or find some more sheep; so my neighbour and I combine all
our ewes together in one mob and include the paddocks on both
farms. This gives us a mob of 3500 ewes. With both farms
we have 45 paddocks available for the ewes without using
electric fences. So we make a compromise and shift every
one and a half days to get our 70 day rotation.

Under this system, there is hardly a need for hay. Last
year I only fed hay when deliberately wanting to keep the
ewes on a poor paddock long enough to pug it up. As the
pastures on the new farm improve this treatment will not be
necessary. The hay feed out last year to ewes totalled 280
bales or 0.12 bales per head.

I winter my hoggets under the same system. Just under 30 ha
is set aside to winter rotate the 700 hoggets. This area is
subdivided into 14 small paddocks and they were fed 200 bales
of hay. The hoggets are trained to eat oats and in the case
of an emergency ever arising, grain feeding would be a
possibility; to date this has not been so.

Costs of this type of wintering are very easy to work out.
If I value the hay at $1 per bale market value, then the cost
per ewe is 12 cents. Further this 12 cents is used to
upgrade the poorer paddocks not just to winter the ewes.
Simply by holding them an extra day on this area in order to
ensure ample trampling out of weed species in conjunction with
providing a lavish layer of fertile silt for maximum pasture
regrowth. The system I have described has been used for the
last six years on my property and is one that has gradually evolved over the nine years I have been grass farming.
C.R.G. Forbes
Farmer, Waipara

THE DISTRICT

My father and I together farm 1200 ha on the Waipara flat; approximately 160 ha being easy down country, the balance is flat.

The soils range from medium heavy to light and stony, bounded by the Waipara river. Cropping is limited by an unreliable summer rainfall, accentuated further by the presence of a strong norwest wind which may blow for weeks on end.

We are in a region where a summer drought is accepted as normal, and although the production of fat lambs is suited to this situation, an early or prolonged drought can drastically alter the summer or winter feed situation causing quite large quantities of supplementary feed to be utilised.

Total rainfall has varied from a low of 410 mm in 1969 to extremes of 850 mm in 1974. The average rainfall over the past seven years has been 600 mm; five of those seven years have been considered drought years.
Naturally, lucerne is a key pasture plant and so there are 600 ha in lucerne stands of varying ages, 400 ha of ryegrass/white clover pasture, and approximately 200 ha of summer or winter greenfeed, crop or fallow ground.

The only time of year when there is normally a large surplus of feed is in the late spring and early summer period, and traditionally as much of the surplus as possible has been converted to conventional hay bales.

**WINTER FEED REQUIREMENTS**

Winter greenfeed, and on the downs all grass wintering, as well as the use of grain with hay have helped reduce the total reliance on hay. However, an increase in stock numbers, coupled with a large proportion of the farm in lucerne, have meant that we are committed to feeding out hay. As stock numbers continue to rise I can see that the feeding of hay during the summer and especially for the pre-tupping weight gain of ewes will continue to increase, and we may eventually use more hay during the summer than the winter.

Wildly fluctuating rainfall means wildly fluctuating amounts of feed available for hay and consequently wildly fluctuating amounts of hay made. From 2,000 bales of hay in drought years, to 30,000 bales plus in more satisfactory years would not be uncommon. Three years ago I realised that I should look at alternative haymaking systems. The ever-increasing cost of making conventional bales; the time taken, when labour was already fully extended; and the cost of hay carted both to and from the barn were all mounting up too much. Silage and haylage offered too many disadvantages so I looked at alternative methods of storing hay. The options then were; the Howard big baler; the round baler; the Stak-n-Mover and the Stakhand systems.
THE SYSTEM

Following some trials and much thought, I purchased the Heston Stakhand 10, which is basically a large box on wheels, with a hydraulically powered roof, which compresses the hay into a tight, dome-shaped stack, looking similar to a large loaf of bread.

At that time a Stakmover was also purchased to transport and feed out the stacks, and more recently we have added a Stakprocessor to complete the system. The three machines in the system operate as follows.

Hay Making

The crop, whether lucerne, ryegrass, clover or straw, is cut and treated as for conventional hay bales, finishing with a raked row no greater than 1.5 m in width, and approximately as dense as the average hay baler would comfortably handle. The Stakhand, which requires a maximum drive of 45 horsepower, collects and compresses the hay until after four to six compressions we have a finished stack equivalent to about 45 conventional bales.

Because the stacks are waterproof they may remain in the paddock until it is convenient to shift them, or they may be carted directly in the Stakhand to a storage area nearby.

Hay Moving

The Stakmover is a five-pronged trailer with castor wheels which is held on the tractor's three point linkage and lifted by a single hydraulic ram attached to the Stakmovers wheels. The stacks are up to 1400 kg in weight, 2.1 m high and have a base area of 2.1 m by 2.5 m, which makes them too large and heavy to be moved by front end loader. The tractor is backed towards the stack with the Stakmover tynes on the ground; the tynes are hydraulically raised while the driver
is selecting a forward gear. The loading of 45 bale equivalents takes an average of 15 seconds.

Feeding Out

The last piece of equipment is the Stakprocessor, which will feed out either stacks or round bales without the driver leaving the tractor seat.

Hydraulically powered tynes at the rear of the processor lift the stack from the ground and force it against two rotating drums with protruding mower knife sections which cut and shred the hay, delivering it forward into an auger and onto the ground. The hay is delivered onto the ground in a continuous line, stalks and leaf thoroughly mixed; the thickness of the row determined by the operator's choice of time, pressure on the stack against the beaters, or the tractor forward speed.

ADVANTAGES

The advantages, in my case, of this system compared with conventional hay bales are:

* The prohibitive and increasing cost of bale cartage by transport companies from field to storage site. We were committed to having nearly all the bales carted by a transport company because of the pressure of stock work at this time, and the need to cut, rake and bale hay as fast as possible before bad weather or a nor-west wind withered hay waiting to be cut.

In our area a strong nor-wester for a week can reduce a potential hay crop by half. This same loss may apply to wet weather affecting the hay quality.

In our case, if on average we made and had carted 20,000 bales per year, our transport bill would now be $4,400 per
year assuming a present price of 22c per bale stacked in heaps exceeding 12 bales and a cartage distance of less than 2 km.

If the cost of carting hay was estimated for the next 10 years at 30c per bale (and this is probably too low) and the average number of bales remained constant at 20,000 per year the total transport cost is $60,000.

Compare this with these costs:

<p>| | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Stakhand 10</td>
<td>$8,000</td>
</tr>
<tr>
<td>Optional hydraulic pump</td>
<td>500</td>
</tr>
<tr>
<td>Stakmover</td>
<td>1,500</td>
</tr>
<tr>
<td>Stakprocessor</td>
<td>9,000</td>
</tr>
<tr>
<td></td>
<td>$19,000</td>
</tr>
</tbody>
</table>

If the effective life of the three machines is ten years then the total costs over the ten years show an advantage with the Stakhand system of a total of $41,000 on hay cartage alone. The Stakhand system also has the advantage that the quantity of hay made in any one season is not governed by any increasing cost (after purchase of plant). The conventional system incurs extra costs on twine and transport.

* Rain on stacks after they have been made is an advantage as they settle, allowing faster transport and giving them a crust on top (especially with leafy lucerne) which seals them against further rain and reduces the danger of wind blow. However rain on baled hay in the paddock reduces the feed and monetary value of the bales and if the bales become worthless they still incur the cost of transport from the paddock. It is not easy to place a value on the advantage of stacks in this case; however the value of baled hay ruined by bad weather, especially in the case of the owner carting himself must be tremendous.
Weathering of correctly formed stacks is negligible though it is higher than hay stored in barns and vastly better than hay stored outside - even if covered.

The particular advantage in our case is that, in general, we have low rainfall both on the top of the stacks or surface water underneath. Then even so no stacks are stored where there may be any chance of surface water. The other precaution we take with stack storage is to reduce danger of high wind by either aligning stacks into the nor-west or sheltering them behind trees. Incredibly, even in the August 1975 wind we had no damage to exposed stacks.

Stacks may be stored along fence lines to provide shelter for sheep at lambing. They may also be shifted at anytime of year and moved to an area close to where they will be fed out, saving time during the winter.

Movement of stacks from paddock to storage site is minimal. One man can on his own in an average day easily shift the equivalent of 5,000 bales. This makes it about eight times faster than our previous best. They can be shifted either on an extremely hot day or shifted in the rain. Further, as they don't need cover, the expense of hay barn storage is done away with and the site of stack storage is more flexible.

The feeding out of stacks is twice as fast as bales loaded and fed from a truck and would be even greater in the case of tractor trailer units. For example, one mob of cattle fed last winter half a mile from the stack storage area took only five minutes to complete. This time included the loading of 45 conventional bale equivalents, the cartage half a mile, one gate opened and hay feeding out.

This emphasises another advantage applying mainly to cattle feeding. If the mob size and feed available in a
paddock suit, an unbroken stack may be left in a paddock for cattle to eat with nearly no wastage. During a bad drought three years ago I started a hay feeding system using twice the ration fed every second day. We were until then using two trucks each with one man taking half a day each day. The introduction of a double ration probably saved 20% of the total time. If a stack is fed to cattle in the whole form a second day is needed to completely clean it up, and so a double ration is given.

If calves are fed a whole stack there are too many to eat from a stack at once and last winter with the tractor at walking speed, the driver would climb on top of the stack with a pitch fork, pushing layers of hay onto the ground. The same could apply to the feeding of sheep in which case a stack processor if not needed reduces the cost of the system to $10,000.

* The advantages of the Stakprocessor are that the product left on the ground is well mixed, leaf and stalk, teased open especially for old ewes with few front teeth. Bad hay is made more palatable. The weathered sides are mixed with better hay. Feeding out time is shorter and less physically demanding. There is probably less driver danger as the driver doesn't leave the seat during feeding out especially on down or hill country.

* If hay has weed seed it can be fed out near a fence line or on top of a previous feed out, so that minimal spraying is needed later. The area of hay left on the ground can be varied to ensure all stock have ample access to it.

* If the ground is wet in winter the tractor and mover provide more traction and stability on the downs than a truck with bales and it means only one man is needed for feeding out as opposed to two where a driver is required.
Stacks have the potential of containing better hay because:

1. They can successfully be made when the moisture content is too high for a baler; therefore on average hay is made earlier before it becomes bleached or too dry.

2. All the leaf is included in the stack because of the vacuum intake.

3. There are no stops for cartage of hay because of impending rain. Stack making capacity is no faster than an average conventional baler when run side by side. However, because a baler has more moving parts and is a more complicated piece of machinery than the Stakhand, breakdowns must be more frequent, take longer to fix and additional problems are created with the use of string.

Finally, it is a relaxing and enjoyable way to make and feed out hay.
Mr Middleton and I have prepared a joint paper to show wilted silage being used in two totally different environments; the one at Mt Peel is in a 1000 mm rainfall area against the hills on the western edge of the Canterbury Plains, the other is in a 620 mm rainfall dryland area towards the eastern side of the Plains.

Mt Peel is now wintering 26,000 ewe equivalents and our winter feeding programme is a large one because we carry all ewe hoggets and calves through the winter. The methods used are mob stocking on hill blocks, fodder crops, wilted silage and hay. Wilted silage is becoming increasingly important in our programme because:

* Whatever the wintering system, be it fodder crops, grain or all grass we cannot do without stored grass or lucerne.

* For maximum utilisation, the November feed peak has to be harvested and stored.

* Within reason and no matter how mechanical and cheap haymaking becomes, silage is a much easier operation to run in our climate. Because of field losses from a
given amount of grass or lucerne I believe more winter feed is likely to result from a wilted silage operation than a hay operation.

* The reasons for making wilted rather than direct cut silage are:

1. It finishes up a better product.
2. It is easier to handle and there is less weight to handle.
3. There is no effluent run off at the heap.

It is in fact a very different product from conventional silage and this cannot be emphasised enough.

For the last 12 years we have been making 1000 tonnes of conventional silage annually for self-feeding to calving heifers and cows.

Now because of the increased palatability and percentage dry matter of wilted silage, we are feeding this to ewes and calves. By doing so we hope to reduce our fodder crops area by half.

To date we are very pleased with the progress ewes have made over winter on wilted silage; but it is still to be seen how well the calves do. We know the key though is in being able to cut pastures at an early stage of maturity, a stage when it could still be used for good fattening feed. This is being done extensively in the United Kingdom but there they use nitrogen on their pastures. This could make quite a difference.

I recently saw a United Kingdom designed self-feeding arrangement for calves. It overcomes the problem of high stack faces and the problems calves have in being unable to reach high up the stack face. By placing a rail measuring about
150 mm square under the electric wire and along the face of the heap, the wilted silage is retained as if in a trough when it is raked down from the face.

THE OPERATION

Mowing
To achieve the optimum 30 to 50 per cent dry matter we mow eight to twenty-four hours prior to harvesting, the ideal machine for this job being a three metre wide mower conditioner. The advantage of conditioning the hay is that the mower does not have to work so far ahead of the harvesting operation; so mowing can often be carried out while the previous days cut is being harvested.

Raking
If the crop is light, say 130 bales or less per hectare, it is best to rake to speed up the chopping operation. The disadvantage of raking is that stones and other foreign matter can be picked up by the forage harvester.

Harvesting
A tractor developing 75 kW PTO matches in well with keeping two trucks on the go. The trucks cart up to 3 km, the operation maintaining a steady rate of 200 bale equivalents per hour.

Our main silage making time is early December with both the second cut of lucerne and any saved pasture coming in then. We endeavour to carry on from paddock to paddock stopping only to cover completed heaps or because of adverse weather. Contractors charge $60 per hour for similar equipment including the tractor at the heap. Contracting, then would cost us 30 cents per bale equivalent.
Carting

Not many farmers would require trucks but they suit us because of the long distances we have to cart for both harvesting and feeding out. Filling a truck takes 12 to 15 minutes.

Heap

We have one large central heap from which the material is fed out and several self-feeding units. A self-feeding stack would have about 3 m high sides, be 12 m wide and 25 m long. With a good operator, one tractor can keep the material spread and packed. Only a truck with 4 wheel drive can climb over the heap, the others tip their loads at the base of the heap. Tipping over the sides has not been satisfactory. All our heaps are now made with permanent sides; this is something we should have done years ago. In strong nor-wester country a cheap solution to stack covering is polythene sheeting held down with car tyres; even to the extent of having the tyres touching one another.

Loading Out

A push-off stacker with strengthened tynes can be used to load out with. This overcomes the problem most front end loaders would have in not lifting high enough to tip their load into high sided waggons.
My brother and I farm an 800 ha dryland property at Rangitata. The rainfall is 620 mm and the property consists of mostly Lismore stony silt loam soils. We will winter 6,000 ewes, 3,000 hoggets and 100 weaner calves. Approximately half the farm is in lucerne and our aim is to sow most of the farm in lucerne as quickly as possible.

All our wilted silage is made from lucerne. It has a sweet, aromatic smell; the stock like it, and do well on it. We have found that two-tooth ewes, or stock that have not previously eaten wilted silage, including cattle, readily accept it as a feed.

**REASONS FOR CHANGE**

Our reasons for changing to wilted silage from a dry hay system are:

* Changeable spring weather often causes severe hay losses by raining on a 30 ha paddock which was almost ready to bale. It is very difficult to get that first, sappy cut of hay in without it being rained on in October or November.

* Wilted silage is of better overall quality than dry hay. This is because the mowed material lies on the ground for eight to twenty-four hours only, greatly reducing the chances of a delay with the weather. The short period of time from standing crop to pit makes for low field losses. A simple analyses on what I consider to be our most inferior wilted silage (made from stunted lucerne;
over mature, harvested too dry and full of nodding thistles) showed:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Dry matter</td>
<td>49%</td>
</tr>
<tr>
<td>Protein</td>
<td>15%</td>
</tr>
<tr>
<td>Crude fibre</td>
<td>17%</td>
</tr>
</tbody>
</table>

* Speed of operation. Wilted silage can be chopped, provided it is not made wet by rain or heavy dew. The dry matter content should be somewhere between 50% and 35%. So we are always chopping long before the balers start, and long after they are stopped by unsuitable weather. This continuity of operation is a real advantage when we have perhaps 130 ha of saved lucerne reaching the optimum harvest time within a period of only 2 to 3 weeks in late October or early November.

* Ease of feeding out. We load our trailer with a heavy duty push off type loader, which takes about 20 minutes to fill the trailer with 6 tonnes of wilted silage. At the present time one load feeds seven different mobs. Travelling time plus feeding takes about one and a quarter hours, feeds 5,000 head and covers nine kilometers.

To become fully equipped for a wilted silage operation today would cost:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedout trailer</td>
<td>$7,000</td>
</tr>
<tr>
<td>Forage harvester</td>
<td>7,755</td>
</tr>
<tr>
<td>Haybine</td>
<td>5,975</td>
</tr>
<tr>
<td>Loader</td>
<td>2,050</td>
</tr>
<tr>
<td>Bin for tip truck or trailer</td>
<td>1,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$23,780</strong></td>
</tr>
</tbody>
</table>

These are the latest prices to replace equipment similar to ours and obviously the operation would have to be fairly big to justify this sort of expenditure.
It is financially worthwhile to have the harvesting done by contract and for the farmer to do his own feeding out. Current contract rates in the North Island are in the order of $60 per hour for the entire harvest operation. This is the equivalent of $0.30 per bale and compares favourably with any dry hay operation.

The farmer will need a loader which could range in price from $1,500 to $2,500. The feedout trailers available range in cost from $3,900 for a small two and a half tonne capacity model to $7,500 for a 6 tonne plus model. In muddy conditions a smaller trailer would be more suitable. Polythene sheet for covering a stack or pit averages out at approximately .03c per bale equivalent.

I believe there is a strong case for syndicate ownership of such machines as haybine or windrower, tip trucks, precision chop forage harvester and large tractor; and I further believe that because of its continuity, a wilted silage operation could well be more suited to syndication than a dry hay operation.

JOINT SUMMARY

Our change to wilted silage as a means of supplementary feeding has been beneficial to both types of farming enabling us to better utilise our respective growth peaks. On both properties we are able to harvest a larger volume of better quality material, without the problems associated with changeable spring weather. We have explained how wilted silage is easy to feed out mechanically and is extremely palatable to sheep and cattle. We must also remember how successful self-feeding can be.
While machinery costs are high we believe that there are good prospects for contract harvesting systems and syndication which could involve many farmers in economical wilted silage feeding for a capital outlay of between $5,000 and $7,000 for a front end loader and a feed-out trailer.
My immediate reaction when asked to discuss this topic was one of panic at the thought of having to cost out my system of grain feeding and having to justify my continued acceptance of such a system, if, as I suspected, it proved to be more expensive than other methods of wintering stock.

However, I went ahead and costed everything associated with grain feeding and haymaking and just for fun compared them with the cost of growing swedes. Having proved to my satisfaction that, at Peel Forest at least, we can produce 1 kg of starch equivalent (S.E.)\(^1\) in the form of either lucerne hay or oats at exactly the same cost, and from swedes at about one-third that cost, I sat down to think why we went in for this system anyway.

**REASONS FOR THIS SYSTEM**

* Swedes for some particular reason are not a good crop with us. My neighbours on either side swear by them and I must admit they grow good swedes. We cannot grow them with anything like the regular success that I

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1 Starch equivalent: A measure of feed value in terms of energy.
believe essential to a planned wintering programme. We can grow chou moellier very well but it has in the past caused serious red-water problems in pregnant ewes. We keep chou moellier for calves.

The property which I farm is of a peculiar nature. It consists of 930 hectares, over half of which are stony, largely uncultivated, semi-improved, well drained flats on Ruapuna entirely stony soils. These flats are ideal wintering country for stock as they are mud free and clean. They don't grow swedes but at a cost they do grow oats and lucerne. So it seemed logical that if we were to utilize them as well as improving them through heavy stocking rates, we should devise some system where the feed was taken to the stock. In fact these flats are intensive wintering pads; hence our system of oat feeding supplemented with lucerne hay.

The improvement of these blocks with heavy stock numbers in winter and associated subdivision and application of fertilisers will I hope increase fertility so that we can look at all grass wintering. At the moment what the grass grub and Perina don't get is effectively cleaned up by the first three hard frosts!

Having a store of grain on hand is the best insurance I know against drought; it is of sufficiently high food value to put weight on ewes when you want to just before tupping.

It is not necessary to starve sheep who have once been fed grain in order to get them back on it; so in a situation where grass is in short supply, a mixed ration of grass and oats will give rapid weight gain. So many other winter rations are of relatively low feed value or are just that - winter feeds, and therefore not available at other time of year.
Another important reason is the ability to spread our tractor work. Instead of a mad rush to sow swedes in November, we can spread our tractor work back into September and sow oats. The other end of the crop is of course a bonus but an important one. The oats ground is ready in March to go into grass, so we can in effect get two crops off the same paddock in one year. Spring does seem to be our pinch period so the more paddocks we have in grass the more likely we are to get through unscathed.

Utilisation is far superior. Even with a 25 tonne crop of swedes I can in theory produce over twice as much S.E. per hectare than from 1 hectare of oats at 1.7 tonnes. The plain fact is though, that in our case, due to poor utilisation of swedes and the fact that the S.E. system tends to undervalue the roughages as a maintenance diet, we can winter as many sheep on an hectare of oats as we can on an hectare of swedes.

Grain feeding stock on a dry, clean area has a markedly beneficial effect on stock health and appearance. The wool is much cleaner and brighter and it is a genuine pleasure to inspect the sheep even on the worst winters day. With swedes I have seen sheep frozen to the ground on their run-off block and waiting to thaw out before they could start breakfast.

THE SYSTEM

We grow Mapua oats. They are the most reliable variety in our climate and are resistant to shake. We have them headed by contract and store them in corrugated iron silos with a "V" pit. The oats gravitate to the auger reservoir at the bottom and from there are augered into a cut down "500 gallon" tank on wheels which serves as our feeding trailer.
From the beginning of June I feed my ewes just over 200 g of uncrushed oats per day along with about 1 bale of hay per 100. The theory is that they will lose weight but it takes a fair time as there is more food value in the roughage left on even the barest block. This ration increases until three to four weeks prior to lambing when I supplement. By then they are on about 350 g of oats together with 0.5 kg lucerne; they also spend an hour or two per day on grass. This ration of 350 g oats at 60% S.E. and 500 g lucerne hay at 35% S.E. costs about 1.8c per ewe per day or 12.6c per week. It represents about 2.5 kg S.E. per week which in theory represents a little over 50% of a maintenance ration for a 57 kg ewe; but the fact is that sheep will do well on this ration when they are confined and the feed is brought to them.

When we were feeding swedes to sheep we had to allow at least a theoretical maintenance ration because of the wastage involved in feeding out and the extra energy requirement of the ewe.

The oats are rationed quite easily from the oat trailer. The opening underneath is 75 mm in diameter and is opened and closed by a rope operated slide.

The trailer contains 600 kg of oats which flows out at about 55 kg per minute.

I ration the mobs accordingly. In fact, towards the end of winter when the ration is about 350 g per day the trailer is too small and represents a weakness in the system at the moment.

Mob size is relatively critical. In order that everyone gets a feed, a mob of over 900 is not advisable for a prolonged period of grain feeding. The competition between the greedy and weak is too fierce in a large mob and too many fall by the wayside.
Introducing sheep to grain is not hard though it is advisable to lure them onto the line with good hay, and to remember not to give them too much to start with. They could end up with severe indigestion if too much is eaten too suddenly. We had problems introducing Romney two-tooths to grain but changed to Border Romney cross and more recently to Coopworths. It is remarkable to see the speed with which the young sheep become accustomed to grain. After three mornings at least 75% of a mob of 900 are on the line and by the end of a week the 20 or 30 left not eating grain may as well be taken off and fed in a small paddock on their own until they have overcome their shyness.

Once they are feeding on the line they are oblivious to all else. They are easily approached from behind to examine for foot rot or for dryness as shearing approaches.

In this paper I have tried to show how and why one farmer has chosen to grain feed his stock in the winter. I have costed everything out and shown possibly that ours is an expensive method. But I hope I have also shown that the economies involved are a minor point in reaching a decision on a wintering system. Climatic, physical and personal considerations cannot be neglected.
COMPARATIVE COSTS OF PRODUCING OATS, HAY AND SWEDES ON PEEL FOREST ESTATE

TRACTOR COSTS PER HOUR

Ford 7000: 1000 hours per year
Fuel @ 12.5 litres per hour 1.80
Repairs and Maintenance @ 75¢ per hour .75
Depreciation, etc. @ $1.00 per hour 1.00
Wages @ $2.00 per hour 2.00

$5.55

OATS COST PER HECTARE

1 ploughing @ 0.8 ha per hour 6.94
1 heavy rolling @ 2 ha per hour 2.78
1 discing @ 2.5 ha per hour 2.22
3 grubbings and harrowing @ 3.2 ha per hour x 3 5.20
Drilling @ 1.2 ha per hour 4.63

$21.77

Seed 6.67
Super 7.41
Spraying 16.06
Heading 59.30

$111.21

Assume a 3.5 tonne per hectare crop: COST OF 1 KG = 3.2¢

LUCERNE ESTABLISHMENT COST AND COST OF HAY PER HECTARE

Stonepicking 74.00
5 tonnes lime 37.00
1.3 tonnes super 37.00
Seed 20.00
Tractor 49.00
Maintenance Topdressing 69.00
Spraying 1½ times in 7 years 74.00

$360.00
Assume a 7 year life $51 per hectare
Assume 250 bales per ha 20 cents per bale
Haymaking with twine 11 " " "
Carting to barn 24 " " "
32 kg bale Total Cost 55 cents

COST OF 1 KG = 1.72¢

SWEDES COST PER HECTARE

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost per ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ploughing</td>
<td>6.94</td>
</tr>
<tr>
<td>1 rolling</td>
<td>2.78</td>
</tr>
<tr>
<td>2 discing</td>
<td>4.44</td>
</tr>
<tr>
<td>4 grubbings</td>
<td>6.94</td>
</tr>
<tr>
<td>Ridging</td>
<td>6.94</td>
</tr>
<tr>
<td></td>
<td>28.04</td>
</tr>
<tr>
<td>Seed</td>
<td>1.24</td>
</tr>
<tr>
<td>Super 375 kg</td>
<td>11.12</td>
</tr>
<tr>
<td>Spraying</td>
<td>34.59</td>
</tr>
<tr>
<td><strong>Total per ha</strong></td>
<td><strong>$74.99</strong></td>
</tr>
</tbody>
</table>

Assume a 62 tonne crop per ha: COST OF 1 KG = 0.12¢

Assume oats are 60% by weight S.E., lucerne hay 35% and swedes 8%, 1 kg of starch equivalent can be produced for the following costs:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Cost per kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oats</td>
<td>4.9¢</td>
</tr>
<tr>
<td>Lucerne Hay</td>
<td>5.3¢</td>
</tr>
<tr>
<td>Swedes</td>
<td>1.5¢</td>
</tr>
</tbody>
</table>
Marrow-stem kale (chou moellier) and swedes are considered in this paper because they are the main wintering crops in Otago and Southland where about 41% and 63% of New Zealand's kale and swede crops are grown (Harris 1975). The yields, quality and production costs of these crops are examined in separate sections.

**YIELDS**

*Kale*

Table 1 shows the influence of sowing date on the dry matter yields of medium-stemmed, marrow-stem kale sown in rows 15 cm apart (Stephen, 1975).

In late June, the total dry matter yields obtained from the September, November and December sowings were not significantly different, although the yield from the December sowing was about 17% lower than that from the September sowing. The yield from the January sowing, however, was markedly lower compared with all other sowings. At the time of this final harvest, maximum yields were achieved only in the case of the September and November sowings; yields from the December and January sowings were still increasing.
TABLE 1. THE EFFECT OF SOWING DATE ON KALE PRODUCTION
(Tonnes DM per ha)

<table>
<thead>
<tr>
<th>Harvest Date</th>
<th>11 Sept.</th>
<th>Sowing Date</th>
<th>13 Nov.</th>
<th>4 Dec.</th>
<th>3 Jan.</th>
<th>S.E.M.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 27</td>
<td>13.3</td>
<td>7.9</td>
<td>4.0</td>
<td>1.6</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Mar. 21</td>
<td>14.8</td>
<td>11.7</td>
<td>6.6</td>
<td>3.0</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>Apr. 18</td>
<td>15.7</td>
<td>13.3</td>
<td>9.4</td>
<td>5.1</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>May 21</td>
<td>16.3</td>
<td>14.9</td>
<td>10.6</td>
<td>6.6</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>June 27</td>
<td>16.1</td>
<td>14.9</td>
<td>13.4</td>
<td>8.5</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>S.E.M.%</td>
<td>7.9</td>
<td>6.6</td>
<td>9.8</td>
<td>11.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Attainment of maximum yield is not the only important factor however. The value of kale, or any other crop, as a stock feed is a function of dry matter production and its quality. Determination of the organic matter digestibility gives some indication of the crop value as an animal feed and a value of about 70% is usually obtained for good pasture. The leaf of kale throughout growth has a value of about 85% and the soft upper portion of the stem also has a value of about 85% though this decreases to about 75% in very mature kale. On the other hand the fibrous basal portion of the stem has a value of only about 54%. It follows therefore that the kale crop is most valuable as a stock feed when the yields of leaf and soft stem are at a maximum and the yield of the lower fibrous stem is at a minimum.

Table 2 shows the yields of leaf at different stages of the crop's growth for each of the four sowing dates in Table 1. In the earlier sowings, leaf yields tended to increase to a maximum and thereafter decreased to a relatively constant yield of about 4000 kg DM per ha. In the January sowing, however, the leaf yields had increased during growth and, by the time of
TABLE 2. THE EFFECT OF SOWING DATE ON KALE LEAF PRODUCTION (Tonnes DM per ha)

<table>
<thead>
<tr>
<th>Harvest Date</th>
<th>Sept. 11</th>
<th>Sowing Date</th>
<th>Nov. 13</th>
<th>Dec. 4</th>
<th>Jan. 3</th>
<th>S.E.M.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 27</td>
<td>6.6</td>
<td>4.6</td>
<td></td>
<td>2.8</td>
<td>1.3</td>
<td>9.7</td>
</tr>
<tr>
<td>Mar. 21</td>
<td>6.2</td>
<td>5.6</td>
<td></td>
<td>4.1</td>
<td>2.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Apr. 18</td>
<td>4.4</td>
<td>4.9</td>
<td></td>
<td>4.3</td>
<td>3.1</td>
<td>6.3</td>
</tr>
<tr>
<td>May 21</td>
<td>4.0</td>
<td>4.5</td>
<td></td>
<td>4.1</td>
<td>3.1</td>
<td>9.7</td>
</tr>
<tr>
<td>June 27</td>
<td>3.8</td>
<td>4.4</td>
<td></td>
<td>4.9</td>
<td>3.9</td>
<td>13.2</td>
</tr>
<tr>
<td>S.E.M.%</td>
<td>7.3</td>
<td>8.1</td>
<td>9.9</td>
<td></td>
<td>10.9</td>
<td></td>
</tr>
</tbody>
</table>

As a consequence it is preferable to use the kale crop when leaf yield is at or near maximum and there is little or no fibre development in the stem. Attainment of maximum total dry matter yields should be sacrificed so that a higher quality...
crop with a good percentage utilisation is available. This can be achieved by a series of sowing dates. For example, September-sown kale would provide an ideal autumn feed during March and April; November sowings would be best for the early winter period and mid-December to early January sowings would be available for late winter feeding. Yields should average about 14000 kg DM per ha of which 80-90% would be utilised. These yields could be obtained on most medium to high fertility soils, although on lighter soils and in some drier parts of Otago lower yields would be obtained (Scott et al., 1972).

**Swedes**

**TABLE 3. D.M. YIELDS OF SWEDE VARIETIES - HARVESTED IN JULY**

(Tonnes per ha)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sown</th>
<th>Doon Major</th>
<th>Sensation</th>
<th>Grand-master</th>
<th>Calder</th>
<th>S.E.M.%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>Dec. 14</td>
<td>8.2</td>
<td>8.7</td>
<td>8.9</td>
<td>8.2</td>
<td>9.3</td>
</tr>
<tr>
<td>Very dry</td>
<td>Nov. 10</td>
<td>5.6</td>
<td>5.3</td>
<td>5.3</td>
<td></td>
<td>7.2</td>
</tr>
</tbody>
</table>

Table 3 gives the yields of four swede varieties, sown in ridges 61 cm apart, in an 'average' and 'dry' year and illustrates that yields can be considerably reduced when moisture is deficient (Stephen and Kelson, 1974). Yields were similar from the four varieties in each year. However, in areas where disease or insect problems are prevalent the recommended resistant varieties should be used.

The changes during growth in leaf, bulb and total yield of swedes sown in mid December are shown in Table 4. Maximum yields are obtained in early winter during April and May and
TABLE 4. THE EFFECT OF SAMPLING TIME OF SWEDE PRODUCTION
- AVERAGE OF FOUR VARIETIES SOWN ON DECEMBER 14

<table>
<thead>
<tr>
<th>Date of Sampling</th>
<th>Dry Matter Yield (tonnes per ha)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leaf</td>
<td>Bulb</td>
</tr>
<tr>
<td>Feb. 25</td>
<td>1.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Mar. 27</td>
<td>3.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Apr. 26</td>
<td>3.2</td>
<td>4.6</td>
</tr>
<tr>
<td>May 23</td>
<td>2.4</td>
<td>5.9</td>
</tr>
<tr>
<td>June 27</td>
<td>1.9</td>
<td>6.8</td>
</tr>
<tr>
<td>July 18</td>
<td>1.5</td>
<td>7.0</td>
</tr>
<tr>
<td>July 31</td>
<td>1.3</td>
<td>7.0</td>
</tr>
</tbody>
</table>

S.E.M.% 6.6 5.8 4.5

whilst there is no change in total yield thereafter the amounts of leaf and bulb present do vary. Leaf yield reaches a maximum in March and decreases thereafter during which time there are increases in bulb yield which compensates for the reduction in leaf yield.

There is no advantage, therefore, in sowing swedes too early and late November, early December sowings as recommended by Faithful (1953) would be satisfactory. In areas where droughts frequently occur in January and February, earlier sowings would give the crop a better chance to establish and develop to the stage when lack of moisture would have less effect.

Yields of 8-9000 kg DM per ha with a utilisation of 85-90% can usually be obtained.
Drew et al. (1974) reported the results - see Table 5 - of a trial in which the growth of hoggets on four forage crops was examined over a 42 day period during winter.

**TABLE 5. D.M. YIELD, UTILISATION, DIGESTIBILITY AND HOGGETS GROWTH ON FOUR FORAGE CROPS**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Total DM Yield (Tonnes per ha)</th>
<th>% Utilisation</th>
<th>% Digestibility of DM</th>
<th>Hogget Weight Gain (g per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kale</td>
<td>12.0</td>
<td>92</td>
<td>80.0</td>
<td>132</td>
</tr>
<tr>
<td>Swedes</td>
<td>6.6</td>
<td>90</td>
<td>91.5</td>
<td>101</td>
</tr>
<tr>
<td>Turnips</td>
<td>5.2</td>
<td>94</td>
<td>90.1</td>
<td>111</td>
</tr>
<tr>
<td>Mangels</td>
<td>6.4</td>
<td>93</td>
<td>91.6</td>
<td>39</td>
</tr>
</tbody>
</table>

S.E.M.% 10.6 2.0 0.46 16.6

Crop yields were low as a result of a very dry year but kale gave significantly higher yields compared with the other three crops which gave similar yields. Crop utilisation was very high and the 92% utilisation of kale was considerably higher than the 75% utilisation reported by Scott and Barry (1972). The higher utilisation was obtained on a crop sown in rows 15 cm apart compared with 36 cm rows used by Scott. The higher plant population associated with the closer spacing probably reduced the average stem thickness thereby permitting higher utilisation.

The percentage digestible dry matter was high although swedes, turnips and mangels at 91% were better than kale at 80%. Hogget liveweight gains were variable but were similar on kale, swedes and turnips and poorer on mangels.
In another trial (Scott and Barry, 1972) beef weaners were wintered on a mixed ration of swedes and hay and on kale and hay from mid-June to mid-August. Similar liveweight gains of about 0.36 kg per day were recorded on both crops.

Swedes and kale are therefore very satisfactory winter feeds for both sheep and beef weaners though kale is to be preferred because of its much higher dry matter production potential.

**COSTS**

The costs of growing crops of kale and swedes immediately after pasture are shown in Appendices A and B.

The cultivation costs, which are the main items, are calculated for conventional cultivation; direct drilling would probably reduce these. The hourly rate for cultivation of $6.46 as calculated in Appendix D takes into account the purchase cost and depreciation of a tractor and all the necessary equipment for growing these forage crops. Tractor variable costs have been assessed at $2.32 per hour, tractor fixed costs at $2.20 per hour and machinery fixed costs at $1.94 per hour.

The seed and fertiliser rates assumed here are rates normally used by farmers.

Aphid control by aerial spraying is included for both crops. In order to maintain high yields, an aphicide in the autumn should possibly be used more often than it is. In these costs we have assumed that spraying may be necessary every two years with kale and once every three years with swedes. The less frequent rate with swedes is because aphid resistant varieties should be used where aphids are a regular problem, although even these are not totally resistant and need to be sprayed in some years.
The total cost of $80.19 to grow a hectare of kale is only slightly higher than the $71.13 to grow a hectare of swedes. However when the cost of producing one kilogram of utilisable dry matter is calculated - Appendices A and B - the swede cost of 1.05 cents is 60% higher than the kale cost of 0.67 cents.

The cost of producing one kilogram of dry matter as hay is 3.55 cents - Appendix C - and this is nearly five times the cost of producing kale and three times the cost for swedes. Good meadow hay has a digestibility value of only about 65% so that both swedes and kale have the advantages of both better quality and lower costs of production. Kale with its higher dry matter production has the advantage over swedes.

ACKNOWLEDGMENTS

To Mr A. Kelson in the Crop Agronomy Section for considerable technical assistance.

REFERENCES


APPENDIX A

COST OF GROWING KALE - for 1.0 ha Medium Stemmed Kale sown in 15 cm rows

CULTIVATION:

Plough - 2.5 hrs per ha
Disc - 0.83 hrs per ha
Disc and harrow - 0.83 hrs per ha
Harrow - 0.5 hrs per ha
Roll and harrow - 0.62 hrs per ha
Drill - 0.62 hrs per ha
= 5.9 hrs at $6.46 per hour* 38.11

SEED:
4 kg per ha at $2.00 per kg 8.00

FERTILISER:
250 kg per ha Reverted Super at $35 per t (net) 8.75

APHID CONTROL:

Aerial application $44.40 per ha
Metasystox 6.25 per ha
\[ \text{Total} = 50.65 \text{ per ha} \]

Applied every two years 25.33

Total Cost per hectare $80.19

Average D.M. Yield (kg per ha) 14000
At 85% Utilisation, Utilisable D.M. (kg per ha) 11900
\[ \therefore \text{COST (cents) per kg Utilisable D.M.} = 0.67¢ \]

* See Appendix C
APPENDIX B

COST OF GROWING SWEDES - for 1.0 ha swedes ridged in 61 cm rows

CULTIVATION:

<table>
<thead>
<tr>
<th>Task</th>
<th>Time per ha</th>
<th>Cost per ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plough</td>
<td>2.5 hrs</td>
<td></td>
</tr>
<tr>
<td>Disc</td>
<td>0.83 hrs</td>
<td></td>
</tr>
<tr>
<td>Disc and harrow</td>
<td>0.83 hrs</td>
<td></td>
</tr>
<tr>
<td>Harrow</td>
<td>0.5 hrs</td>
<td></td>
</tr>
<tr>
<td>Roll and harrow</td>
<td>0.62 hrs</td>
<td></td>
</tr>
<tr>
<td>Drill</td>
<td>0.62 hrs</td>
<td></td>
</tr>
<tr>
<td>Total TIME</td>
<td>5.9 hrs</td>
<td>$38.11</td>
</tr>
</tbody>
</table>

SEED:

0.6 kg per ha at $1.55 per kg = 0.93

FERTILISER:

125 kg per ha Borated Super = 8.75
125 kg per ha Reverted Super at $35 per t (net) = 8.75

WEED CONTROL:

One Scuffling = 1 hr at $6.46 per hr = 6.46

APHID CONTROL:

Aerial application $44.40 per ha
Metasystox 6.25 per ha

$50.65 per ha

Applied every three years = 16.88

Total Cost per hectare = $71.13

Average D.M. yield (kg per ha) = 8000
At 85% Utilisation, Utilisable D.M. (kg per ha) = 6800

.: COST (cents) per kg Utilisable D.M. = 1.05¢

* See Appendix C
APPENDIX C

COST OF MAKING A BALE OF HAY

Assume: 1. Bale weight = 20 kg
2. Cost of making = 55¢ per bale

Therefore: 20 kg hay costs 55¢

At 90% Utilisation and 86% D.M.: 15.5 kg hay D.M. costs 55¢

i.e. COST per kg Utilisable D.M. 3.55¢
APPENDIX D

CULTIVATION COSTS PER HOUR

N.B. These costs take into account the necessity to replace tractors and machinery, so depreciation is included in hourly cultivation rates.

<table>
<thead>
<tr>
<th>TRACTOR VARIABLE COSTS:</th>
<th>$ per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel: 13.5 l per hr at 14.2¢ per l</td>
<td>1.92</td>
</tr>
<tr>
<td>Repairs and Maintenance</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>2.32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRACTOR FIXED COSTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Assume new 50 H.P. Tractor costing $8000)</td>
</tr>
<tr>
<td>Interest at 8½%</td>
</tr>
<tr>
<td>Depreciation over 8 years (salvage $1600)</td>
</tr>
<tr>
<td>Registration</td>
</tr>
<tr>
<td>Insurance and sundry</td>
</tr>
<tr>
<td>Total Yearly Cost</td>
</tr>
<tr>
<td>Assume tractor runs 700 hrs per year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MACHINERY FIXED COSTS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
</tr>
<tr>
<td>Depreciation over 10 yrs</td>
</tr>
<tr>
<td>Drill $2000</td>
</tr>
<tr>
<td>Interest at 8½%</td>
</tr>
<tr>
<td>Depreciation over 10 yrs (Salvage $200)</td>
</tr>
<tr>
<td>(b)</td>
</tr>
<tr>
<td>Depreciation over 20 yrs</td>
</tr>
<tr>
<td>Plough $750</td>
</tr>
<tr>
<td>Discs $650</td>
</tr>
<tr>
<td>Harrow $150</td>
</tr>
<tr>
<td>Roller $250</td>
</tr>
<tr>
<td>$350</td>
</tr>
<tr>
<td>$1800</td>
</tr>
<tr>
<td>$153</td>
</tr>
<tr>
<td>$233</td>
</tr>
<tr>
<td>Total Yearly Cost</td>
</tr>
<tr>
<td>Assume Machinery used for 300 hrs per year</td>
</tr>
</tbody>
</table>

TOTAL CULTIVATION COST PER HOUR $6.46
INTRODUCTION

It was Wardell who in 1966 focussed on the fact that New Zealand's economy is based on "ryegrass, white clover and Pinus radiata".

To overcome the limitations of ryegrass and white clover, fodder crops can be grown; chiefly maize for summer production with brassicas and winter greenfeeds being used for the cool season. I want to review winter greenfeeds with particular emphasis on the factors associated with yield and utilisation. In preparing this review, frequent reference has been made to other published and unpublished work. Reference to this is gratefully acknowledged and a list of references is included at the end of the paper.

WINTER GREENFEED TYPES

There are three types of winter greenfeed
* Cereals
* Ryegrasses
* Forage legumes
CEREALS

Almost any temperate cereal can be used as a greenfeed but oats are the most common with less reliance being placed on ryecorn, barley and wheat.

All cereals have been bred and selected mainly for grain production and from the greenfeed viewpoint this has resulted in three characteristics. Firstly, cereals produce comparatively few large tillers with rather elevated growing points giving a plant which does not recover very well from grazing. Secondly, cereals produce reasonable yields of seed meaning that seed is usually cheap. Finally the large seed can be sown into a rough seedbed.

It is risky to generalise about variety recommendations as one needs to know the type of soil, climate and the time when feed is needed, as well as the type of stock and intended grazing management. In general, oats are the best crop where a high yield from a single grazing is required and for this purpose Mapua is probably the best variety for South Island conditions. Where late sowings are practised barleys are generally superior. Of all the cereals, ryecorn is the most tolerant of grazing and will produce feed from late autumn to early spring, particularly in areas with severe winters.

Comparatively recent releases of cereals for greenfeeds include Amuri oats which shows rapid early growth and Rahu ryecorn, a rust resistant selection of C.R.D. ryecorn. In practice, availability and price of seed usually have a big influence on choice of variety and in this regard ryecorn seed is often rather scarce and expensive.

Place in Rotation

Cereal greenfeeds can be sown anywhere in a rotation but usually come after a cereal crop. For example on intensive
mixed cropping farms a common practice is:

```
CROP
(Cereal, Peas)       →       CEREAL GREENFEED

NEW GRASS            ←       SUMMER FALLOW
```

The greenfeed is fed off over winter, ploughed up the follow­
ing spring and a summer fallow given for four months for control of twitchy weeds which are becoming more of a problem now with irrigation. Alternatively there is often a place for a greenfeed crop between harvesting a cash crop in autumn and sowing a crop or pasture in spring.

The sowing of cereal greenfeeds in land cultivated out of pasture is not a common practice probably because with the higher fertility and opportunity for early sowing it is preferable to grow a higher yielding crop of ryegrass greenfeed or a brassica. However when such crops fail due to prolonged drought and/or insect attack a cereal can be used as a salvage operation.

Finally cereals can be directly drilled into lucerne or pasture, the latter practice being commonly used on town supply dairy farms to provide out of season greenfeed and reduce the risk of bloat.

**Fertilisers**

There is a general agreement that on cropping soils cereal greenfeeds usually benefit from the application of superphosphate at sowing, with 125-250 kg per ha being the recommended rates.

Because of their position in the rotation cereal greenfeeds are often sown on soils low in available nitrogen. Responses to nitrogen vary tremendously depending on soil N levels, climate plus the cereal cultivar and its response to grazing. It is recommended that N should be applied to cereal greenfeeds
when they are 5.0 to 7.5 cm high and not drilled with the seed. The question of rates and forms is largely one of economics. In trials completed in 1962 DM responses varied from 5 to 14 kg DM per kg N applied, while in other trials in 1958 the response averaged 14 kg DM per kg N. Both these trials were with sulphate of ammonia but in the latter case it was found that when nitrolime was drilled with the seed it had a slower but more lasting effect than sulphate of ammonia. Recommended rates, forms and times of nitrogen fertiliser application therefore depend on the cost per unit of N and when the feed is required. Recent reductions in the price of fertiliser N to 42¢ per kg N may make its application more economic.

Utilisation and Quality

If necessary more cereals can be grazed four to six weeks after emergence and in the overdug situation this may be desirable to prevent the seedlings being smothered by the existing vegetation. The methods of grazing cereal greenfeeds vary considerably from several light grazings over the winter to a 'oncer' grazing in late winter-early spring. The amount of regrowth can be drastically altered by grazing management and a common bone of contention is whether cereals should be grazed over the winter or left for one last 'oncer' grazing.

Table 1 lists total DM yields of four trials where cereals were grazed once or twice over winter or left ungrazed until late winter.

In all cases the yield of oats was reduced substantially by grazing in winter, while for ryecorn yield reductions were less or non existent.

There is little data available on the proportion of cereal greenfeed which is actually utilised but it probably seldom exceeds 60%. In this regard some data from the beef farmlet at Lincoln are of interest - see Table 2. In this trial Amuri oats were sown on 13 February 1975 which in retrospect was
TABLE 1. EFFECT OF MID-WINTER GRAZING ON YIELD TO LATE WINTER OF SEVERAL CEREAL GREENFEEDS (KG DM/HA)

<table>
<thead>
<tr>
<th>Location</th>
<th>Cultivar</th>
<th>Grazed</th>
<th>Ungrazed</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln</td>
<td>C.R.D. Ryecorn</td>
<td>2560</td>
<td>2250</td>
<td>Vartha &amp; Rae, 1973</td>
</tr>
<tr>
<td>26/3</td>
<td>Amuri Oats</td>
<td>2670</td>
<td>3340</td>
<td></td>
</tr>
<tr>
<td>Auckland</td>
<td>Ryecorn</td>
<td>1307</td>
<td>1284</td>
<td>Farrell, 1974</td>
</tr>
<tr>
<td>19/4</td>
<td>Algerian Oats</td>
<td>1307</td>
<td>2374</td>
<td></td>
</tr>
<tr>
<td>20/5</td>
<td>Amuri Oats</td>
<td>1980</td>
<td>3500</td>
<td></td>
</tr>
<tr>
<td>Lincoln</td>
<td>C.R.D. Ryecorn</td>
<td>2659</td>
<td>3959</td>
<td>J.G.H. White (pers. comm.)</td>
</tr>
<tr>
<td>10/3</td>
<td>Amuri Oats</td>
<td>1506</td>
<td>3895</td>
<td></td>
</tr>
</tbody>
</table>

slightly too early in that the crop, under the long photo-period, became reproductive and flowered in July. Grazed at a stocking rate of seventy 210 kg weaners per hectare utilisation was about 65% in May-June and animal gains of 0.5 kg per day indicated that the quality was quite reasonable. However, by July when the crop had flowered and become frosted both utilisation and quality declined with weight gains falling to 0.2 kg per day. Between 30 June and 30 August total DM actually declined at the rate of 30 kg per day. Nicol (pers. comm.) suggests that for cattle a vegetative cereal yielding about 300 kg per ha gives optimum utilisation.

Under wet conditions the degree of utilisation and regrowth from cereals may decline due to increased fouling and pugging. In this regard it is suggested that cereal overdrilled into existing pasture can often be utilised more efficiently than if the same land is cultivated. The existing pasture acts as a more solid 'raft' than cultivated soil.
<table>
<thead>
<tr>
<th>Time Period</th>
<th>Growth Stage</th>
<th>Herbage Offered kg DM/ha</th>
<th>Herbage Remaining kg DM/ha</th>
<th>% Utilisation</th>
<th>Liveweight Gain kg/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>May-June</td>
<td>'Boot'</td>
<td>3500-4000</td>
<td>1500</td>
<td>60-65</td>
<td>0.5</td>
</tr>
<tr>
<td>June-August</td>
<td>Flowering</td>
<td>6000</td>
<td>3000</td>
<td>50</td>
<td>0.2</td>
</tr>
</tbody>
</table>
The two ryegrasses used for greenfeed production are Grasslands Paroa Italian ryegrass and Grasslands Tama Westerwolds ryegrass. Paroa is usually regarded as an annual species but under high fertility, moist conditions and lenient grazing it may persist for several years.

Tama is a tetraploid form of the extreme form of Italian ryegrass and is strictly an annual. It was released into the certification scheme in 1968 and has rapidly replaced Paroa as the main greenfeed ryegrass.

Place in Rotation

Compared with cereal greenfeeds, ryegrasses require higher soil fertility and a well prepared seedbed, so they are commonly sown out of pasture or lucerne on arable farms. For example, a common rotation on the Ashley Dene farm at Lincoln College is as follows:

<table>
<thead>
<tr>
<th>OLD GRASS OR LUCERNE</th>
<th>→</th>
<th>RYEGRASS GREENFEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUCERNE</td>
<td>←</td>
<td>TURNIPS</td>
</tr>
</tbody>
</table>

This rotation fits well into the light land farming system by providing both winter feed and greenfeed, and as well it avoids land being left idle. In this situation the ryegrass - usually Tama - is rotationally grazed over winter and early spring followed by set stocking with ewes and lambs in spring. A very important attribute of ryegrass greenfeeds is that they can perform this function of a temporary pasture in spring because of their capacity for regrowth.

In areas with a long cold winter it is sometimes preferable to sow new pasture in spring and a ryegrass greenfeed can be used to fill in the gap between the harvesting of a cash crop in autumn and the sowing of new grass the following spring.
However, unless ryegrass can be sown by early April it is probably preferable to sow a cereal greenfeed unless the provision of spring grazing is of prime importance.

As with cereals ryegrass greenfeeds can also be direct drilled into existing pasture or lucerne stands, the latter practice having received considerable attention in recent years.

**Fertilisers**

As with cereals ryegrasses should be sown with superphosphate, the rate depending on soil type and previous cropping history. In contrast to cereals ryegrasses require higher fertility to produce at their potential. Tama in particular requires high fertility as under low fertility conditions it is no better than Paroa.

Where ryegrasses are overdrilled into lucerne no response to N applied at sowing may be obtained but results are variable.

On cultivated land trials showed that such comparatively high rates of N as 67.2 kg per ha drilled with the seed, produced an extra 10 kg DM per ha by mid winter for each additional kg of N. This response occurred in both Paroa and Tama ryegrass.

Annual ryegrasses usually respond well to winter applications of nitrogen where fertility has been lowered by a previous crop and when temperatures are high enough to permit reasonable growth. When sown out of high producing pasture no responses may be obtained.

On land previously in wheat responses of 11 and 22 kg DM per kg N for Tama and Paroa respectively were obtained when 34 kg N per ha were applied in mid winter and the herbage harvested in late August. A similar trial on more fertile soil with rates up to 180 kg N per ha gave no response until late
September. Where responses do occur there is generally a diminishing response to each additional unit of N applied – see Table 3.

**TABLE 3. RESPONSE OF TAMA RYEGRASS TO INCREASING RATES OF N FERTILISER AT LINCOLN. N APPLIED 30.6.75, HARVESTED 3.9.75**

<table>
<thead>
<tr>
<th>Rate of N (kg/ha)</th>
<th>Response (kg DM/kg N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>50</td>
<td>18</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
</tr>
<tr>
<td>200</td>
<td>8</td>
</tr>
</tbody>
</table>

Where ryegrasses are overdrilled into existing vegetation responses to mid winter applications of N have been more consistent, at least in the Canterbury environment; probably because of the competition for nitrogen offered by the resident vegetation.

On lucerne overdrilled with Tama, measured responses between 11 and 31 kg DM per kg N applied, while on light-land grass-clover pastures, overdrilled Tama has given responses between 8 and 16 kg DM per kg N for the cool season with responses also continuing into spring.

**Time of Sowing and Yields**

The biggest single factor influencing the yield of ryegrass greenfeeds is time of sowing. It is suggested that for good winter and early spring yields in Canterbury, Tama should be sown in early March and this recommendation also holds true in Southland, Wairarapa, Palmerston North and Auckland. In these trials on cultivated soils Tama or Paroa ryegrass produced around 3000 kg DM per ha by the cool season of late August if
sown by early March. With progressively later sowings yields were reduced, usually out of all proportion to the time involved - see Fig.1.

**FIG.1. EFFECT OF TIME OF SOWING ON YIELD OF TAMA AND PAROA RYEGRASS (CROUCHLEY & BIRCHAM, 1971)**

<table>
<thead>
<tr>
<th>Yield kg D.M./ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>1000</td>
</tr>
</tbody>
</table>

![Graph showing yield kg D.M./ha over time]

In some of the early trials reported some much higher yields of Paroa and Tama were produced by late August: up to 7000 and 8000 kg DM per ha for Paroa and Tama ryegrass respectively.

Where greenfeed ryegrass is overdrilled into existing vegetation, yields are usually considerably lower than in cultivated soil. Thus on light land in Canterbury cool season production of overdrilled Tama ryegrass varied between 730 and 1010 kg DM per ha while on heavy land ryegrass yields up to 2570 kg DM per ha have been recorded.
Utilisation and Quality

In practice ryegrass greenfeeds usually remain ungrazed until late winter and are then ration grazed to breeding stock prior to an immediately following parturition. The extent to which this practice reduces total yield depends on whether the ceiling yield has been reached.

Table 4 lists the total DM yields of several trials where Tama ryegrass was grazed once in mid winter or left ungrazed until late winter.

**TABLE 4. EFFECT OF MID WINTER GRAZING ON YIELD TO LATE WINTER OF TAMA AND PAROA RYEGRASS (KG DM/HA)**

<table>
<thead>
<tr>
<th>Location</th>
<th>Sowing Time</th>
<th>Cultivar</th>
<th>Grazed</th>
<th>Ungrazed</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln</td>
<td>Over-drilled</td>
<td>Tama</td>
<td>710</td>
<td>630</td>
<td>Vartha</td>
</tr>
<tr>
<td>Lincoln</td>
<td>14/3</td>
<td>Tama</td>
<td>3390</td>
<td>2520</td>
<td>Vartha &amp; Rae, 1973</td>
</tr>
<tr>
<td></td>
<td>14/3</td>
<td>Paroa</td>
<td>2500</td>
<td>2250</td>
<td></td>
</tr>
<tr>
<td>Lincoln</td>
<td>26/3</td>
<td>Tama</td>
<td>3860</td>
<td>2490</td>
<td></td>
</tr>
<tr>
<td>Auckland</td>
<td>19/4</td>
<td>Tama</td>
<td>1195</td>
<td>1801</td>
<td>Farrell, 1974</td>
</tr>
<tr>
<td>Waikato</td>
<td>20/5</td>
<td>Tama</td>
<td>1160</td>
<td>1400</td>
<td>Cottier, et al. 1973 (unpublished)</td>
</tr>
</tbody>
</table>

From the limited data available in Table 4 it appears that if a yield in excess of about 2000 kg DM per ha can be obtained by late August then mid winter grazing will probably increase yield. At lower yield levels grazing depresses yield probably by removing leaves before the optimum leaf area index is reached. If Tama and Paroa are to be regularly grazed through winter there is ample evidence to suggest that a grazing interval of at least seven weeks is required to give
reasonable yields. It has also been found that mid-winter grazing gave slightly superior spring recovery in Tama but not in Paroa.

The digestibility of ryegrass greenfeeds is slightly higher than cereals at the same stage of growth but the DM content is usually lower than cereals. The DM content of Tama may drop to 8% in mid winter (Scott, unpublished). As a sole ration in mid winter the intake of greenfeed ryegrasses particularly Tama may be limited by the high water content but in general a portion of ryegrass greenfeed in the ration increases the voluntary intake of other feeds, particularly roughages (Nicol, pers. comm.). As a lambing greenfeed for sheep both Tama and Paroa are very satisfactory.

Little published data are available on the proportion of ryegrass greenfeeds which are actually eaten at a grazing. In practice utilisation probably seldom exceeds 60% and may fall to considerably lower levels under cold wet conditions (Nicol, pers. comm.). Of all the ryegrasses Tama is the most susceptible to treading damage.

Cereal - Ryegrass Mixtures

It is possible to combine the advantages of cereals and ryegrasses to some extent by sowing the two together in mixtures and early trials in this direction appear promising. For example, it has been found that yields to late winter from an oats-Tama ryegrass mixture were 25% higher than from Tama ryegrass alone. The mixtures had the advantage of higher yields than Tama ryegrass to mid winter and as good recovery growth in late winter and spring. In favourable years a reasonable degree of managerial skill is probably required to hold the two species in balance (Cottier et al. 1973, unpublished data).
Subterranean Clover

In the drier eastern areas of New Zealand on droughty soils subterranean clover was the main pasture legume for many years although it is now being replaced to some extent by lucerne. A common practice on these soils growing subterranean clover pastures is to produce "topworked greenfeed" or "rejuvenated subterranean clover". This practice involves lightly topworking the paddock in late summer-autumn followed by the application of superphosphate and occasionally some cereal or annual ryegrass seed. Old subterranean clover pasture may contain several hundred kg per ha of seed, much of which germinates following the autumn rains, producing a good bulk of high quality feed.

The success of the venture depends on the early arrival of autumn rains and the amount of subterranean clover seed present in the soil. At least 600 kg per ha of seed should germinate to give high yields and the same effect cannot be produced by using conventional sowing rates of 8 to 10 kg per ha.

Mt Barker and Tallarook are the main cultivars used at present although Woogenellup may be superior in some areas. As with ryegrasses, subterranean clover greenfeed can be used as a temporary pasture the following spring. The cultivars in present use are considered low in oestrogens and so have little if any effect on lambing percentages.

Lupins

Since 1950 the area of lupins for forage production has declined markedly. Recent interest in lupins as a seed crop has stimulated interest in their use as forage crops although their ability to grow at low temperatures is restricted. However, in view of the finding of Farrell that lupins out-produced other greenfeed crops at Auckland, they may have a
place in the milder areas of New Zealand. The capacity of lupins to fix nitrogen would be an added bonus in any cropping rotation.

SUMMARY AND CONCLUSION

Several cultivars of oats as well as Tama ryegrass are the main greenfeed crops used in New Zealand. Cereals can be sown later into a rougher seedbed and generally produce a higher initial bulk than ryegrasses. However, late winter-spring production is generally higher from ryegrasses which have the added advantage of being used as a temporary pasture in spring. Early sowing is very important for ryegrasses.

It is possible to combine the advantages of cereals and ryegrasses to some extent by sowing a cereal and Tama in mixtures, and altering the proportions of each at sowing according to feed requirement dates. Early trials in this direction appear promising although a reasonable degree of managerial skill is probably required to hold the two species in balance (Cottier et al. 1973, unpublished data).
REFERENCES

THE TOWN MILK SURVEY - SOME MANAGEMENT IMPLICATIONS

R.J. Gillespie
Agricultural Economics Research Unit

OBJECTIVES

The main aim of this paper is to present an overview of the results obtained in the national survey of town supply milk producers for the year ending March 31, 1974. The Agricultural Economics Research Unit first contracted with the New Zealand Milk Board and the Town Milk Producers Federation to carry out the national survey in 1975. As in previous surveys, the major objective was to ascertain the average net farm income\(^1\) being received by North and South Island milk producers. A second and important purpose of the survey was to collect a range of management and production data concerning town milk production.

There are two other town milk producer surveys carried out annually; the Department of Statistics uses the income tax returns to determine the taxable farm income and the committee of South Island town milk producers organisations carry out a postal survey of 63 South Island producers.

\(^1\) Net farm income being defined as the difference between the gross revenue and total expenditure per farm.
With the transfer of the national survey to the Agricultural Economics Research Unit at Lincoln College, it was decided to draw a completely new sample of farms. The present national survey is based on a five per cent sample of all the town milk producers which is made up of 90 farms; 61 in the North Island and 29 in the South Island.

The random sample of producers was selected so that proper representation by district and by quota groups was achieved. Only those producers who supply producer companies with a minimum nominated quota of over 20,000 litres were included in the sample. To be eligible for inclusion in the random selection, each producer had to derive at least 75 per cent of his gross farm revenue from the sale of milk and produce town milk over the survey period. He also had to have a set of accounts without too many complexities!

It was noted that 70% of the account balance dates were on March 31, 1974, with the remainder being spread between April and August.

Figure 1 shows the distribution of herd size within the sample.

FINANCIAL RESULTS

Net Farm Income

The average net income for all farms was $12,524. North Island farms had a net income of $12,804, while in South Island the average net farm income was $11,948. The comparative figures for the 1972-73 survey were $12,236, $12,911 and $10,741.
FIG. 1. DISTRIBUTION OF HERD SIZE IN SURVEY SAMPLE

Number of herds

Herd size (number of cows)
The average net income per cow was approximately $234 for all farms. The net income per cow on South Island farms was about $48 over North Island farms. The main reason for this is that South Island cows are much better milk producers than their counterparts in the North Island (4,200 litres compared with 3,400 litres). However, on a per hectare basis, North Island producers have a net income of $164 and South Island has $134. This result reflects the higher stocking rates in the North Island. It is interesting to note that analysis of the 11 Canterbury farms showed a net farm income of $15,632 was attained. However, it is necessary to view any regional analysis with caution on account of the sample size.

Figure 2 shows that the net farm income per productive hectare is at a maximum in the 80-99 herd size, while the peak return per cow is in the 40-59 herd size. The level of net farm income per cow and per productive hectare is relatively constant at herd sizes greater than 100 cows.

If one were to use an imputed interest rate of five per cent on the total value of farm assets in place of interest paid the national net farm income is $5,571. A 3½% interest rate would give a net farm income of $9,091.

Farm Assets

All farm valuations were updated to 1974 by using a series of indices based on the movements in the Valuation Department's farmland sale index.

The average value per farm of all assets including land, buildings, plant, equipment, vehicles, livestock, investments and working capital for New Zealand was approximately $168,000 in the survey year. The comparable value for North Island farms was $177,000 and $149,000 for South Island. On a productive hectare basis, there is a 22 per cent greater value of farm assets on North Island farms.
FIG. 2. NET FARM INCOME PER COW AND PER PRODUCTIVE HECTARE FOR VARYING HERD SIZES

With increasing herd size, the total capital investment in dairy stock and equipment per cow declines. Herd sizes under 80 cows are considerably more capital intensive per cow ($281) than larger herds ($217). However, it was noted that investment in dairy stock, plant and equipment per cow on farms with greater than 80 cows was relatively constant.
There was no significant relationship between the total value of assets per farm and milk output per cow or milk output per labour unit.

**Gross Revenue**

The income received from the sale of milk accounted for about 96 per cent of gross farm revenue. Other income principally included the sale of grain, farm produce, and the revenue received from contracting work and rent and lease fees. The livestock profit of $3,130 was down $675 from the previous year.

**Farm Expenditure**

The expenditure per cow on South Island farms ($270) was considerably higher than on North Island farms ($223). This is mainly a result of lower stocking rates and higher feeding and irrigation costs.

Labour costs per farm accounted for the largest proportions of the increases in farm expenditure over the previous year. Labour costs per farm increased by $1106 to $5364.

It was noted that as herd size increases up to 100 cows, average expenditure per cow declines showing some economy of scale, but beyond this size costs per cow increase slightly. Total labour costs accounted for 38% of total expenditure on the larger farms compared to 15 to 20 per cent for the smaller farms. Farms with larger herds and employing labour generally provide housing and other benefits, thus adding to the labour costs.

Operating costs made up about 40 per cent of total farm expenditure, labour accounted for 23% with the balance being made up of overhead and depreciation costs.
LABOUR USAGE

Two aspects of farm labour on town supply farms were studied, mainly the amount of family and hired labour resources applied and the productivity per labour unit.

The average number of labour units that were involved in farm work was 2.03 units. The 1972-73 survey showed 2.05 labour units were used. There was a small decline in the total number of labour units employed on South Island farms from the previous year.

Only a quarter of the surveyed North Island farms employed one or more full time non family labour units continuously throughout the year, while 80 per cent employed hired labour for short periods. The South Island situation showed that only 17 per cent of farms employed one or more full time non family labour units during the year with family labour contributing 80 per cent of all farm labour.

LABOUR EFFICIENCY

The average milk output per labour unit in New Zealand was 175,854 litres while in the South Island it was 153,386 litres. This was a small decline on the output per labour unit for the 1972-73 survey and can probably be explained by seasonal conditions. The Canterbury output per labour unit was similar to the South Island figure. The 1960-61 Board and Federation survey showed an output of 94,165 litres per labour unit, so a significant increase in labour productivity has been gained since then.

1 Any person 18 years and over involved in full time farm work throughout the year constitutes a labour unit. Fractional units were used where a person only worked for a part year or part time on the farm.
The analysis in Table 1 indicates that as herd size increases, there is also a certain increase in the labour costs per cow up to the 200-249 cow herd size after which labour costs per cow decline a little. It must be remembered that while the sample is fairly representative of the national town supply population, there are only a small number of producers in each of the larger herd groups. The increase in labour costs per unit in the larger herds can partly be explained by the fact that these farms employ a greater proportion of non family labour, supply housing, pay higher wages and include some salaries of family members. A similar trend in labour costs per cow has been noted in earlier surveys. Owner operator wages are not included in the labour costs.

A separate study of labour on North Island farms was carried out - see Figure 3. North Island was selected because of the uniformity of breed type and environmental conditions. The study concluded that as labour units increased from 1 to 1.75 units, there was increasing milk output per labour unit. Output per labour unit then dropped significantly on farms with 1.75 to 3 labour units, mainly family labour units. It is suggested that farms with around this labour input tend not to increase their cow numbers as much as farms with over three labour units. The high output of milk on farms with over 3 labour units may be partly explained by the fact that farms with a high labour input are more capital intensive and have more modern milking equipment and so on.

MANAGEMENT PRACTISES AND IMPLICATIONS

Basic data was collected on the survey on a number of management practises and these included shed and yard layout, supplementary feeding, herd testing, topdressing, and artificial breeding.
<table>
<thead>
<tr>
<th>Herd Size</th>
<th>No. of Farms</th>
<th>Average number of labour units employed</th>
<th>Labour Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Per cent of non-family labour employed</td>
<td>Per farm ($)</td>
</tr>
<tr>
<td>30 - 39</td>
<td>3</td>
<td>1.15</td>
<td>703</td>
</tr>
<tr>
<td>40 - 59</td>
<td>13</td>
<td>1.39</td>
<td>1433</td>
</tr>
<tr>
<td>60 - 79</td>
<td>19</td>
<td>1.80</td>
<td>3177</td>
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<tr>
<td>80 - 99</td>
<td>19</td>
<td>1.85</td>
<td>3375</td>
</tr>
<tr>
<td>100 - 119</td>
<td>12</td>
<td>1.96</td>
<td>5140</td>
</tr>
<tr>
<td>120 - 149</td>
<td>13</td>
<td>2.40</td>
<td>7497</td>
</tr>
<tr>
<td>150 - 199</td>
<td>6</td>
<td>2.91</td>
<td>13759</td>
</tr>
<tr>
<td>200 - 249</td>
<td>4</td>
<td>3.80</td>
<td>17340</td>
</tr>
</tbody>
</table>
Annual milk output per labour unit ('1000 litres)

FIG. 3. OUTPUT OF MILK PER LABOUR UNIT ON NORTH ISLAND FARMS

Shed and Yard Layout

Developments in the introduction of new milking equipment and shed layout have continued over the last few years.
Six per cent of the surveyed farms (8% in the North Island) are now operating automatic rotary milking units with automatic cup removers. The survey findings on the use of rotary milking machines were similar to those of Copeman and Phillips¹ (1973) and indicated that rotary sheds appear to be associated with larger herds, (165 cows on average compared with the national average of 100 cows) and that milk production per labour unit with rotary sheds was 222,354 litres, some 25% higher than the national average.

The walk-through (or internal race) remains the most common type of shed in New Zealand, 47% of all producers have a walk-through system; 42% have herringbone; 6% have rotaries and the remaining 5% have other systems. The average number of pairs of cupsets per shed has remained about the same for the last three to four years (9 pairs). The average age of cow-sheds in the South Island was about 15 years, whereas in the North Island it was 11 years.

**Supplementary Feeding**

Purchased supplementary feedstuffs accounted for about 12 per cent of total cash expenses incurred on the surveyed farms. Expenditure on dairy meal was a very important item on many North Island farms during the year, particularly in those areas that experienced drought. The average expenditure on meals per farm was close on $2000 while the comparable figure for the South Island was $384. However, the majority of the surveyed farms in Canterbury grew their own grain having an average value to the dairy unit of about $780 per farm. Once again, only North Island farms were analysed in detail as there was greater uniformity of feed and management.

The results shown in Figure 4 indicate that dairy meal and grain feeding was associated with higher output and higher net farm income under North Island conditions in 1973-74. Many of the farmers who fed dairy meal and grain only did so because of the drought conditions and the limited supply of forage crops. The extra milk production on farms feeding meal and grain was approximately 400 litres per cow. The average cost of meal and grain fed per cow was approximately $20; the extra milk returned a gross revenue of $35 per cow, leaving a margin of around $15 per cow. In general, meal and/or grain feeding appears profitable under drought type conditions. Analysis on the profitability of feeding meal or grain under normal conditions was not carried out, this would require a more detailed study.

The total area under forage crops on the average South Island town supply dairy farm is 6.9 ha and represents about nine per cent of the total productive area of the farm. This percentage is more than three times the average forage crop area of North Island farms. Chou moellier accounted for 42 per cent of the total forage area in the South Island.

Herd Testing

Approximately half of all the farms used some form of herd testing and monthly herd testing was the most dominant. There was a clear difference in milk production between the surveyed farms that used herd testing and those not using herd testing - see Figure 5. The farms that used herd testing were larger and held larger quotas. The average net farm income was about $1500 greater on the farms which were herd testing. Since herd testing fees account for less than one per cent of total expenditure, it appears to provide effective returns.

Topdressing

Practically all (96%) farms applied some phosphatic fertiliser to pastures, and about one-quarter applied some form of
FIG. 4. COMPARISON OF LEVELS OF PRODUCTIVITY BETWEEN HERDS WITH AND WITHOUT HERD TESTING

- **Herd Testing**
- **No Herd Testing**

Milk output per farm ('1000 litres) vs. Milk output per cow ('1000 litres)

North Island | South Island | North Island | South Island
FIG. 5. MILK PRODUCTION FOR NORTH ISLAND FARMS FEEDING SOME MEAL AND GRAIN COMPARED WITH THOSE NOT FEEDING MEAL AND GRAIN.
nitrogenous fertiliser mainly in the form of urea. A summary of fertiliser applications per hectare is given in Table 2 and it will be seen that the farms with larger herds have a considerably higher rate of fertiliser application per hectare. From the analysis no clear relationship emerged between high net income per hectare and high fertiliser application. The relationship would need to be assessed over a period of time to get a clear indication.

It was noted on the North Island farms that there was no significant difference in the fertiliser application between those farms which fed meals and those which didn't.

Fertiliser applications per hectare varied widely from region to region. In general, fertiliser application per hectare on North Island farms was almost double the rate of South Island farms. The results showed that less fertiliser was applied than in previous years. Fertiliser price increases towards the end of the period probably caused some of this reduction.

Research work on the use of nitrogenous fertiliser by O'Connor and Cumberland \(^1\) confirmed from a series of trials that potential pasture production in New Zealand (and particularly South Island) is being limited by nitrogen availability. The responses to nitrogen were quite substantial. Previous measurements of nitrogen fixation by clover at Gore produces about half the nitrogen it does at Palmerston North (280 ng/ha compared with 600 ng/ha). This is presumably due to the shorter clover growing season in the South. With the recent reduction in the price of nitrogen fertilisers, producers should assess the economics of applying nitrogenous fertiliser on their farms.

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TABLE 2. FERTILISER APPLICATION BY HERD SIZE

<table>
<thead>
<tr>
<th>Herd Size (per productive Ha)</th>
<th>Phosphate Fertiliser (kg/ha)</th>
<th>Nitrogenous Fertiliser (kg/ha)</th>
<th>Total Fertiliser (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 - 39</td>
<td>370</td>
<td>0</td>
<td>370</td>
</tr>
<tr>
<td>40 - 59</td>
<td>220</td>
<td>100</td>
<td>320</td>
</tr>
<tr>
<td>60 - 79</td>
<td>430</td>
<td>160</td>
<td>590</td>
</tr>
<tr>
<td>80 - 99</td>
<td>570</td>
<td>120</td>
<td>690</td>
</tr>
<tr>
<td>100 - 119</td>
<td>630</td>
<td>170</td>
<td>800</td>
</tr>
<tr>
<td>120 - 149</td>
<td>470</td>
<td>160</td>
<td>630</td>
</tr>
<tr>
<td>150 - 199</td>
<td>750</td>
<td>110</td>
<td>860</td>
</tr>
<tr>
<td>200 - 249</td>
<td>730</td>
<td>130</td>
<td>860</td>
</tr>
</tbody>
</table>

Artificial Breeding

Much greater use was made of artificial breeding in North Island (84 per cent against 59 per cent in the South Island). An average of only 29 per cent of the cows on farms that use artificial breeding are actually artificially inseminated, the remainder are put to the bull. The South Island sample is too small to draw any firm conclusions about milk productivity between artificial and natural breeding.

CONCLUSIONS

It is extremely difficult to draw conclusions about the profitability between various quota groups in the sample, due to the uneven distribution in the sample. It appeared that the medium sized quota groups, that is those around 900 litres were the most profitable per cow, averaging a net income of $158 per cow compared with the national average of $125.
Without knowing individual situations, it is very difficult from these figures to advise a producer on whether he should increase his quota and how profitable it is going to be. These figures act mainly as a guideline for the industry.

The main findings of this survey were that:

1. The average net farm income for town supply farms was $12,524 which was about 2 per cent up on the previous years result. The South Island average was about $900 less than the North Island average.

2. The average value of the total farm assets was $168,000.

3. Labour costs per farm accounted for the largest proportion of the increases in farm expenditure. Labour costs per farm increased by $1,106 to $5,364. Labour costs per cow tend to increase with increasing herd and quota size.

4. Many of the one and a half labour unit farms were efficiently managed in terms of milk output per labour unit. However on farms with 1.75 to 3 labour units, it appeared as if many of them were understocked and so produced much lower milk outputs per labour unit.

5. The maximum net farm income per cow was attained in the smaller herds, while the maximum return per productive hectare was in the 80-100 cow herd size.

6. Farms using rotary cowsheds had the highest milk output per labour unit.

7. Herd testing significantly increased milk production per cow.

8. Meal and grain feeding was profitable under drought conditions in the North Island.
9. Fertiliser application per hectare varied widely from region to region. Fertiliser applications seem to have been down on previous years and was probably due to the severe drought conditions in some areas and the price increases.

10. Major economies of scale did not emerge from the sample. This aspect would need examining using a larger and different type of sample.

ACKNOWLEDGEMENTS

The A.E.R.U. gratefully acknowledges the co-operation and assistance willingly provided by the officers of the New Zealand Milk Board and the Town Milk Producers' Federation. In particular, thanks are expressed to the town milk producers for co-operating in the survey and making the information contained so freely available.
RECENT EXPERIENCES IN DAIRY FARMING

R. Murphy
Farmer, Ikawai

INTRODUCTION

On 1 July last year we shifted from Seadown to Ikawai and from milking 39 cows we now milk 110. Our previous farm was in the lower Seadown-Washdyke area about a kilometre from the sea.

Our present farm on the Morven-Kurow highway at Ikawai is 16 kilometres inland from the state highway or 3 kilometres towards the coast from the southern end of the Waimate Gorge.

I was brought up on a small farm separation unit of 15 ha, milking an average of 20 cows; I used to help milk the cows at night from the age of 12 except for two years when I worked in the frozen food industry. So I have been associated with dairying all my working life.

THE OLD FARM

In 1965, at the age of 19, I leased the property from my parents, leased an additional 4 ha of land nearby and started milking 18 cows and growing vegetable crops - mainly green beans for the frozen food industry at Washdyke.
During 1966-68 we increased the pig numbers from the 20 we took over to 100; we began growing barley for the cows and pigs.

In 1967 we purchased an irrigation plant.

In April 1968 we brought an additional 5.5 ha but we lost the 4 ha which we were leasing. This gave us a total of 20 ha on which, for the next 7 years, we were able to build up our carrying capacity and production per hectare.

In the winter of 1968 we built a new 4 bale internal race cowshed. We built the dairy section so that if we ever changed to whole milk collection we could lift the roof three metres and put a vat stand beneath without major structural alterations or cost.

At this stage we bought our first Jersey bull. Till that time we had two Friesian bulls and one Shorthorn Jersey Cross bull. The main reason for buying the Jersey bull was to cross breed and we have had success with this experiment. That year we also bought some pedigree Jersey cows. Our theory has been that production is one of the main criteria because it is our income. Although we have gradually bought more pedigrees into the herd, these have had no preferential treatment, gaining their place only on production. I believe there is a happy medium between production per hectare and production per cow, and one should not be at the expense of the other.

In the spring of 1968 we border dyked 3.3 ha of the 5.5 ha block. The rest of the property was under spray irrigation using surplus M.O.W. water from the Levels Plain scheme.

In that same season we began herd testing, averaging about 134 kg fat per cow. Using these figures we culled approximately one-third of the herd.
The next season, 1969-70, was our last on farm separation. We peaked with 28 cows, 4240 kg of fat. We were lucky to get 500 cu metres of spoil at 50c a metre to start building up stock tracks and the tanker roundabout ready for whole milk collection. Payout for this last season on cream was 52c per kg of fat. Our pigs were sold and we used the capital to convert our shed for whole milk for the 1970-71 season. We were very fortunate that a cheese company, Cloverlea Dairy Company of Temuka, was offering tanker service in the district at a cost of 4.5c kg of fat cartage.

Our production over this first season was 4640 kg of fat from 30 cows bringing us an income of $4,100 compared with $2,100 the previous season on cream.

Paddock sizes varied between 1.3 and 1.8 ha; the limiting factor being suitable drinking water which was holding back production. So we put in a high pressure water system and sub-divided into 0.6 ha paddocks. The boost of higher return and without the work of the pigs enabled us to concentrate on this development during the winter. By this stage we were buying about 10 tonnes of mangolds and harvesting 1.2 ha of barley for meal feeding. All meadow hay was grown on the property and we purchased 1,000 bales of thrashed HL straw. No stock was grazed off the farm. This was our last year of growing barley as with increased production it was cheaper to buy it.

I would like to point out at this stage that I did several part-time jobs from relief milking to factory processing work. My wife helped on the farm and worked for three years after our marriage; the work load was high but we felt that the future in dairying was worth the effort. No additional labour was used on the farm except some help from my parents.

We put on 370 kg per ha of super over the whole farm: in addition one-third of the farm was dressed with a mineral
mixture mainly the paddocks grazed first after calving. For the spring we had one and a half to two hectares of greenfeed, either Tama or Hl.

In 1971-72 we milked 34 cows, including 2 carry-overs, for 5500 kg of fat with another good payout of 112 cents. In the spring we started a 24 hour per paddock rotation until the hay paddocks were closed up. We then dropped back to 12 hours per paddock moving progressively around the farm doing away with the set night and day paddocks system. The top-dressing level was 490 kg of super and 2.5 tonnes of lime per ha. For capital development we extended the cowshed yards.

For the 1972-73 season we milked 38 cows for a total production of 5900 kg of fat giving us an average per cow of just under 156 kg at the factory. This year for the first time we made 59 tonnes of silage using 1.3 ha of Tama and balance grass; we used a wedge or high end style stack and covered it with polythene to save wastage. A neighbour who had had previous experience with silage gave valuable assistance, advice and manual labour; it was also about this time that my neighbour and I started helping one another with hay and silage and in sharing various farm machinery. This meant a big saving of capital. The payout was again 112 cents per kg of fat, the balance of 15.6c being retained when the Government froze payments. That year we entered 5 pedigree animals in local shows.

We milked 39 cows for a total 6500 kg of fat during the 1973-74 season. In the spring we fed silage for the first time together with hay and 14 tonnes of mangolds, but this didn't prove very successful as we weren't utilising the grass or silage to the fullest extent. The following November we made 119 tonnes of silage using 49 tonnes of grass from a neighbour's property. We also had a topdressing programme of 860 kg per ha in three applications. The extra manure was
financed with the 3.1c per kg of fat retained the previous season by the Government. We put in a well for irrigation but it was not very successful being able to give only 36.4 cubic metres an hour, but with M.O.W. water becoming scarcer each year, it was better than no water at all. In August 1973 I was elected to the directorate of the Cloverlea Dairy Company. Our payment was 144½ cents per kilo net after paying 4½ cents per kilo cartage.

The 1974-75 season was started with new stainless steel milking machinery. Production from the 39 cows was the same as the previous season 6500 kg of fat, but payment rose to 146 cents per kilo after deducting cartage. We made 169 tonnes of silage, the increase in grass available being due to the extra manure applied in 1973-74. We made 950 bales of meadow hay on the property and brought in 2000 bales threshed hay for the price of baling. An additional 200 bales of lucerne at 65 cents each were also purchased. Eight extra calves were reared that year. The idea of the extra hay and silage was to increase production per cow and per hectare the following season.

THE NEW FARM

In the meantime we sold our property because we were unable to buy suitable land at a realistic price so close to the town boundary. To illustrate this point, one property just inside the boundary sold for $13,450 per hectare! Over the previous 4 or 5 years we had looked at several farms on the West Coast, in North Otago and South Auckland and a few in South Canterbury, always trying to find one which appealed to us. After much contemplation we chose Ikawai. To buy a farm of similar size in the main dairying areas of the North Island would have meant a considerably higher price with risks of drought and facial excema. Another bonus to buying the Ikawai property was that the Cloverlea Dairy Company
moved into the Waimate, North Otago area, collecting whole milk for 15 cents per kilo cartage.

We took over this property of 61 ha on 1 July 1975 and shifted our 56 head of cattle, farm implements and all cowshed machinery to Ikawai. Over the next fortnight 2,500 bales of hay were transported from Seadown. In the autumn, when we knew we were shifting, we fed as much silage as possible and conserved the hay to shift to the new farm. With the property we purchased 57 Friesian cows and 15 heifers all in calf to the Hereford bull, 11 dairy yearlings, 32 beef yearlings, 10 one month old calves and 1 Hereford bull. There were 100 pigs of various ages in the fattening house, 15 sows and 2 boars. Also included in the purchase price was all milking plant and 300 bales of hay.

The purchase price of the farm was $97,000. It cost a further $3,000 to build a vat room and the two bail extension. The farm was financed with a maximum loan from the Rural Banking and Finance Corporation, a small private loan and money from the sale of our Seadown property. The bank agreed to supply us with overdraft funds for working capital. Over the last two years the previous owner milked 60 cows, ran replacements and 30 head of beef, selling these as yearlings in late October. Production for the 1974-75 season was 9400 kg of fat. A peak of 10400 kg of fat had been achieved in a previous season. Annually 3,000 to 4,000 bales of hay were made.

Of the 60.6 ha, 48.8 ha are border dyked and can be watered by a time clock system using water from the Redcliffs scheme. There were nineteen paddocks varying from 1.3 to 8 ha in size, including 2.4 ha of lucerne on borders. Of the unbordered land 1.3 ha is swamp and a similar area is in the piggery unit. A creek runs through the property dividing the light from the heavy ground.
The farm was well raced and had a six bail internal race shed. We wintered 172 head of cattle plus the 10 calves, feeding an average of 60 bales of hay per day. The cows were in three herds; we mixed our cows and in-calf heifers with the friesian heifers, and put the beef, Friesian and Jersey yearlings together. We were not happy buying the beef stock but as there was no market we had no alternative. On August 20th we put them out to graze and sold them late October.

Our next major job was to lay the foundations for the milk and vat room and pipe the irrigation drain which ran alongside the shed, ready for the tanker roundabout.

The cows started calving on August 3rd so until the milk and vat room was completed on 1st September we were separating 50 cows' production for cream. The major problem with calving was that we had no calving dates for the purchased cows and no satisfactory calf shelter. In August we applied 370 kg per ha fertiliser, 7.1 tonnes potash and 14.2 tonnes of magnesium mixture.

Subdivision of paddocks followed. We tried to keep ahead of the milking cows but this was not always easy. There were 3.6 ha of young grass which we used to relieve pressure when we were unable to get fencing completed. We divided 16 paddocks into 37, leaving 3 smaller paddocks to be done; there should be 43 paddocks by this winter. The fences consisted of one single electric high tensile wire, posts 29 metres apart. We intend to run extra wires into the fences at a later date now that the paddock sizes have proved satisfactory.

With subdivision came another major problem - water. The existing water scheme is only 12 mm alkathene with limited troughs. Cows often had to walk back across grazed
paddocks to existing water troughs, or back up the race to the creek. Water was also available at the cowshed at milking time.

Grazing was 24 hours per paddock until the end of November when we went into a 12 hour per paddock rotation. From 1st April we went onto 14 night and 19 day grazing choosing the weaker paddocks out of the day grazing and supplementing these with wilted lucerne, mowing the break the previous day. Threshed hay was being fed at a rate of one bale per 8 cows. The change of system enabled a small build up of grass for the day grazing paddocks. From 15th April hay was increased to just under one-third of a bale per cow per day, which was continued until 16th May when cows were put down to once a day and back to 24 hours per paddock.

In mid September additional machines were installed together with new milk line vacuum pumps and a new releaser. This brought us up to 8 sets of cups and knocked half an hour off our milking time. The shed now is all stainless steel.

Next was mating. We were very fortunate in that our neighbour was an A.I. technician. We used AB over one-third of the herd; the balance are naturally mated D.B. Jersey and Hereford and some private Jersey semen.

With only two herd test figures available it was difficult to judge which cows to put to which bull. About half the Friesians are in calf to the Jersey which should give us quite a good selection for 1st cross heifers. There is a local demand for Hereford cross calves so the balance of the Friesians are in calf to the Hereford. Next year all cows being put in calf to Hereford will be artificially inseminated. We intend to carry on with our Jersey breeding but will only be replacing existing stock on production. It will be interesting to see how much the crossbred stock will lift our production.
Calving has been put back one week to 10th August because grass growth was slower in the spring here compared with Seadown; however with a different winter stocking programme and more manure we hope growth will begin earlier.

In the past the stock grazed the heavy ground until it was too wet for the feeding out truck, then they were put onto the dry ground. This coming winter it is our intention to try 48 hour paddock grazing over the whole farm. If unable to do this on the heavy ground we will try either 36 or 24 hours per paddock. Even though the paddocks look in a bad way the damage is usually minimal as long as stock are shifted and not left. But one noticeable difference between Seadown and Ikawai was that our cows wintered better on the drier ground and also there was less hay wasted. This point will have to be watched.

In the September the pig unit was scaled down to nine sows and between 40-50 pigs in the fattening house. This is just an extra and if, at a later date, we employ labour it could be developed back to full production.

Our dairy yearlings were next put out to graze, giving us more room to manoeuvre our spring grazing. They came home on March 31st.

In October we started irrigating. Although I had had experience with it, extra time was required sorting out, shifting lines and so on. I'd point out that it is easier shifting gates and clocks than irrigation pipes. For the season we used a little over 2500 cubic metres of water. Next year we intend to water heavily through till January. Regular showers until Christmas gave us a false sense of security then with the drying winds of January the ground dried out fast, halting grass growth. Heavy watering in January gave us growth again in late February.
Flood irrigation proved economical and fast, 100 mm of water covering up to nearly a hectare an hour. The only running cost involved keeping the drains clean either by mowing or spraying. At Seadown we flanked the susceptible cows for bloat in spring but had no major problem. This season, owing to numbers milked, we pasture sprayed. The problem didn't arise in the autumn with hay being fed.

Hay made on the property for the season was 1,000 bales lucerne and 2,350 meadow hay. We bought 650 bales of lucerne standing and baled 5,000 bales threshered H1 straw at Morven. Baling this far from home meant long hours and with unfavourable weather extra travelling. At Seadown a contractor baled the hay and we carted it, but with the extra hay this year we bought all our own equipment - again with the help of our friendly bank.

Unfortunately 800 bales meadow and all threshered straw had to be stacked outside under polythene; the balance being stacked in a 2,000 bale hayshed and the rest in the implement shed. A new 4,000 bale hayshed was ordered for December but like everything else today, arrived 3 months late. We hope to have this shed partially empty for calf shelter in the spring - alleviating another problem.

Production from the 110 cows is expected to be 18400 kg of fat. This equals 167 kg per cow and 123 kg per hectare. We budgeted on producing 16000 kg of fat and had hoped for 17000 kg fat; reaching 18000 kg was above all expectations!

On 14th November our production peaked at 0.88 kg fat per cow at the factory. Being on skip-a-day tanker collection our top collection was 4370 litres. Production was mainly off the border dyked paddocks.
THE FUTURE

* We will proceed with the stock water system.
* In winter 1977 we intend to build a new cowshed, probably a herringbone, but we will look at various types of sheds before then.
* A further five hectares can be border dyked. When this is done I am confident that 120-130 can be milked.
* As fertility increases, hay and silage reserves will be built up and only then will extra stock be considered.
* Bridge the irrigation race for individual paddock access.
* Shelter belts of poplar, pampas and flax will be planted giving shelter to the three-quarters of the farm at present exposed.

POINTS TO DWELL ON

* Buy the right farm - have self confidence.
* Is irrigation water available with no restrictions? Consider flood irrigation - especially economical. Bordered paddocks drain giving drier ground for winter, therefore less mud.
* If the farm has an existing shed, make sure there are a few mod cons such as an efficient flushing down unit and teat washers - all time savers.
* Consider extending the shed if practical - even two sets of cups can make a difference to the work load.
* Unless the shed was in very bad repair, wait and see what is required after a season or two.
* What stock water is available?
* One very important fact to consider when buying or changing dairy farms is to enquire into the factory you will be supplying - the financial structure, tonnage and the company's future. Public relations between the company and suppliers is of utmost importance. Regular contact or newsletters make suppliers feel part of the company, as they are in reality.
* Other items to consider: effluent, herd testing, mating, bobby calves, cull cows, availability of supplementary grazing and hay.
THE INTEGRATION OF ARTIFICIAL BREEDING INTO HERD MANAGEMENT

K.L. Macmillan
Research Officer, N.Z. Dairy Board, Awahuri A.B. Centre

INTRODUCTION

A herd owner's decision on whether to use AB mostly involves his acceptance of the advantage of using selected progeny tested sires to produce future herd replacements. The Massey Marketing Survey reported that the major reason given for not using AB was inconvenience (37%), although 22% of the non users of AB considered that they obtained higher conception rates with natural mating. Only 21% of the non-users considered their bulls equal to or better AB sires and 19% stated AB was too expensive. Thus, convincing a non-user that he should use AB must involve the identification of his reason or reasons. The expense aspects should be answered from cost benefit and production statistics. Inconvenience may be related to inadequate drafting and holding facilities, to dissatisfaction with technician reliability or to lack of confidence in technician ability. These problems can best be resolved by consultation with Livestock Improvement Association representatives. It is noteworthy, that among AB users 28% stated AB was more convenient than natural mating.

The problem of conception rates as a reason for not using AB largely relates to the farmer's ability and efforts to accurately identify and diagnose oestrus cows. Very few AB
users consider low conception rates to be a reason for dissatisfaction with the L.I.A.'s AB service; but that is not to say that many AB users should be satisfied with the conception rates they are getting. A recent survey showed that 15% of herds had conception rates 10% or more below the L.I.A. average. From field trials in herds, most of which had adequate to very good heat detection, the fertility results have been outstanding by overseas standards. When 964 cows had conceptions confirmed by pregnancy dating, the pregnancy rate to first insemination was 61.4%. In the U.K. and U.S.A. pregnancy rates are closer to 50%.

Conception rates with natural mating are usually inflated because of incomplete recording of return dates.

REPRODUCTIVE PRIORITIES

Irrespective of the mating system, a cow must get pregnant this season if she is to be an efficient milk producer next season. The seasonal nature of New Zealand dairyfarming imposes a further restriction. Namely she must conceive during a 12-week mating period, and preferably during the first 4 weeks of this period. Thus, the foremost priority is the maintenance of a seasonally concentrated calving pattern.

As most dairy farmers rear their own herd replacement, a second priority is the production of sufficient live heifer calves which are suitable for rearing. Any breeding programme which results in increased calf or cow deaths, or calving difficulties must increase inconvenience and expense. Many herd owners prefer to have a 5-week age spread or less among these heifer calves partly because of easier calf management, but also because another reproductive priority is that potential replacement heifers must be sexually active to conceive at around 15 months of age. Age and level of management both influence the age of puberty.
The final reproductive priority is that the replacement heifers should have the potential to be higher producers than the cows they are replacing. Thus, genetic aspects relating to production do not have a high reproductive priority.

VARIATION IN CALVING PATTERN

Although the date for planned commencement of calving has assumed importance in recommendations for herd management, scant regard has been given to calving pattern. The extent of these differences is summarised in the following table for some herds serviced by the Wellington-Hawke's Bay L.I.A. Mating and calving patterns were available for each of these herds.

'All cows' describes the pattern for cows commencing their second or later lactation. 'All heifers' refers to first calvers with dates adjusted to compensate for the introduction of the bulls when these heifers were around 15 months of age so that yearling mating started on the same date as herd mating. These figures show that the calving pattern for first calvers is more concentrated than for older cows. This is widely known, but this average figure does not indicate the spread pattern and incidence of later calving 2 year old heifers.

The 1974 AB questionnaire showed that one seventh of all the induced cows were first calving 2 year olds. Having to induce a late calving 2 year old is courting reproductive inefficiency. The interval from calving to first ovulation in young cows is 52 days compared to 36 days in older cows. In many cases, these young cows would have had to have been induced because poor rearing delayed their conceiving as yearling heifers. It all adds up to a poor start to a productive life.
TABLE 1. PERCENTAGE OF COWS CALVING DURING SELECTED PERIODS FROM PREDICTED DATE FOR CALVING TO COMMENCE

<table>
<thead>
<tr>
<th>Group</th>
<th>1-4</th>
<th>5-7</th>
<th>8-10</th>
<th>11-13</th>
<th>14 or more</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cows&lt;sup&gt;a&lt;/sup&gt;</td>
<td>60</td>
<td>20</td>
<td>13</td>
<td>5</td>
<td>2</td>
<td>4939</td>
</tr>
<tr>
<td>All heifers&lt;sup&gt;a&lt;/sup&gt;</td>
<td>72</td>
<td>17</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>1343</td>
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<tr>
<td>Herd average&lt;sup&gt;a&lt;/sup&gt;</td>
<td>63</td>
<td>19</td>
<td>12</td>
<td>4</td>
<td>2</td>
<td>6282</td>
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<tr>
<td>Best herd</td>
<td>78</td>
<td>13</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>80</td>
</tr>
<tr>
<td>Worst herd</td>
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<td>26</td>
<td>6</td>
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<td>120</td>
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<tr>
<td>Ruakura No.5</td>
<td>82</td>
<td>17</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>148</td>
</tr>
</tbody>
</table>

<sup>a</sup> averages for data derived from 43 herds.

The 'herd average' row in Table 1 is the calving pattern for cows and heifers combined. The between herd variation around the 1 to 4 week figure of 63% produced a standard deviation of ± 8%. Thus, the distribution curve was a relatively flat one with the best herd having 78% calving in the first 4 weeks and the worst herd 44%. These differences meant that if the best herd planned to commence calving on 1st August, an average herd would have to calve on the 22nd July and the worst herd on the 10th July if each herd was to have as many cow-milking days completed by the 31st December. Alternatively it means that the worst herd must milk for 3 weeks longer each season to get as many cow milking days as the best herd.

Naturally, calving pattern will influence the demand for feed and this should be related to calving date, pasture growth, pre-calving feeding patterns and the use of inputs such as nitrogen. Provided that an AB herd supplies complete mating records for computer analysis, then the calving pattern can be predicted from recorded conception dates.
FACTORS INFLUENCING CONCEPTION PATTERNS

The most important factors influencing a herd's conception pattern are conception rate and submission rate. It is important to understand these terms.

Conception Rate (CR) is the percentage of all inseminated cows in the herd which are not recorded returning to service within 49 days of their first insemination.

Submission Rate (SR) is the percentage of the herd which has been mated (preferably inseminated) at least once by the end of the fourth week of mating.

These two factors interact to produce the herd-in-calf rate. Worst results arise with a low CR and low SR whereas best herd-in-calf rates occur with high CR and high SR. Results from 97 Wellington-Hawke's Bay herds of from 100 to 200 cows which each used AB for at least 7 weeks are summarised in the following table. These figures show that SR influenced the 4 week herd-in-calf rate more than the CR. While the difference between the 9 groups of herds at 7 weeks was less than at 4 weeks, only the three high SR categories had a 7 week herd-in-calf rate of over 70%, even with CR's as low as 51%.

Several other points can be made from this table. First, one group of herds had an average SR of 93%. Our studies and those of Knut Moller indicate that with good breeding management an SR of 92% is a realistic objective. Secondly, SR is a more immediate statistic than CR. Once a cow is inseminated she becomes an SR statistic, but CR can be only crudely estimated from 21 days after the last of a series of inseminations. Finally, SR is a factor which is entirely the farmer's responsibility whereas CR could be influenced by the technician's ability, semen quality, etc.
TABLE 2. INTERACTIONS BETWEEN THE SUBMISSION RATE (SR) AND THE CONCEPTION RATE (CR) ON THE HERD-IN-CALF RATE

<table>
<thead>
<tr>
<th>SR</th>
<th>CR</th>
<th>Herd-in-Calf Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4 weeks</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>53</td>
</tr>
<tr>
<td>(73%)</td>
<td>Low</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>59</td>
</tr>
<tr>
<td>Average</td>
<td>Low</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>65</td>
</tr>
<tr>
<td>(83%)</td>
<td>Low</td>
<td>51%</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>66%</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>65</td>
</tr>
<tr>
<td>(93%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Low CR = 51%  Average CR = 60%  High CR = 66%

A high SR is a farmer's best way of attempting to ensure that his cows get in calf quickly, thus contributing to a concentrated calving pattern and a low number of empty cows following a set mating period. This result is shown in Table 3 with the 1972 calving patterns following the 1971 mating patterns.

FACTORS INFLUENCING SUBMISSION RATES AND CONCEPTION RATES

The most important factors which influence SR also influence CR. Cows submitted at the first post-partum oestrus have a lower CR than cows submitted at the second or subsequent oestrus. This is the reason why time since calving appears to influence fertility. While there is an element of time necessary to allow uterine involution, the longer the interval from calving, the more likely that a cow will have had at least one heat. Thus, you cannot expect a high SR or a high CR if the herd has a high proportion of cows calving later than the first 4 week period.
TABLE 3. THE 1972 CALVING PATTERN FOR COWS IN HERDS WHICH HAD HIGH TO LOW SUBMISSION RATES (SR) AND CONCEPTION RATES (CR) IN THE PREVIOUS MATING SEASON

<table>
<thead>
<tr>
<th>1971</th>
<th>1972 Period (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>CR</td>
</tr>
<tr>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>A</td>
<td>H</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>A</td>
<td>L</td>
</tr>
<tr>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>L</td>
<td>A</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

It is the level of nutrition, particularly prior to, but also following calving which influences the interval to the first post-partum ovulation. Therefore the level of nutrition can affect herd fertility by affecting the SR and the CR.

It is essential that there is efficient heat detection. While errors in detection will obviously lower CR they also contribute to the production of a misleading SR. But it may be even worse to have bulling cows remain undetected, as they will not be observed again for another 3 weeks.

There are three types of situations which should be defined when considering errors of heat detection.

Errors of Diagnosis. They usually arise when the herd owner believes a particular cow is genuinely or possibly bulling. This type of error will contribute to an increased number of short returns, but few cows will be missed and no
time will be lost in terms of getting a high proportion of the cows in the herd in calf.

Errors of Identification create chaotic return patterns and occur when non-oestrus cows are put up because they have been mistaken for the oestrus cows which remain in the herd.

Errors of Omission where a bulling cow goes undetected. A high incidence of these will produce a higher proportion of 6-week returns. This type of error may also arise where a farmer is very conservative in his diagnosis and will never submit a cow unless he is certain that she is in oestrus.

While the ideal may be the elimination of all errors, the least costly and most tolerable are the errors of diagnosis in part produced by the liberal interpretation of the normal symptoms of oestrus. This type of error will not delay final conception and may minimise the incidence of errors of omission. From extensive surveys, we have estimated that on average:

1. 89% of cows submitted for their first insemination are in oestrus at that time;
2. among the remaining 11% not in oestrus at the first insemination, most (10%) will be detected and diagnosed correctly at their next oestrus which will usually be within 17 days of the first insemination;
3. only 1% of cows are submitted when not in oestrus for two consecutive inseminations;
4. 1.4% of all cows have a genuine short cycle of 8 to 10 days after the first insemination;
5. 1.8% of all cows have an oestrus first insemination followed by a non-oestrus second insemination, possibly resulting from incorrect diagnosis in the latter case. If the non-oestrus second insemination is within 3 weeks of the oestrus first insemination chances of conception to the first insemination will be halved;
6. 3.8% of all cows return to service around 18 to 24 days after first insemination but are not observed and appear as 6-week returns.

It is important to realise that not all types of errors and returns occur in every herd. Thus, recommendations relating to efficient heat detection may not be meaningful unless the types of error which are being made can be identified.

Aspects of heifer management can have a significant influence on SR's. This is because the interval from calving to the first post-partum ovulation in 2 year old and 3 year old heifers is 52 days compared to 36 days in older cows. It is not surprising that the incidence of anoestrus (no apparent ovarian cyclical activity) is higher among heifers, particularly when they have had a spread calving pattern reflecting poor management as yearlings and have been poorly fed prior to or following calving.

In many cases putting the bull out with the yearling heifers 10 days to 2 weeks prior to the commencement of mating in the main herd is the most effective way of improving SR's and commencing a programme to concentrate calving patterns. Subsequently, when high SR's have been achieved and feed management is improved, the need to consider early heifer mating may be reduced.

**SOME RECOMMENDATIONS FOR HEAT DETECTION**

The system of heat detection which is ideal for every herd and which is easily implemented by every farmer has yet to be devised. Most farmers rely on visual observation and the consequent detection of the normal behavioural symptoms of oestrus, e.g. standing to be ridden, riding, bellowing, vaginal mucus, holding milk, increased excitability, etc. The usual times for observing the herd are immediately prior to the cows coming in for milking and during milking. But
The usual times for observing the herd are immediately prior to the cows coming in for milking and during milking. But between milking observation periods can be recommended.

Vasectomised marker bulls fitted with the chin-ball harness have worked efficiently in those herds where the recommended bull management procedures have been implemented. They are an effective alternative when errors of identification or omission are frequent. Matemaster have proved effective in some herds where observation and marker bulls have failed. A more recently used technique is a paint strip brushed across the top of the tail.

All techniques require some time and effort if they are to be effective. Some of the time element can be substituted for by using marker bulls, matemasters or the paint strip. In those cases where there is a detection problem producing a spread calving pattern, it may be advantageous to record pre-mating heats as well. Low SR's occur most frequently in herds with a low incidence of pre-mating heats. A veterinarian should be consulted even before mating starts, but his task is almost impossible if the farmer has no data.

It is important for farmers to realise that this year's mating is this season's empty rate and next season's calving pattern. Their increased efforts in heat detection will be rewarded. Although the normal cycle is 18 to 24 days, some cows - usually younger ones in large herds - do have genuine 8 to 10 day cycles. If there is to be a form of glib philosophy to describe heat detection it would be, "It is better to have tried and failed than not to have tried at all!"

GENETIC IMPROVEMENT THROUGH AB

Although the production of sufficient live heifer calves and their subsequent rate of sexual maturation are important reproduction priorities, the attainment of these objectives
is relatively easy with Jersey and Friesian cattle. Poor growth rate, particularly with Friesian heifers is the major factor contributing to poor heifer in-calf rates. Some sires, particularly among some exotic breeds can increase calving difficulties, calf death rates and can delay sexual maturation.

In terms of genetic improvement through AB, maximum progress will be made if all replacement heifers are progeny of highly selected AB sires. Presuming this is one objective of an AB user, then the influential factors will be the percentage of cows in calf to AB, the number of live heifer calves which these cows produce, the number of these live heifer calves which eventually get in-calf and then come into milk, and the herd replacement rate. The data in Table 4 shows that if all the cows in a herd were reported as in calf to AB in say February 1976, then in the spring of 1978, there could be 29 2 year old heifers per 100 cows in the herd. If the percentage of cows reported in calf to AB which actually produced AB calves (calving rate), the sex ratio or the heifer retainment rate were above the quoted averages, there could be more heifers available.

TABLE 4. SOURCES OF WASTAGE INFLUENCING LOSS OF REPLACEMENT HEIFERS FROM THEIR CONCEPTION TO THEIR CALVING

<table>
<thead>
<tr>
<th>Source of Wastage</th>
<th>% Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calving Rate</td>
<td>83%</td>
</tr>
<tr>
<td>Sex Ratio (heifers)</td>
<td>48%</td>
</tr>
<tr>
<td>Calf Retainment Rate</td>
<td>92%</td>
</tr>
<tr>
<td>Heifer Retainment Rate</td>
<td>80%</td>
</tr>
<tr>
<td>Heifer Replacements</td>
<td>29%</td>
</tr>
</tbody>
</table>
The average herd wastage rate in New Zealand dairy herds is 21%. Therefore, in a herd with an average wastage rate and average conception losses similar to those in Table 4, the proportion of the herd which would need to be reported in-calf to AB is \( \frac{21}{29} \) or 72%. Alternatively, the replacement rate is multiplied by 3.4.

However, not every inseminated cow gets in calf to AB, particularly in New Zealand herds where AB is usually only used for from 4 to 7 weeks. More cows will have to be inseminated to get the 72% in calf to AB. The data derived from the study which was used to produce figures in Table 2 showed that in high CR herds there were 1.2 inseminations per conception, 1.31 inseminations in average CR herds and 1.37 inseminations in low CR herds. Therefore, a herd owner with an average herd replacement rate, with average conception losses and an average CR would have to inseminate \( 21 \times 3.4 \times 1.31 = 93.5\% \) of the cows in his herd to AB, and should use AB for at least 7 weeks. Those herds with high SR's would attain this goal sooner than herds with low SR's.

The recommendation of 93.5% of the cows being inseminated means that virtually all the cows in the herd, apart from the infertile and obvious low producers should be included in the AB programme. Yet many farmers obtain all their replacements while only putting up a smaller percentage of the herd. The two major factors which influence the proportion which should be inseminated are the replacement rate and the CR.

A Taranaki survey covering 315 herds showed that the average replacement rate was 21% with a standard deviation of \( \pm 6\% \). The following table shows how replacement rate and CR interact to influence the proportion of a herd which should be included in the AB programme. Thus, in a herd with a low replacement rate and a high CR only 61% of the cows need be inseminated during a 7 week AB programme, but chance must
produce a very favourable sex ratio if herds with high replacement rates are to obtain sufficient AB heifer calves.

**TABLE 5. PERCENTAGE OF COWS WHICH SHOULD BE PRESENTED FOR INSEMINATION IN HERDS WITH VARIED REPLACEMENT RATES AND CONCEPTION RATES (CR)**

<table>
<thead>
<tr>
<th>Replacement Rate</th>
<th>Low CR (3.4 x 1.37)</th>
<th>Average CR (3.4 x 1.31)</th>
<th>High CR (3.4 x 1.20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>70</td>
<td>67</td>
<td>61</td>
</tr>
<tr>
<td>18%</td>
<td>84</td>
<td>80</td>
<td>73</td>
</tr>
<tr>
<td>21%</td>
<td>98</td>
<td>94</td>
<td>86</td>
</tr>
<tr>
<td>24%</td>
<td>112</td>
<td>107</td>
<td>98</td>
</tr>
<tr>
<td>27%</td>
<td>126</td>
<td>120</td>
<td>110</td>
</tr>
</tbody>
</table>

**AB PROGENY IN AB HERDS**

The 1973 AB questionnaire was used to obtain data on the proportion of heifer calves which were AB progeny, but only herds with at least one AB heifer calf were included in the analyses. There were regional differences as well as herd size differences. A brief summary of the results (Tables 6 and 7) shows that on average only 84% of the heifer calves in AB herds were AB progeny, with the remainder being progeny of herd or heifer sires. Although this may suggest that AB herds are only achieving 84% of potential genetic progress, the herd and heifer sires in many cases will themselves be AB progeny.

Of greater concern is the fact that only 69% of the AB users expect to rear only AB heifer calves. A further survey has been undertaken to determine the reasons, but likely possibilities include aspects of calf management (a short intensive rearing programme), only wanting to use AB for a short period, wanting to dabble in herd-sire progeny testing, or accepting that to obtain sufficient AB heifer calves
usually requires a satisfactory level of breeding management which previously they have not been able to attain.

This last reason may also be a significant factor why merely 68% of those AB users hoping to rear only AB heifer calves are actually achieving their objective.

**TABLE 6. PERCENTAGE OF HEIFER CALVES WHICH WERE PROGENY OF AB SIRES, HERD SIRES, OR SIRES USED WITH MAIDEN HEIFERS IN HERDS WHICH REARED AT LEAST ONE AB HEIFER CALF**

<table>
<thead>
<tr>
<th>Region</th>
<th>AB Sire</th>
<th>Type of Progeny</th>
<th>Heifer Sire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>87</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Lowest</td>
<td>80</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>New Zealand</td>
<td>84</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

**TABLE 7. PERCENTAGE OF HERD OWNERS REARING AT LEAST ONE AB HEIFER CALF WHO (A) HAD ALL AB HEIFER CALVES, OR (B) ENDEAVOURED TO HAVE ALL AB HEIFER CALVES, AND THE PERCENTAGE OF AB USERS WHO REARED AT LEAST ONE HEIFER CALF BORN TO A TWO YEAR OLD HEIFER**

<table>
<thead>
<tr>
<th>Region</th>
<th>% Owners with only AB Calves (a)</th>
<th>% Owners wanting only AB Calves (b)</th>
<th>( \frac{a}{b} )</th>
<th>% Owners Rearing Progeny from Heifers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>52</td>
<td>74</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>Lowest</td>
<td>35</td>
<td>62</td>
<td>56</td>
<td>41</td>
</tr>
<tr>
<td>New Zealand</td>
<td>47</td>
<td>69</td>
<td>68</td>
<td>34</td>
</tr>
</tbody>
</table>

The most likely reasons why more AB users are not obtaining more AB heifer calves is because too many of them present too low a proportion of the herd and use the service for too short a period. Because most L.I.A.'s charge on a per cow
basis, re-inseminating returns does not increase breeding costs and thus produces more AB heifer calves for the same cost. While this means an obvious cost/benefit gain and also results in increased genetic progress, the management reasons for the less than optimum use of AB in AB herds may need to be identified if the situation is to be rectified.

CURRENT AND FUTURE DEVELOPMENTS

Although the use of drugs to induce premature parturition is a relatively recent development, it has rapidly become a widely used procedure. The 1974 AB questionnaire showed that:

1. 40% of AB users induced at least one cow,

2. whereas only 11% of farmers with 50 cows or less used the procedure, in herds of more than 200 cows the adoption rate was 61%;

3. in herds where cows were induced, the average number of inductions was 10 cows per herd, with a ratio of 6 mature cows for every 2 year old;

4. 24% of the calves born following treatment of the cow were born dead or died within 48 hours;

5. 38% of the induced cows were milked prior to calving.

The relatively rapid adoption rate of this technique indicates that many farmers are conscious of the management complications and cost of lost production through having a spread calving pattern. Unless effective changes in breeding management are instituted during the breeding programme, the necessity to induce late calving cows will be perpetuated.

A newer technique which may be acceptable to many herd owners is oestrus synchronisation. Recent field trials have demonstrated that using a single injection of a prostaglandin
analogue administered to cows observed in oestrus during the 10 days prior to the commencement of mating on the sixth or seventh day of the breeding programme, can increase the herd-in-calf rate to AB after 2 weeks mating from 36% to 60%. Only 40% to 45% of the herd need be injected to obtain this result. But this regime can only be used in conjunction with efficient heat detection, and is most beneficial in herds which already have a low incidence of anoestrum.

CONCLUSIONS

The New Zealand dairy cow is a very fertile animal and reproductive efficiency is higher in our seasonal herds than any other dairy industry. While our achievements to date are commendable, there are substantial management and production increases to be obtained in many herds by further concentrating the calving pattern and also reducing the spread of calving.

The most important parameter relative to breeding management in seasonal herds is the submission rate. The objective should be to mate 92% of the herd in the first 4 weeks of the breeding programme. The major factors influencing this objective are efficient heat detection and the incidence of anoestrus particularly among heifers. While the ideal may be the complete elimination of errors in heat detection, errors of diagnosis resulting from the liberal interpretation of the symptoms of oestrus are less undesirable than errors in animal identification or errors of omission when oestrus cows 'escape' detection.

Although over half of New Zealand dairy farmers use AB, many of these farmers intend rearing other than AB heifer calves, and others who would hope to rear only AB heifer calves do not obtain a sufficient number. Presenting too few cows for first insemination and re-insemination appear to be the main factors producing the reduced rate of genetic progress in
many AB herds. Recommendations as to what proportion of the herd should be inseminated should be based on a herd's future replacement rate and previous conception rates to first insemination.

The widespread use of drugs to induce premature parturition in the later calving cows suggests a farmer awareness of the cost of spread calving patterns. But the likely introduction of oestrus synchronisation will be an acceptable alternative which will also further increase the concentration of calving patterns.

If a single factor was to be identified as the most important factor limiting breeding efficiency, it would be the incidence of post-partum anoestrus. This syndrome reduces submission rates and conception rates. Its resolution involves adequate feeding prior to and following calving.
It is 14 years since I was at Canterbury University. It is 12 years since I married a shepherd. From then on I have had to fit into that box labelled 'Rural Women'. If chance had been different, I might have married one of my university acquaintances, a law, accountancy or theological student. Then I am sure I should have fitted equally well into that box labelled 'Urban Women'. But I don't think I would have been much different from what I am today.

Rural women are exactly the same as urban women; they are just as diverse. On the whole, they are women who, by accident rather than design, married rural men.

There are women in the country, and the town, who help physically with their husband's occupation. There are women in both places who don't. From my experience, it is a popular misconception that most rural women are actively involved in physical work on the farm. In our district less than a quarter of the women could honestly claim that they help beyond the garden gate more than very occasionally. That is not to say that all do not play a vital role as wife, mother, cook, housekeeper, gardener, receptionist, and secretary.
During the election campaign Roger Douglas said his Government was committed to encouraging the family farm. Someone asked if by this he meant committed to making the wife and children work harder!

It is not everyone who wants to class the wool, and milk the cows. It is a personal decision, and what is right for one obviously may not suit another. Those who choose to help physically do so because they enjoy it, and because they see the benefits. My children and I help with the drafting, the docking and at other busy times; and we are able to run 5,000 ewe equivalents as a one man farm. The money saved on permanent labour is diverted into development projects, or into perks such as a swimming pool, going hunting or a South Island holiday. This suits us, but I am not a typical rural woman, and there are many who do not keep fowls or a vegetable garden, let alone contemplate helping sort the dags or wean the calves.

In the same way, I don't feel a need for Women's Days, Women's Divisions, or Ladies Auxiliaries, although I respect that there are women who do. I have always been pretty liberated, and seldom felt discriminated against. If a person is interesting, intelligent and nice they go up the scale, if not they go down. Sex and colour just don't come into it. In all that I have written or said you will find references to parents, to people, to men and women, and to rural communities, but seldom to women on their own. Others may label my efforts 'back-country woman', but this is not my conception or philosophy.

Rural people are now so few that we cannot afford our communities to be divided into workers, farmers and wives. Also we are too interdependent to do so. It is quite impossible in a good marriage, or on a good farm, to isolate the contribution of one partner. I may help with the drafting and the docking, but my husband helps with the bottling and the baby-sitting. Women should be no one's appendage. In the rural community the part played by women is too complex and
interwoven to be divided off. It may not be recognised, but in recognition it is wrong to cut it off, to package and to label it.

Over the last few months I have thought a good deal about the rural organisations. When one tires of running or walking it is helpful to have a vehicle for a journey. I have never been to a Women's Division or a Country Women's Institute meeting, except as the speaker. The practical reason for this is that these organisations have not been active in the various areas in which I have lived. From where I stand on the outside, I see women in cities of 20,000 being members and provincial office-holders in the organisations which believe they are the mouth-piece of New Zealand's rural women, while women who have lived on farms all their lives have never been invited to belong.

I would have the same criticism of Federated Farmers. My husband was an active farmer in his own right for eight years before he was asked to join. I worked for Watties for three weeks and paid a union fee without protesting.

When European men do something, it is not usually commented upon that they are men or European. If it is Maoris or women they are labelled and placed in a sub-set. It is time for both Maoris and women to break out of these sub-sets, and become integral parts of our society.

That does not mean that one has to call oneself Ms or chairperson, or discard one's bra. Such stupid feminist trappings do nothing for the cause of liberation or equality. I call myself Mrs because I am proud to be in partnership with my husband. I wear a bra because it is more comfortable.
Already the Country Girls and Young Farmers have successfully combined. Where will the female graduates from that organisation move on to? Our place is with the men, helping make the decisions and the tea. We do our intelligence, our education and our capabilities a disservice by confining them within one sex. I am now a full member of Federated Farmers, and I invite you to be the same.

But, perhaps I misjudge. Perhaps some of you may be thinking that I am young and immature, and that my ideas will mellow with the years. Perhaps you are right. On the other hand, in eight years time my daughter will be deemed an adult, will be able to vote and pass judgement on our systems. If I who spring from the establishment find such faults, how will her generation view these institutions?

If the conception of the rural woman is one of mistaken identity, there is another I think I had better explain. The Wairarapa, like Canterbury is fairly extensive, and if you live near Ashburton you probably see little of people at Amberley. In the Wairarapa there is a little country district called Tuturumuri, and that is where I live. Further north, about two hours by road, there is a much larger district called Tinui. At Tinui there is a very active Women's Division. Before the United Women's Convention they did a survey of their district, and produced an excellent paper called 'What is a Rural Woman?' Since then I have been associated with them in various ways, but I had nothing to do with their original survey or report. I think that the organisers of today's conference tended to confuse us. We are going in the same direction, but not in the same vehicle, or quite on the same path.

I am sure they would not mind if I told you a little story about their report. They sent a copy to Sir Keith Holyoake, who is their M.P. They received a letter back: "Dear Mrs Douglas, Thank you very much for your paper on Homosexual Law Reform." They wrote quickly back to enlighten him, for
although they viewed the mistake with a good deal of mirth, they did not think that the Committee on Homosexual Law Reform would be equally amused to be thanked for their report on rural women.

I met the Tinui girls at the Convention in June. In September I set out to organise a day of discussion on rural social problems, which unlike 'Rural Women', is the cause I have chosen to promote. The Wairarapa President of the Country Women's Institute said they were much too busy, and couldn't it wait until March. The Farm Workers' Association promised to send a representative. They didn't. The President of the Women's Division couldn't come at the last minute. She had the 'flu. So at our only organising meeting we had two WEL members, three members of the Tinui Women's Division, and two who didn't belong to anything.

People kept asking me, "Who are you?", "What is this?" We weren't really WEL, and we weren't really Women's Division. We weren't really anyone. But I though I knew where we were going. I named that journey TREC - Towards Rural Equality of Citizenship. New Zealanders are very keen on committees, on labels, and on boxes. Is it that once a committee has been elected, packaged and labelled they feel that the problem can but put away and forgotten. TREC is too important for that. In some ways now I regret giving it a label, but it still has no committees, and no boxes.

Although organised by women, there were about 130 men and women at that day, from every part of the Wairarapa, and I gained the impression that most would have been sorry if all the ideas and recommendations which came out of it were just left to gather dust. So I collated the information, and set out to publicise the recommendations and the problems they uncovered. Perhaps I should say here that none of those recommendations were mine. I was much too busy organising to have time to participate.
But what is TREC, this journey to which I have referred? This journey on which hopefully men and women will eventually move hand in hand.

The politicians, the economists and the rural organisations have not given the social constraints of rural life enough consideration. The rural organisations say that they have been working on these problems for years. It is not the years you put in, it is what you put in the years. They say they have the ear of Government. It is a deaf ear. They must speak a little louder. With every one that leaves the rural area the problems are that much greater for the few that carry on, and no one can refute that these problems continue and grow worse.

Today is especially important for TREC, and it is nothing to do with my being here. At 10 o'clock this morning with representatives from most of the rural organisations I was meant to meet the Minister of Education, to discuss with him our joint submission on rural education. This joint approach is quite historic, and I ask you all to say a little prayer that he will heed that submission. It is something I have worked very hard for over the last six months, and in that submission I can see my thoughts, my suggestions, my phrases, and my research. As Churchill said:

"This is not the end.  
It is not even the beginning of the end.  
But it is perhaps the end of the beginning."

But that is in Wellington and I am here, and that is important too, because I have been the focus of much attention over the last few months, I am not important, or indispensible. It is the problems and their solutions that are important, for rural people, men and women.
When I think of TREC I think of my great grandparents who came to New Zealand in the 1850's. It is with pride that I see members of my family still farming the land they took up, and the contribution they made over the years. I am proud of my heritage. But I also view with sadness the decaying remnants of others' heritage, the neglected homesteads, the divided estates, the absentee landlords, and the numerous reminiscences of the grand old days.

I wonder if in China Mr Muldoon heard this proverb:

"If you plant for a year plant grain,  
If you plant for 10 years plant trees,  
If you plant for 100 years plant men."

We have reaped the harvest of last century's planting. Let us not forget to plant wisely for the future.

TREC makes me think of these many people who have walked off the land over the years, of all the empty houses I saw recently in Taranaki. Our farm was once three farms, and our house once a derelict ruin. It is the women who usually have the first urge to go.

I think of the Maori land marchers, and their leader, a woman. Of their turanga wae wae; that special feeling which many of us have and understand, but is quite inexplicable to those who only think of dollars and cents, of gross national products, and of standards of living. We have no racial problem in New Zealand. The problem we have is urban drift. As late as 1936 only 10% of Maoris lived in cities, boroughs and towns. In 1966 the figure was 50%. There is no need to elaborate on the problems this has caused in the cities, but we must concentrate on the problems caused in the areas they left behind.

The Waiapu County is that area of the East Cape, about 80 miles north of Gisborne. Between 1951 and 1971 the population of the Waiapu County was reduced by 39%, from 8,156 to 4,974; a loss of over 3,000 people, making life that much more difficult for
those that remain. I don't know the figures of the empty houses, and the closed schools. I can only imagine. The Department of Labour still takes busloads of teenage Maoris, born and bred in places like that, and feeds them into the labour markets of the cities, to be swallowed up by situations for which their education and their upbringing never equipped them. Our heritage ensures that we are usually better equipped, but after six years of correspondence and seven years of boarding school I found university life in Christchurch almost as difficult to cope with.

Most women recognise and enjoy the many advantages of country life. A visit to the city every six months reminds us to count our blessings. But if the advantages outweighed the disadvantages there would be no need for TREC. Rural people are very fortunate, and we must see that the difficulties of our life are overcome, so that those who share this life can stay; and so those who would like, could afford to come.

Some are lucky and can afford to stay for the moment. They have their own house, a decent car and enough money to ensure their children a good education. Even so, money cannot buy a reliable telephone, a daily paper, milk and bread, good television reception or a tarsealed road; and nothing will ever really overcome the long way to town and the long way home.

I am not a politician, an economist, a sociologist, but perhaps as Kennedy said:

"Some men see things as they are and say why,
I dream things that never were and say who not?"

The brightest ideas don't work unless you do. My first priorities are still with my children and my husband. Every trip to Martinborough costs $8.80, and to Masterton $20. I have to accept that I cannot be an active member of anything.
I have decided that for me an hour spent at my typewriter is more productive than an hour spent at the wheel of the car. I have used by resources to influence those who make decisions, those with greater resources, and those who can go to meetings and can be active in organisations.

My neighbours and I have done a number of surveys on what we consider the most pressing problems; the capitation allowance, the boarding bursary and the extra-curricula trips. They were done on a New Zealand wide basis, but fairly hurriedly before the postage rates went up. They may not be perfect, but I feel they reasonably reflect the situation. They have been done with individuals' resources, and individuals' finances.

I have taken the case of the capitation allowance to the Ombudsman as my research shows he may have jurisdiction over it. I am planning to take the boarding bursary case also to him, or to the race relations counciliator.

Why haven't the rural organisations done this type of specific research, discovered these facts, and pursued these avenues? They may cry poverty, but they have more resources than I.

But whether one works within a Division, a Federation or as a guerilla, the important thing to remember is that, men and women, we are all on the same side, hopefully fighting for the same end. That liaison and cooperation will help us to walk in step, and that we must all fight harder if the war is to be won.

Modern pressure groups show us that activity is more important than numbers; that thinking, questioning and persuading can result in action. Rural pressure groups have been slow to learn, let us run to catch up.

Women have an absolutely vital part to play in this. They are the change agent in rural society. The Tinui and North Canterbury surveys showed the high percentage of rural women who had
experienced life in other areas, and that on the whole rural women are better educated than their husbands. They have fewer children than their predecessors, but in many cases cannot go out to work like their urban counterparts. As everyone knows farmers are working harder for diminishing returns. There may be limits on the physical contribution of women to farming, but we must share more of the administrative and political burden.
RURAL WOMEN AND INTERNATIONAL WOMEN'S YEAR IN RETROSPECT

Mrs A.D. Talbot
Pleasant Point

International Women's year has ended, and though most of the tumult and the shouting seem to have died, we must realise that the activity has not. The activity has really only just begun in earnest, for the International Women's Year was the beginning, the trigger, if you like, for the United Nations Decade of Women.

The year was really a time for examining the situation of women in each country in terms of equality: socially, educationally, economically, and politically. It was a time to sort out the problems, to pinpoint the areas of discrimination, and to arrive at priorities for action through legislation, education, or persuasion.

For this reason I believe that all women should examine the events of the year, to ascertain how they themselves, and their community, may be affected by any decisions that were made, and so that they may be involved in finding what acceptable and effective action may be taken to improve the lot of women, and to open up new horizons for women during the Decade of Women.

To the idealist this is a vision splendid; to the realist it is a certainty of a hard battle to make reasonable and real and
lasting progress despite the engulfing apathy of the masses on the one hand, and the vocal, demonstrating lunatic fringe on the other.

For me, International Women's Year really began when Dominion Council of Women's Division Federated Farmers gave me the job of Convener of the Workshop on Rural Women at the United Women's Convention held in Wellington last June. It was an honour, and a privilege, and a terrifying prospect. Fortunately I had Mrs Godsall, another Dominion Councillor from Otago, to help me.

It would seem we came into the play somewhat late in the day, because on attending our first meeting of the committee we found some groups had been organising their workshops ever since the first United Women's Convention in Auckland in 1973.

We were not dismayed however because among the activities suggested for International Women's Year by the United Nations was the undertaking of studies and surveys on the changing roles of women and men in society and the family, and the setting up of fact finding bodies to undertake special studies on the needs and problems of women, both urban and rural.

Well, the Survey on Rural Women which was already being organised by the Psychology and Sociology Department of the University of Canterbury for Women's Division of Federated Farmers, who were finding the money and the interviewers for it, certainly fitted into the first category, and Women's Division itself had been a fact finding and activist body for fifty years.

The results of the pilot survey would be available in time for the Convention so we were off to a good start.

When we made a very encouraging discovery. We learnt that a very active group in the Tinui Branch of W.D.P.F. was already
working on their own survey of the women in that district with a view to presenting a paper at the convention. So, with the pilot survey from North Canterbury, and the Tinui survey from the Masterton area, we felt that we had a reasonably representative coverage of rural women. But just to make sure and in order to give as many rural women as possible the chance to be involved we wrote an article in Straight Furrow explaining what we were up to and asking everyone who was interested to write about her life in general her triumphs and her tribulations.

This was most rewarding, and brought forth come very interesting material. A number of groups C.W.I., W.D.F.F., and several independent ones, used the article as a discussion topic at meetings and sent us their findings. Several groups conducted surveys of their own members and many individuals wrote. We had most interesting and informative letters from one end of the country to the other. If you would have liked to be involved and were not, I think you should examine yourself, and your organisation to find out why you missed out. There is another United Women's Convention in Christchurch in 1977. You may like to repair the omission.

When we collated all this material, a definite pattern began to emerge. The findings of the Tinui Survey and the pilot survey correlated to a remarkable degree and were underlined by the findings from the letters. Our workshop already had a shape and an aim.

The aim was to define 'Rural Woman' in all her diversity of background, commitments, environment, enthusiasms and difficulties; in short, to present a balanced and honest picture of rural women, to ourselves as well as the urban women. Because unless we understand ourselves, we cannot hope to help others to understand us, and without understanding there can be no true communication or co-operation. In short we designed the workshop to promote mutual understanding and as a public relations exercise in the deepest terms on behalf of rural women.
To this end, Elaine Foreman of the Tinui Branch of W.D.F.F. used their survey to formulate a short paper entitled *What is a Rural Woman?*

All right, what do you think a rural woman is? Give it some thought and you will begin to realise why there is no Mrs Fred Dagg.

Surely, you will say, a rural woman is a woman who lives in the country, or she is a farmer's wife. But more than farmers wives live in the country. The are the farm workers wives, the wives of contractors, forestry workers, teachers, school bus drivers, sawmillers, and even fishermen's and lighthouse keepers' wives. Now we can add to the list electricity workers wives. Besides this little lot, there are the wives whose husbands do not work in the country, but who live in the country for the sake of the children or because of housing shortages. All these live in the country so presumably they are rural women, but are they?

The dictionary defines rural as 'rustic, living in or pertaining to the country or to agriculture'. The sociologist describes rural people as 'living in a community of less than 1,000'. Then there is the vision conjured up by the women's pages, as the Tinui people put it, 'A mother-duck figure continually winning prizes for cream sponges and best blooms'. Though I think I.W.Y. has changed that a bit.

A generation ago you could have clinched the matter by saying 'A rural woman lives in the country' because bad roads, lack of electricity, lack of motor cars, and lack of money, to say nothing of too much work kept rural woman pretty strictly in the country. She was pinned to the cow's side, the cooking stove, the garden, the sewing machine, and the wash tub.

The girls helped mum and learned her ways until they married; or some went nursing or teaching.
Low mobility meant partners tended to be chosen from one's own neighbourhood so complicated chains of inter-relationships were set up. They made their entertainment in their own areas, and the whole community was closely knit and inter-dependent.

The generation change came at the end of the war. Land girls had come into the country while the boys were away, and many stayed on as wives of farmers, and continued to work on the land, thus setting a pattern of outside work, helping the men on the farm. The boys coming back from the war in many cases brought urban brides, or even brides from overseas, but the older women were still there in the beginning of their married lives to teach young brides country ways. By and large these girls settled in well, taking on the patterns of life to a great extent, learned rural skills, joined W.D. or C.W.I. according to what was in the district, and became, in fact, rural women, no matter what their origins.

Few had electricity, many had only rain water and not enough of that, money was short, and they went to town at lengthy intervals, usually on wet days; and they would be harassed by the need to lay in supplies for a lengthy period, as cheaply as possible, and in time to meet dad back at the car when he was ready to go home. If the children were at boarding school in the nearest town, they would be visited too, on the infrequent shopping days. The life of the rural woman was hard, and fully occupied. Her leisure time, if she had any was used to improve her knowledge and skills in baking, sewing and gardening and to this end, those much maligned 'competitions' in the local branch of her organisation, were devised. Her work and her recreation were one, because there was little time, or energy or money left for anything else. She may have been tired, but she was happy because she knew she was playing a vital role in the home, the family, the community, and if she was on the farm, in the family business. She also had the comfort of knowing that her urban sister was also tied to the house.
This pattern was changed by the increasing affluence of the boom years of the fifties, which brought with them improved roading, and the reticulation of the rural areas. The Tinui group found that if any one single thing could be claimed to be the liberator of rural women, it is electricity; for with the flick of a switch the countrywoman at last had the energy-saving, time-saving assistance that her urban counterpart had so long taken for granted.

The rural woman at last had an option. She could cut down on the time spent in essential chores around the house, and at last had time and energy to herself. She used it to participate in her husband's work, her children's activities, and in the community; and most at last had good roads reasonably close at hand to give mobility.

The workshop paper says:

"It is ironic to realise that by the late fifties and early sixties when all this was happening and countrywomen were at last free to indulge in what they regarded as leisure, urban women were beginning to return in large numbers to what is regarded as work."

"Is this the great basic difference between urban and rural women? To the rural woman, home is often farm, and farm is work, and all three are one. To the urban woman home is house, and work is job, and the difference is as far apart as the poles."

There is arising from this, another difference, for the farm wife, though her work adds to the efficiency of the farm and lightens her husband's load, she is often not paid for it. The farm income may not in fact be enough to allow her a wage. The urban woman brings a second income into the house. Nevertheless, most rural wives agree, and this applies to the wives of fishermen or the wives of contractors who answer the phone and keep the records, that the time is well spent because it allows the husband time with the family.
Do we always make sure that the farm worker's wife has the opportunity to have her husband with her at the school sports, or to take the boys to football?

I wonder how many rural mothers have ever counted the mileage used taking children to sports and other extra curricular activities? One of our correspondents had recorded one thousand miles of car running in a single season to take her children to sport.

All the contributors to the workshop made a point of family togetherness, believing that it made for stronger marriage bonds and family ties; and the urban women in the workshop said how lucky they were. Several instanced commuting husbands who left home before the children were up and returned after they had gone to bed, and the executives who often spent the whole weekend working on the job at home.

But the Tinui report showed that not all women thought rural togetherness was all happiness and scenic beauty. For an ex-teacher used to the challenge of moulding young minds, it is no great thrill to walk up and down fenceline with a tin of staples, or for a one-time highly paid secretary to help with the milking or pick up dags in the woolshed.

You may have the satisfaction of knowing you are an essential part of a team and that your discomfort or disgust is all in a good cause. But, though your efforts may indirectly and obscurely add to the total income, it will not give you a personal income commensurate with your skills if you are a trained nurse or a teacher.

But skills can be used for the good of the community and often are by part-time teaching or nursing, fund-raising for the church, C.W.I., W.D.F.F. or Plunket, or helping with school bus tours or taking meals on wheels.
Now with the incoming generation the pattern is changing again. Older women for some reason no longer feel in a position to advise or train the young brides. Besides, they have their golf, bowls, or committees; or they move into town to resume the urban pattern of their early lives. Often as not taking with them a husband who is like a fish out of water, and has made no plans whatsoever for using his time on retirement.

With the modern day acceptance of married women working we see many rural women are returning to paid employment, especially those living within a radius of about twenty miles of town. Many young marrieds have found it natural to return to their old jobs, or indeed never to leave them. When farm prices dropped it was the man who often, within the last generation, looked for other work to supplement the farm income. This generation, when the wool price dropped it was often the woman who found outside employment. Many younger women have just grown up in an age of doing their own thing and have preferred to continue working. Some do not think of themselves as rural women, and though married to farmers or farm workers, think of themselves as city girls living in the country, and indeed they are travelling no further to work than if they were commuting from the suburbs into Wellington or Auckland. Their job, either part time or full time, is in town; their children if they have any, will probably commute with them to town schools. Their social life is in town, and their friends are urban. As the Tinui women put it, they are certainly living in a community of less than a thousand, but they do not pertain much to agriculture.

Neither can we really think of as rural those many married couples who, fed up with high rentals and housing shortages in town, have moved into empty farm cottages and commute daily into town. They may well vote in the County Council elections, but their life style, and probably their sympathies are suburban.
These women have relatively easy access to medical services, shopping facilities, cultural activities and adult education classes. When the time comes for their children to go to secondary school, it will be within easy reach and unless petrol rationing puts their cars off the roads they will continue to enjoy the facilities of town at will.

The truly rural woman as the Tinui people see her, lives out of reach of city facilities. She may very well be urban in origin - the Canterbury Survey showed at least 45% of rural women are urban in origin - but her remoteness, her isolation, precludes her from taking any advantage of many of the things her city sisters take for granted; from many of the things she herself may have taken for granted before her marriage.

She will be on an elongated party line telephone at the mercy of the weather; she is much more likely to have mains electricity now, but she still probably has quite a length of unsealed road, or even a launch trip between her and the corner shop, which may be thirty to fifty miles away. It will not be economic for her to travel to work outside her home, even if she has the time and wishes to, which she probably doesn't. But she probably sells the product of her art or craft, and though she is noted for her hospitality she may now take in some paying guests.

Medical facilities are many miles away, but she and her family are fortunately, remarkably healthy; though if ill health or accident does strike her or her family, visiting in hospital may be well-nigh impossible, because of distance.

One woman wrote of a child with hip dysplasia, which was not found until the child was eighteen months old, and then told of the problems of visiting her in a hospital 40 miles away, and later taking her for treatment and check-ups.
Almost every woman surveyed said she valued and enjoyed the benefits of rural life; the space, the clean air, the beauty of the countryside, the peace, the total involvement with her family in the community, and the full participation as a working partner with her husband; but there is a price to pay for all this.

She will be lucky, if she is a farm worker's wife, if her home is within easy reach of a good school bus route, particularly when her children reach secondary school age. If she is not, then there is the terrific burden of boarding school fees, or she must persuade her husband to leave the life he loves and move to town. A loss to the nation of another skilled worker in a vital industry. The same applies to the farmer. Lucky indeed are they whose children are so spaced that only one is at boarding school at a time.

If she survives this hurdle, she must still contend with the knowledge in the case of the farmer's wife, that if her husband dies she may very well lose her home as well because of estate duties.

The farm worker's wife has a similar problem in a different form for there is a very real problem in providing herself with a retirement home. Finance is almost impossible and savings do not keep pace with inflation, and not all wish to move into a state house in town, which may not be easy to obtain anyway.

All this is a shortened form of the way the rural woman was defined to the United Women's Convention Workshop.

From the letters that came in as a result of the Straight Furrow article we were made aware for the first time of the struggle to obtain an allowance for the mothers of full time primary school children on correspondence school lessons. Mrs Evans, the secretary of the Parents' Association, gave a splendidly moving exposition of the struggle which her
association had been waging since 1968 to get Government recognition for these women. Her story received such a sympathetic hearing that many sent telegrams to Mr Rowling the then Prime Minister, and to the Minister of Education. There was a splendid surge of sympathy too from the 2,200 women in the plenary session when I featured this problem in the four minute report on the four hours of workshop time. A great deal of publicity was generated throughout the country and though Government had said the economic climate was not right, we certainly went a long way towards making the political climate right among a much wider public than those attending the Convention. We must ensure that we do not lose ground on this matter.

Mrs Gill and Mrs Koopman Boyden from the University of Canterbury used the third section of the workshop to give some of their findings from the pilot survey on rural women. They explained the sociological implications, particularly on levels of education, social involvements, and work opportunities, and suggested ways of using the reservoir of professional expertise among rural women for the good of the community.

I have told you all this about the workshop because I think as rural women you have a right to know just what was said about you at the Convention. This is the way you and your problems were presented not only to the Convention, but to a number of seminars and workshops held in various places during the rest of the year.

These problems were listed as follows:

1. To persuade government to provide an allowance for all mothers of primary school children on full time correspondence school.

2. To find some way of putting the farm home on the same footing as the Joint Family Home for estate duty purposes.
3. To find some way of making finance available for the rural worker to purchase a home on retirement.

4. To have more five day hostels established where appropriate in order to cut down travelling for rural secondary pupils.

5. That an education programme be devised to instruct rural women in their legal rights, the making of wills and so on.

Those of us who took part in the workshop and later seminars are sure we built up a great fund of good will and greater understanding of rural women among their urban counterparts who were present. The news media too discovered rural women; even the Listener gave us a two page spread, and we were given time on radio and television.

You may ask why it is considered necessary to get the help and understanding of urban women. I will tell you; it is because more than 80% of our population live in the urban areas now. Ministry of Works Town and Country Planning population projections predict that by 1991, that is in 16 years from now, 94% of the population growth of this country will be in urban areas of more than 20,000 inhabitants. The remaining 6% of population growth will be in areas which include population centres of up to 20,000. It is not so much that they predict an actual decline in the present rural population, but an extreme growth in the urban centres, so the percentage of the population in the rural areas will be much smaller.

The rural population is a diminishing minority, and in a democracy where one person has one vote, our chances of getting anything through Parliament that is likely to be unpopular, or misunderstood by the urban voters, are pretty slender.
That is why our I.W.Y. effort on rural women was not only one of self-examination, it was also a strenuous exercise in public relations. Furthermore, as the main political parties were very well represented at almost all I.W.Y. activities throughout the country, all recommendations agreed to were bound to be noted. This is why so many were included in the Government manifesto.

There is no doubt that the women's movement is a growing power in the land, and it is essential that rural women should be ably and actively represented within that movement. Very full reports on all I.W.Y. activities and findings were sent to the Committee on Women in Wellington who will or who have already conveyed these to the Government.

This committee was instrumental in organising the Prime Minister's Conference on Women in Social and Economic Development held in Wellington in March. This was the culmination of I.W.Y. Here representative and influential women were invited to meet in discussions with male policymakers, and of course with the Prime Minister.

If Women's Division of Federated Farmers had not been so active throughout I.W.Y., I do not believe rural women as such would have been represented at this Conference at all.

As it was the whole rural sector was represented by three people: Mr Kneebone, President of Federated Farmers, Jenny Simpson, President of Y.F.C. and myself. I do not mean this as a criticism of the Conference arrangements I am merely trying to show you how difficult it is to give rural women a voice in the affairs of the nation.

The Conference, lasting for two days, was very tightly planned, with speakers on many subjects affecting women, mostly urban women, such as child minding, and day care centres, and women in employment and in town planning. The only speaker I heard
mention rural women was Ruth Richardson who gave one of the best papers of the conference. It was on the Matrimonial Property Bill that was introduced by Labour and will be proceeded with by this Government. This Bill introduces the concept of equal sharing of the matrimonial property in the event of a marriage breaking up in divorce. In these days most couples regard their marriage as a partnership of equals to which both contribute in different ways. The new Bill takes the view that the wife's contribution of maintaining the home and caring for the family is equal to that of the husband in providing that home, and the Bill provides for equal sharing in the event of the break-up of the marriage. Ms Richardson, who is the very competent legal adviser to Federated Farmers, believes we must press to have the provisions of the Bill extended to cover separation by death. This would put the farmer's wife and the wife of the small business man on the same footing for Estate Duties purposes as the urban owners of a Joint Family Home. I strongly advise you to bring pressure to bear on your M.P.s of whatever party, to this end.

The only other mention of rural women was a short background paper which was not entirely accurate, and was not intended for discussion. It served to bring out the paucity of information on rural women, but did include most of the problems brought forward during I.W.Y. This paper concludes by saying the onus to seek actual progress lies heavily on the farming organisations to take the steps urged by the International Federation of Agricultural Producers at their 21st General Conference. It also urges the Government to implement the promise made in the manifesto on education, housing, medical services, communications and rural social research. This last refers to the promise made to help the financing of the Women's Division survey on rural women, organised by a University of Canterbury team. When we have the results of this, which will be presented at the Dominion Conference in June, we should have a true indication of the nature and extent of the real needs of the rural woman, and can set about finding ways of fulfilling them.
When problems are known to exist, the farming organisations really work to solve them in an acceptable way. But some problems seem to have no solutions. I believe we must accept that in order to enjoy the many advantages of rural life we must be prepared to put up with some of its disadvantages, just as town dwellers accept the disadvantages of such things as commuting and crowding. We cannot expect to have the best of both worlds.

I believe we would so well to advise our young people who intend to live in the country to be as careful in the selection of their own mate as they would be for their stud flock. In this case choose one with the right attitudes and see that he or she is fully conversant with all the implications of country life. We must realise too that it is no use permitting our sons to be the strong, silent, totally undomesticated types if they are going to marry girls who have been steeped in the beliefs of the feminist movement at school and university. I believe too, as the Canterbury team said in the workshop, we need to welcome the new rural women into the community, help them as we were helped to learn rural ways and requirements and find ways for them to use their skills for the good of the rural community.

Finally, the International Federation of Agricultural Producers said at their Conference that the farming organisations must get together. I believe that the whole rural population must get together. The farming organisations can only be as good as the members make them. If you do nothing to support or encourage them, if you can't be bothered to join, then they lack the strength and the enthusiasm to support you.

If the rural way of life is to remain attractive at all, we cannot afford splinter groups, we cannot afford to be too apathetic or too self-centred to join the organisations that can
and do work for our good. The rural population must come together as one, men and women of all ages and persuasions, to work together to support each other.

If we are to have any voice in the political arena it must be a united one to be heard at all. Besides this, I believe we must learn to use the news media, and also do a big concerted and continuing public relations job. In this women can play a major part - getting town people into the country on farm trips, farm holidays or farm employment. In short, we must miss no opportunity to promote greater understanding between town and country especially among young people. Unity among the rural population is essential for our social survival. Unity and understanding between town and country is essential for the economic survival of the country as a whole. I believe we made a good start in International Women's Year, will you help us to keep up the good work for the rest of the decade and beyond.
THE ROLE OF WOMEN IN TODAY'S RURAL SCENE

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Not long after I joined Federated Farmers I was summoned one morning to deputise for the Dominion President. He had, he said, 'missed the plane' and requested that I represent him at the Wellington Town Hall. It was the Annual Conference of the Country Women's Institute. 'Just say a few words of greeting on my behalf' was my brief. Naturally I agreed although I had never spoken from the public platform before.

I appeared at the entrance of the Town Hall and was ushered down through the aisle and up on the stage. It looked like a spectacle resembling a Republican Convention in the United States with the many coloured banners and flags draped around the walls. If there was one woman in that Town Hall there must have been 2000! Distinguished guests included the Governor-General's wife, the Prime Minister and his wife, the Mayor and others. When my turn came to address the gathering I decided there was only one thing to do - in fact Mrs Holyoake beside whom I was sitting gave me this advice - "Just gaze into space - don't look at anyone"! I managed to emit some words of greeting, in accordance with my instructions and sat down with the utmost relief. The Wellington Mayor was even more nervous than I was. In his introductory remarks he referred to Miss Mabel Howard who happened to be seated near me on the stage. He called her "The Rt Hon. Mrs Howard." Mabel, when
her turn came to speak, commented that it was the first occasion in her life that she had been both promoted and demoted at the same time!

When I agreed to undertake this assignment today I recalled the occasion when I undertook to address a gathering of women. My terms for entering upon such a 'hazardous' mission were that I would be completely free to express some ideas on "the modern role of country women". I reckoned my task would not be a difficult one and that my audience would likely consist of a couple of dozen 'matrons' perched on seats before me in an old draughty country hall. I calculated that they would sit there, listen to what I had to say, pass the usual vote of thanks and then of course adjourn for that inevitable cup of tea and those lovely home-made cakes. Imagine my surprise when I was ushered into a hall literally crammed with women - young, old and middle-aged. They were from the local Women's Division of Federated Farmers, the Country Women's Institute, Country Girls Club and some who belonged to no group. The proceedings began with a buffet meal and as each lady approached me she seemed to remark "We are just dying to hear what you have got to say about us!" I almost took fright and wished I had never agreed to come. But it was then too late to run away - besides, the thought of two hundred women chasing after me was too frightening to contemplate. I just had to 'fact the music' and stop being a coward.

When the meal was over I was led on to the stage and introduced, almost as a participant in a wrestling match is introduced by the referee. My knees were knocking but I recalled King Harry's appeal to his troops at Agincourt:

"In peace there's nothing so becomes a man
As modest stillness and humility:
But when the blast of war blows in our ears,
Then imitate the action of the tiger;
Stiffen the sinews, summon up the blood,
Disguise fair nature with hard-favoured rage;
Then lend the eye a terrible aspect."
It was too late to change my text, so I braced myself to deliver the prepared address.

What did I endeavour to say to this gathering of what Victorian writers would have called (for reasons I have never been able to discover), 'The Fair Sex'? My thesis was that as wives of farmers they were partners in a wonderful enterprise. Their role was so important that they should in fact be taken into the business partnership legally not only as a recognition of their contribution but also to ensure that the taxation authorities made proper allowance for the vital work they carried out. I did not advocate manual labour but I knew that many prefer to assist in the various jobs about the farm.

I was thinking in particular of the massive amount of 'paper work' that has to be done on the farm. I saw them as carrying out secretarial and accounting duties which are so burdensome to our male farmers who, unlike their English counterparts, are full-time working farmers. If the women considered themselves untrained for such tasks I stated that it was essential that they enrol in a course of instruction. If no such courses were available then I offered to help to arrange for the Adult Education Services or the Ministry of Agriculture to provide them.

I asserted that as partners in the venture they should share in the decision-making, particularly the financial decisions that every farmer has to make from time to time. To ensure that the women were free to assist in these duties it was of course imperative that they possess all the various labour-saving devices in their kitchens. To some this would mean expenditure but it was just as important as that new tractor or hay-shed.

I then spoke of what I regarded as social problems in rural areas. I cited a local school that was lacking a mathematics teacher. I suggested that it was quite likely that there was a mathematics graduate amongst the farming wives in the
district. If the Women's Organisation could arrange for the provision of child care during school hours the graduate would be free to assist in the local classroom. This was one way of overcoming the disadvantage that the children attending were encountering.

I spoke of the activities of the rural women's organisations. I quoted from a survey I had carried out amongst the wives of some of my farming friends. Like the majority of rural women they did not belong to a rural women's organisation and I wanted to know their reasons for not joining. They contended that their local branches were far too occupied with competitions for the best-baked cake and the best-knitted garment, etc. They considered that such activities discouraged the attendance of wives of younger farmers and they believed that this was also one of the reasons for the fall-off in membership. After quoting from my survey I expressed the hope that one day - not too far off - the Women's Division and the Country Women's Institute would amalgamate - just as the Farmers' Union and the Sheep-Owners' Federation had done after World War II. (We have of course the more recent example of the Y.F.C. and Country Girls joining forces.)

I made some other pleas and I tried to emphasise that if they were partners in a farming business farmers' wives should regard themselves as active members of Federated Farmers. I believed they could put some badly needed 'ginger' into that organisation and that instead of being content to assume responsibility for providing the lunch or supper for the male-dominated Federated Farmers meeting, they should participate in it. After all their welfare also is at stake. Farming numbers were diminishing and to protect and promote their interests it was essential that they join forces with the males to build an even more effective organisation.

After all these salvoes I sat down. Madam Chairwoman asked the audience "Have you any questions?" They came thick and
fast. As you would expect several challenged my assertions. One speaker from the floor asked how the average farmer's wife could possibly afford a dishwashing machine. When I told her the surprisingly low cost of a basic utility model she looked incredulous and sat down. "But what about the massive plumbing bills?" asked another speaker. I told her there were virtually none with the mobile model I was thinking of.

Another speaker attacked me for advocating a return to the cowshed for the wives of dairy farmers. I denied this - but I added that I knew of numerous dairy farmers and sharemilkers' wives who enjoyed helping in the shed. I said I saw nothing demeaning about a farmer's wife assisting in the modern milking shed. Participation of women in such work did not denote a return to the 'Depression Days'. Indeed I believe that farming is one of the relatively few occupations where the husband and wife can both participate as a team. This is a tremendous advantage that farming possesses over most other activities in the economy. I have seen the wives of farmers and sharemilkers helping in a wide range of jobs on the farm. I have deliberately asked them how they felt and almost invariably they have replied that they derived great satisfaction. If this meant that they had less time to bake those cakes and buns, so what? We are in the twentieth century and the Industrial Revolution is well behind us. If more recourse has to be had to a packet of factory-made biscuits, block-cake or cookies this will not cause the decline and fall of the farming industry. Indeed it may be beneficial to health if we reduced our consumption of carbohydrates, if we are to believe the medical authorities who tell us we are consuming excessive calories in New Zealand. Admittedly, as I have said, I was mainly thinking of that secretarial or planning work but I didn't rule out assisting at lambing time, etc.

After the meeting concluded we gathered outside the hall. I was approached by many of the younger women who told me they had appreciated the points I was trying to make. To some the
suggestion that they become business partners with their husbands in their farming venture was as likely to eventuate as the evolution of a breed of cattle producing wool. Two who had professional training in one of the disciplines I had mentioned said that while they would like to work part-time the social traditions of their group regarded it as not the 'done' thing. Another said that so long as the farm required new machinery and equipment her chances of acquiring a dishwashing machine were nil!

After the paper was published I received 'fan mail' from various parts of New Zealand. Representatives of one of the rural women's organisations expressed shock that I should quote those non-members who alleged that their branches were obsessed with cake-baking and garment-knitting competitions, etc. Others however thanked me for giving vent to some fresh ideas. At least one farmer's wife resolved, after reading my comments, to secure legal recognition as a joint partner with her husband in their farming enterprise. Her subsequent comments were 'It has changed my life'! I have not heard her husband's reaction!

I cite my address for several reasons. Firstly there is a paucity of information on the subject of rural women. Many libraries have shelves of books on Urban Society but if you are looking for studies on the rural scene you will have the greatest difficulty in finding anything.

In the early 1960s when we were commencing the 'indicative planning' exercise, working parties were established to bring down recommendations on particular topics. We managed to persuade the manpower working party to include the following recommendation in its 1964 report:

"A small permanent research unit should be established to maintain a continuous social survey of farming, including particularly problems of social life and amenities and means of increasing the retention of labour on farms."
Despite the fact that I raised the subject on several occasions at the Agricultural Production Council in subsequent years no action was taken to implement the recommendation. In 1968 at the National Development Conference I again raised the issue and the Chairman, the Rt Hon. J.R. Marshall, undertook to ensure that further consideration would be given the 1964 recommendation. It came back on the plate of the APC and by 1972 it was decided that an examination of the social factors associated with farming was essential to further planning. It was further decided that as a preliminary exercise a review should be made of the information currently available concerning the social situation of those people who live in rural areas. We secured the services of David Lloyd a Mid-Canterbury farmer-turned-research-officer and his report was presented to the Council in 1974.

In his report David Lloyd made some specific recommendations relating to pre-school primary and secondary education, medical services, and housing, plus some general recommendations. He then concluded, "Given the limitations of the information available it is not possible to come to any firm conclusions as to whether the greatest need is to improve the social services within the rural villages and districts or within the service towns. Indeed this is likely to vary from area to area. It is clear, however, that some improvements are necessary, and that greater attention needs to be given to the limitations which may be placed on agricultural production by the social problems outlined in this report."

David Lloyd's report drew attention to the urgent need for more statistical information of a social nature. When the Women's Division were looking for a project to sponsor on the occasion of their 50th Jubilee I had hoped to sell them the idea of a survey of rural women along the lines of the survey of Urban Women. Unfortunately they chose to sponsor a research project on Leptospirosis. This was a laudable effort but I considered that the funding of such research was a proper responsibility of Government.
I always maintained a close liaison with the Women's Division and its efficient and pleasant secretary, Pamela L'Estrange. I suggested to her that if the Division was prepared to advocate such a survey it was likely to receive financial support from Government. I was naturally delighted when I learned that the Division had decided to endorse such a survey, the results of which I am looking forward to seeing when they are published in the near future.

It may be said that discussion on social problems is not relevant to my topic. I believe that it is an inseparable part of it. For instance I would suggest that some of the problems in the educational field have been due to the failure of rural women (through their organisations) to put forward strong claims to ensure that adequate resources are available to rural children. It has also been said that problems of farming in recent years have been so severe that many of the males are forced to concede to their wives - "I'll look after the farm - you watch over the rest" - the rest including in many cases the education of the children. It will be apparent from what I have said already that I oppose this view very strongly.

The farm is not the sole responsibility of the male nor is the education of rural children the sole concern of the women. The fault does not lie always with the male - in many cases it is a failure of rural women to demand and get a share in the running of the farm and failure to persuade their husbands to take a more active role in the matter of rural education.

In the National Farmers' Union in the United States women take an active part alongside their husbands. Indeed membership is on a farm family basis. The potentialities of all members are tapped from time to time. For instance if success if not being achieved on a particular farm policy issue it may be decided to arrange a 'Fly-In' to Washington by a group of farm women. Each is briefed thoroughly on the issue and advised of
the Congressmen and Senators on whom she has to call. The women are very adept at such work - just as our rural women would be if they were so organised. Husband/wife leadership training in the U.S. National Farmers' Union is given at a special training establishment in the Rocky Mountain area where farming couples (and their families) can go for a fortnight's course in leadership. Could we establish such a system in New Zealand?

I am encouraged by developments in some of the Women's Division branches. They are beginning to take a greater interest in the needs of the younger farming wives. Some have organised creches to enable the young mothers to attend meetings. Others are convening panel discussions on topics of vital interest to the rural community.

Why do I consider amalgamation of the W.D.F.F. and the Country Women's Institute imperative? Firstly because with smaller numbers it is even more important that both groups unite to strengthen their activities. I have often thought that the 'Women's Division of Federated Farmers' implies that the organisation is for the wives of farmers only whereas in fact it is for all rural women - the wives of farmers, farm staff and the wives of all those engaged in the myriad of industries servicing agriculture - the stock and station agents, the transport operators, the contractors, the local retailers, the post office staff, etc. All these 'off-the-farm' staff have a vital interest in the life in the rural areas. They represent over half of the rural areas. They represent over half of the rural population and their families are being reared in the rural environment.

In the format of the meeting of rural women's organisations there is a need to interest a wider range of people. They want to do things together but not necessarily to compete. Involvement is positive, but competition, particularly in a small group, tends to be negative. I suspect that the association of
'conservatism' with rural women's organisations is often due to the older and more reactionary membership. The younger and more liberal women are sometimes deterred from attending for the reasons I have already mentioned.

In a recent issue of a country newspaper I noted a report of a meeting of a country women's organisation. It mainly comprised the results of monthly competitions. One name appears eight times, four names appear three times and one name appears twice in the ranks of the winners. For some, how could it hold the interest when year after year the same people attend? Bringing flowers to do a floral arrangement is constructive and bringing jam to sell or give away is an act of kindness - but why the insistence on "which is the best"?

In a recent report in the 'Ellesmere Guardian' I noted a report of a women's meeting to commemorate 'International Women's Year'. I quote "Two important things came out of the discussion - the problem of the loneliness of some young rural wives and the feeling that something must be done to boost educational opportunities in the country. The women of Ellesmere intend to act on both these problems."

"Community discussion is planned with a view to expanding and centralising medical and paramedical facilities and setting up a counselling service in Leeston. Amongst other things this will provide help for women with emotional difficulties."

The report went on to say that "There is a growing number of city girls - or country girls gotten used to city ways - marrying farmers. The first five years or so that she spends in the country can be a lonely time for this kind of girl. Then, when the first child starts play centre things start to gel, she starts meeting other people."

"The second point which has a real bearing on the first is that there is less 'country hospitality' around now. Television
must take some of the blame, but country people just do not get together as they did in the past. There was a time when country women visited new people in the district and made them feel welcome, but not so much now ... The other big thing is the need for better educational opportunities in the country.." These are provocative comments but I believe they have some substance to them.

To represent the rural electorates it is essential that we have high calibre people, regardless of whether they are male or female. Rural women have to debunk the notion that only males can advocate the cause of rural New Zealand. As an observer of the political arena in the House of Representatives over the last 18 years, I would say that the quality of representation of the rural areas in numerous electorates could have been very much higher. There was ample talent available from some of the outstanding women in our rural areas. The great pity is that they were not able or prepared to come forward. Did they recoil from the male-dominated selection systems? These and other questions occur to me when I seek the reasons why so few of our rural and semi-rural M.P.'s have come from the ranks of our rural women.

In the recent Australian study 'Women and Society', there was the following statement on the subject of the role of the father and mother in the family: "Olser and Hammond, in their study of social relations in Melbourne, found that the mother was far more important as a source of both praise and punishment than the father. In a parallel study of a country town, Olser and Emery endorsed the importance of the mother as a rewarding agent, but suggested that the father punished sons more than the mother did."

The autonomous role of parents in the home may be seen as both the cause and the product of sex segregation in some areas of today's society. This topic received some attention in the discussion recorded in 'Women and Society'. One male speaker
who had lived in both Japan and the United States, contrasted social situations with Australia. "In America, when you visit someone's house the wife is completely part of the conversation. Here she says "Have you boys got everything you want?" and then she'll go off somewhere else. You see it at parties. The men are up one end and the women at the other. That doesn't happen in America. It does happen in Japan. Segregation in Australia is halfway between Japan and America. An American woman, especially an educated one, will leave the washing-up and become totally involved in the conversation, but even an educated Australian woman will just fall for the domestic role. There is more segregation among educated people here than there would be in either England or America." The authors concluded, at the end of this chapter that "Australia is still a man's world and the situation of twentieth century women is still one of subservience". I suspect many of these observations would also apply to New Zealand, despite our reputation of being a leader in women's suffrage.

In our urban areas in New Zealand today, contrary to the claim that we live in an egalitarian society, there are some increasing gaps between levels of income. Taxation certainly levels out incomes but only partially - there are other compensating factors which increase inequalities. Whatever they are, the evidence suggests that divisions between the various income groups are becoming more marked. In our rural areas there is always a prospect that divisions can become more marked than in urban areas.

For example our educational system was designed to provide educational opportunities for all children regardless of the income levels of their parents. In Federated Farmers and the Women's Division considerable time and energy have been devoted to ensuring that the rural child is not disadvantaged. But in our efforts to improve the situation the authorities often confronted us with the questions "Do your farmers support their
local school or do they look for 'better education for which they are prepared to pay'?' The logical next questions are of course "Has this trend kept rural schools smaller than they need be?" and "Has this tendency contributed to inferior education for the children of those without the means to pay the additional costs of 'better' education?" I hope in the rural survey some more light will be thrown on this subject. Meanwhile I would appeal to our rural women to take an even greater interest in this aspect if they wish to reduce undesirable divisions in our society.

I would also hope that our rural women will fight to achieve educational facilities that are best for the 'consumer' of education and not those that best suit the producers. The interests of the two main teacher organisations and our rural children are not identical in every way. I could cite instances of educational policy where the demands say of one of the teacher organisations have been met at the cost to our children. In making these comments I am not unaware of the tremendous assistance of the teacher organisations and the Education Authorities generally that we have received in our efforts to improve the facilities for our rural children.

In preparing this address to you I again put some questions to those wives of farming friends who do not belong to a rural women's organisation.

They were emphatic that their local branch should offer more than pikelet baking competitions and that rural women on farms needed a more active role in the running of the farming industry. They supported schemes for giving women a training in agriculture. They were delighted that there were now 170 women students undertaking degree or diploma courses at Lincoln. This is a dramatic contrast to pre-world war II days when Lincoln was, in effect, a monastic institution.
The Ministry of Agriculture now provides short-term farm bookkeeping courses for women and these are most valuable. Similar short-term veterinary courses for women to enable them to care for that sick animal would also be valuable. There are other subjects that would be useful to farm women and I am delighted to read of the earnest efforts of the Ministry of Agriculture and other authorities to provide them.

Regretably, in my view, many farmers still consider that the woman's place is in the house. The provision of training for farm women would facilitate the husband and wife partnerships I spoke of earlier. Also a trained farmer's wife could enable the wives of farm staff to take a greater interest in the operations on the farm as they could sometimes assist the farmer's wife.

There is no denying that there is a feeling of resentment amongst rural women at the job opportunities available to urban women. On the other hand many urban women do not work by choice and the nature of the jobs undertaken by many could hardly be regarded as attractive. In some rural areas cottage-type industries have I understand been organised, with a ready demand in the cities for the products of such efforts.

I would hope that rural women will continue to encourage visits by town people so that a greater understanding can be gleaned of the lot of our rural people. Despite some disadvantages, life in rural areas is attractive and many of my rural friends wouldn't swap it for life in a 'box on an eighth of an acre'. The surroundings are usually more pleasant, it's often easier for raising a family and there is no noise from the neighbours! On the other hand, medical services in many rural areas are still nothing to boast about.

In times of illness or emergency in the home the farming wives can usually call on their husbands more readily than can urban dwellers. In human terms this can be a tremendous advantage.
Let me conclude by reaffirming my basic thesis that our great farming industry would, for the reasons I have outlined, be even more effective if greater numbers of our rural women took a more active role in it. It would not only help the farming industries to make an even greater contribution to the economy, but it would also enable more of our rural women to develop and apply more fully their latent and precious talents.

Generally I advocate the greater involvement of women in all aspects of rural life today.
Perhaps you are thinking that this is going to be far too advanced for you and that I am a qualified accountant or such. This is not so. I have no qualifications for this type of work, except practical experience gained through working in a large accountancy firm in Christchurch, and of course a tremendous interest in both farming and accounting. I do not even have School Certificate.

Now perhaps for a little background information. I was brought up on a mid-Canterbury farm, my father getting a Returned Servicemen's Rehab draw in 1945. My mother who had worked in an accountant's office in Timaru before her marriage did all the accounting work for my father and continued to do so till the age of 71. In the last six years she carried out these duties, the work had become very involved because of the partnership between my father and my brother. This was all done without the services of an accountant, and I can remember occasions when letters went back and forth to the Tax Department several times until both parties were satisfied. I believe this background formed the interest I now have in both farming and accounting.

I attended primary school in Ashburton and secondary school in Timaru. I spent a year at home on the farm before working for
four years in the Ashburton office of the New Zealand Farmers' Co-op. During the first 18 months while I was cashier I wrote up the firm's cash book - which was very involved - and also taught myself to operate the bookkeeping machine. I operated this for the following two and a half years. After a nine month trip overseas to South America I came home and again worked on the farm for six months as my brother had gone for a trip to Tokyo. I was then very fortunate in getting a position with a large firm of accountants in Christchurch. After working there for four years I left to get married and make my new home on a farm at Courtenay, near Darfield.

My husband, John, encouraged me to take an active part in the keeping of the farm accounts. After discussing this with his accountant, it was decided to keep a cash book and at the end of the next financial year do the accounts right through to the balance sheet. That was seven years ago. In the first two years time was not a problem but now with three young children, two boys aged 5½ and 4 years, and a daughter 9 months, the situation can get rather hectic. Also I like to take part in a few interests outside the farm such as church activities, gardening and garden club, Plunket and a machine knitting club.

Because of the close communication between John and myself, I know most things that are purchased on the farm and am therefore able to check the incoming accounts. I always cross check and add all invoices and check them onto the statements. It is surprising the number of mistakes that we have found over the years, and they have seldom been in our favour. For example, last year John had nine and a half tonnes of fertiliser spread on the farm. The cartage for this was charged separately on one invoice and then duplicated on the invoice where the spreading costs were charged. This amounted to a credit of $38. The next month we found a $13 error, again not in our favour.
I remember a few years ago John found he hadn't been credited with sacks after selling some grain to a firm, and after we spent many hours checking back on previous years and enquiries with the firm concerned we found other discrepancies and came out about $100 better off. It was a hard battle but we had the facts right and the firm was slow to give in to their mistakes. So I consider careful checking of all accounts as time well spent. Due to a good filing system these records were easily found.

A good filing system is very important, so instead of putting all accounts and so on into a drawer, it is more practical to file them in alphabetical order, or in order of receipt. I use two ring binders, one for bank statements and credits, and the other for accounts paid by cheque. At the end of each financial year I remove and bind them, and then label them with the appropriate year. It is much easier when looking for details from previous years. I know some husbands do not encourage their wives to help with the accounts, and some wives do not have the interest, but I am sure it brings a closer relationship for the wife to the farm activities. It is also a guide as to knowing where the income is spent. A lot of wives hear of the large cattle, lamb, wool or grain cheques received, and wonder a few months later why their request for a new fur coat is turned down. I am sure that even a very basic understanding of accounting helps us all to realise some of the problems involved in running a farm in these times of high inflation. Last year the Ministry of Agriculture and Fisheries in Darfield held a course in record keeping and budgeting, especially for farmers' wives, and this year they are running two courses to fill the demand. I am sure this course would be a great help for anyone who was keen to help their husband with the accounts.

Whether you deal through a stock firm or a trading bank you receive monthly statements of your cheque transactions. From these statements I write up a cash book which has one column
for the amount of the cheque and 25 columns for details. You could of course write up your cash book from your cheque book as cheques are written out and then tick them off from the bank statement as they are presented. Full details on cheque butts are essential. The name of the firm is not adequate. Cheque butts must include enough detail to allow your accountant to place them to their appropriate expense account. In my office experience I saw many hours wasted in tracing cheque details. Remember time costs money. I find it easier to write up our cash book from the monthly statements as John deals with a stock firm, so therefore a lot of items such as seeds, wire, fertiliser and fuel and so on are debited straight to the account. I have a separate page for detailing the incoming cash, and of course I must add the columns and make sure everything balances. And then by subtracting debits from credits make sure your balance is the same as on the statement received. Writing up the cash book would entail approximately one hour's work per month, depending of course on interruptions from children.

Until two years ago I used to add all these columns in my head, but now like a lot of other farmers we have a small calculator, which is a real time and headache saver. At the end of the financial year these columns are all totalled and of course balanced off. The sundry column is analysed and any necessary adjustments are made by journal entries. A journal entry is a term used in bookkeeping where you transfer an amount from one expense account to another. For instance, you can only claim one quarter of your house power as a farm expense, so therefore you transfer three quarters from your power account to your income account. Then the sundry creditors - accounts owing by us at balance date and not paid - and sundry debtors - money owing to us and not received - are listed and analysed. From all these figures I then draft up the trading accounts for sheep and grain and arrive at a gross profit for each.
Now the depreciation schedule is done. This is a list of all buildings, vehicles, plant and machinery on the farm, and the book value depreciates each year. The amount of this depreciation is claimed as an expense on the profit and loss account.

Next I do the income account. The net profit from the profit and loss account is carried forward to this account and from it is deducted all our personal spending, including the private proportions of car expenses, car depreciation, power and dwelling repairs; also life insurances and taxation. The new balance, which we call the surplus for the year, is transferred to the capital account on the balance sheet.

When we are satisfied that everything is correct we take a copy of our accounts to our accountant who goes over them with us and makes any necessary adjustments. The accounts are typed out in the accountant's office and our accountant deals with the tax and any queries that may arise. I will not dispense with an accountant and the assistance and advice he gives. This finalising of accounts would take me roughly three or four days.

I also have a registered stud sheep flock which was started before I was married and has now increased to 75 ewes. It is a good interest and also one way of dividing the income from the farm between husband and wife and thus saving tax. I must add that the Inland Revenue Department appear to be suspicious of arrangements between husbands and wives, and we have answered several letters in this respect. Although records for a stud are quite detailed and time consuming, it is another aspect where the wife could usefully become involved if there is a stud on the property.

Budgeting is another important aspect of accounting. To be worthwhile a budget must be done at the beginning of the financial year and it must be done in detail and with some care.
When working out your budget, income should always be kept on the conservative side. Firstly, you estimate your income by working out the number of sheep and cattle to be sold and take a realistic price. Then estimate the amount of wool to be and take a realistic price. Then estimate the amount of wool to be sold and a price for it. Now estimate the number of tonnes of grain you expect to harvest. At the time of doing your budget you should know the price of most grains and seeds. Any other farming income you know you will receive should also be put into your budget. Now detail your expenses for the year and use your previous year’s accounts as a guide. Some of the previous year’s expenses may not occur this year, and of course there may be additional expenses to be listed. The most important thing to remember - and do - is to update your budget monthly. That is why the keeping of a cash book can be so helpful and I emphasize again how useful the wife can be in this part of the running of the farm. We have found a budget very helpful when considering the purchase of a new header or tractor or other major items. Budgeting can also be a useful exercise in controlling household expenditure.

Looking at the economic side a wife can draw wages for her help on the farm and also for a secretarial fee as long as the proposal is put to, and approved by, the local Commissioner of Inland Revenue beforehand. The wages must be paid on a regular basis and P.A.Y.E. deductions must be made in the normal manner. This would of course lower your husband’s taxation. We don't regard the saving of cost the most important factor.

In this address I have not attempted to go into detail of all accounting procedures, but if any of you wish to become involved in this interesting part of the farm running I am sure you would receive help and guidance either from your accountant or a farm adviser from the Ministry of Agriculture and Fisheries. But to do this it is essential that you have the interest; and the encouragement of your husband.
Two weeks ago a lady phoned me to make a booking for a Farm Holiday cottage. She told me that although her children had been to a farm she had never been on one herself. This seems almost incredible in New Zealand where we think that most city families have relatives or friends in the country. But I find that this lady's lack of a farm experience is not uncommon, particularly when so many people have come from overseas to settle here in recent years. I would think that at least 40% of our clients seem to be new New Zealanders.

How did the Farm Holidays scheme begin? About seven years ago, Mr David Yerex, who will be familiar to many of you through the farming television programmes, attended a seminar on tourism. As he returned from the seminar he wondered what connection there could be between tourism and farming. He then thought of all the town people he knew who would love to holiday on a farm, and the farmers he knew who had empty cottages and homes too big for them. He started with a small group in Southern Hawke's Bay and the first summer had about ten members. Demand soon outstripped membership, then vice versa and so it has grown to the extent that today there are just on 300 members.
The gross takings of Farm Holidays for the eight months from August, 1975, to the end of March 1976 was something in excess of $67,000 with an estimated income for the year at close on $80,000.

There are three aspects to the Farm Holidays scheme. It offers fully-equipped cottages to rent, live-in accommodation for children only, and live-in accommodation for adults or family groups.

The cottage side of the scheme is understandably the busiest as it is within the reach of the average New Zealand family and most people enjoy their independence when on a family holiday.

Children's live-ins are sought after but the cost seems to be beyond the reach of many who inquire. A great number of inquiries come from working mothers who want somewhere for their children to go while they continue at work.

Live-ins for adults cater for both New Zealanders and tourists. But the greater number of live-in clients are from overseas - English, Americans, Australians, Noumeans, Canadians.

From the comments that come back to me in letters and phone calls the scheme is certainly catering for a wide variety in its clientele who in their different ways are enjoying their farm experiences. Many are the stories I could relate to you. In a letter from San Diego last month an ex-client wrote "... it was the greatest ... the highlight of our New Zealand trip. We were treated as honoured guests, yet felt part of the family..."

The headquarters of Farm Holidays is in Wellington. It is responsible for the printing and publishing of the 25,000 brochures which are distributed in New Zealand and overseas each year; the insurance of the guests; the supervision of
and liaison with the members; the inspection of the facilities they offer; the handling of complaints; advertising and promotion on a national scale.

There are three Farm Holidays booking agents located in Auckland, Wellington and Christchurch. Other travel agents both in New Zealand and overseas, including the Government Tourist Bureau, are able to, and do, make bookings through the Farm Holidays agencies.

All accommodation is graded on an A1 to A4 basis and priced accordingly. Only cottages of a high standard are accepted into the scheme. These, and live-ins, are visited by a Farm Holidays representative before acceptance. This means we have a personal link with all members which we find invaluable. This is reinforced by holding, when possible, annual group meetings of members throughout New Zealand. Two were held in Canterbury last week and very pleasant and happy occasions they were too.

I would just like to say that anyone going into the scheme cannot expect to make a fortune. The monetary rewards vary considerably. For cottage members the return could range from $250 to $1,000 a year depending often on the hospitality offered, the quality of the cottage, and the general locality. Some live-in hosts may have only one or two bookings during the year while others may be quite busy with guests. There are some who record returns in excess of $1,000 a year. Like many things in life one gains from the scheme whatever one is prepared to put into it.

The meeting together of city families and their country hosts in this happy relaxed atmosphere is a rewarding experience for both parties as they discuss with each other their differing ways of life, so creating a better understanding between urban and rural peoples.
When we took over the family estate about three years ago we were lucky enough to move into a ready made tourist attraction. The house has nine bedrooms, two living rooms, dining room, kitchen, laundry, store rooms, three bathrooms and a billiard room with a full sized table. It was built in 1903 with totara milled on the property and still contains a lot of the original furniture. The long drive in is a special attraction during spring as it is lined with flowering bulbs but even during autumn the leaves of all the old English Oaks, Walnuts and Golden Ashes add their touch of glamour. The house is completely hidden from the road and therefore offers an element of surprise. All the trees were planted by the original members of the family. The grounds surrounding the house include swimming pool, croquet court, tennis court, barbeque area and several flower beds.

The companies which we deal with ring me about two hours before the tourists arrive to let me know the numbers coming. If there are more than 15 they ring me the night before. When they arrive they are greeted and offered tea or coffee and while I'm making this they wander round the garden or produce a camera and start shooting. During morning tea I tell them some of the history of the place and show them the old family photo album. When they have finished I take them on a tour of
the house pointing out the particular things of interest, mainly paintings done by the family going as far back as the great grandparents and of course the billiard room. After their look around they walk up through the grounds past the dog kennels and stables, to the woolshed where my husband works a dog and shears a sheep.

We have a basic charge of $1.50 per head though this is lowered when there are more than 60 in the group. Our only direct expenses are scones and the tea and coffee and normally each group would involve about two to three man hours depending on whether or not I have to bake. If a group is especially interested and relaxed it may stay up to two hours but on an average they usually stay for about an hour. Since January this year we have put through 2,060 visitors, the main bulk coming between January and March. From now until about September or October we can expect things to be a lot quieter.

At the beginning of this year we signed a contract with the Intrav Group which involved a party every four days for exactly three months. We were told to expect 40 to 80 per group but as it turned out we averaged 85 and twice coped with 140. We found the easiest way was to stagger the arrival times of the buses, the first would arrive at 9.30 and at 10.30 whilst the first group was watching sheep shearing the second bus would arrive for tea and coffee.

There are naturally a few hardships. During the busy season you find that there is very seldom a day which you can have alone with the family. We noticed with the large group especially that the two children were affected because they were unable to be as free as usual but the worst thing of all was all the money and gifts they were given. By the end of the season my three year old was asking for money and sweets just like a little begging Boy. At least though, he was asking for his 18 month old sister as well!
The other thing I find so hard is the fact that every single room is entered and even some of the wardrobes inspected. The whole house has to be 'on show' practically all the time and this can have its problems as I would not class myself as one of the world's best housekeepers.

On the other hand we have been very lucky with some of the people we have met. Many still send cards at Christmas time, others send photos of their visit when they've returned home. Tips are inevitable but not always accepted. Most important of all though is the fact that the income from these tourists means that we can afford those little extras which normally we would have to do without.
We are living in times when we see great changes all around us, great advances in science and technology. It has been said that our life style changes every 10 years. This may not seem very evident or true, particularly to those of us living in rural areas. Life seems to go on in the same humdrum way, where we are governed so much by the weather and the seasons. But today the role of the country woman has changed greatly from that of our grandmothers. For instance, if I had been told 10 years ago that I would be directing a lily business, or more terrifying still, be standing here today, I would not have believed, and possibly held up my hands in horror.

In a recent survey conducted by the New Zealand University Women some interesting facts emerged. Rural women were not excluded from this survey 'Women at Home' and I quote:

"Investigating the way women changed their occupations after marriage, the survey noted that most rural women, whatever their previous occupation, ended up doing farm work after marriage. What was noticeable in all areas was the number of trained nurses who are not following their profession; again particularly obvious in rural areas."

As one of those nurses who trained before my marriage 25 years ago, I mention this because my training, even though not being followed now in the professional way, helped a very shy and
retiring young woman to meet people, deal with emergencies, and work to a routine, all very valuable and necessary in running a business.

It was while travelling overseas that my husband and I realised the possibility of diversification in farming, and on our return to New Zealand became interested in lily culture and were fortunate to have the opportunity to buy out a well-known lily business Ounhampton Lily Fields. When we talk about lilies we mean 'Liliums', one of the 2,000 varieties of the lily family. Of these liliums there are approximately 80 species all of which it is interesting to note are natives of the Northern Hemisphere, and from which we find the countless numbers of hybrids which are so popular.

When we first began to grow lilies on a large scale, the bulbs were planted in raised beds, but we soon found that the maintenance of these beds and the intermediate paths, was too great an expense, requiring several outside helpers. More recently we have found that growing the bulbs in long rows, similar to potatoes, has the advantage of less upkeep, and together with the pre-emergent sprays, has minimised labour costs so becoming a more economic proposition.

Today my husband and I work as a team, requiring little outside help. With our two sons now having charge of the farm, we are able to concentrate on this business, together with another horticulture venture of my husband's and with which the preparation of the soil for replanting the bulbs, topdressing, and spraying programme, works in well.

With well over 50 different varieties of liliums in stock, care must always be taken to ensure these do not get mixed. Good healthy stock is important, and a constant scrutiny of plants must be made during the growing and flowering season; as well as great care in digging. So far little mechanisation is used in this business, all digging being done by hand.
digging is completed, all bulbs are sorted, the largest selected bulbs used for scaling to produce new stock, the large ones packed for sale, and the smaller bulbs replanted. Bulbs are packed by hand into named plastic bags. Then comes the task of packing the orders for the many hundreds of customers. After being packed for posting I can assure you the local postmistress has a very busy time, and an interesting time, as many orders are sent to places little known throughout New Zealand.

Handling correspondence is a task in itself, and my family comment on my 'fan mail'. All orders must be checked for correct listing and payment including packaging and postage. A thorough list of clients is also essential so that next year's Catalogue can be given the widest publicity. Arranging the Catalogue in summer, and deciding which stocks are to be included is difficult, as bulbs are sometimes disappointing and not up to standard for selling; this not being known until bulbs are dug in the late autumn. Consequently some substitutes must be allowed for.

Once the growing and producing of saleable bulbs is achieved, one has to learn the marketing of these goods. Costing of bulbs is important prior to setting out the Catalogue and allowing sufficient profit margin, bearing in mind increases in costs such as sprays, fertilisers, wages, packaging and postage. In the first few years it became obvious that costs would outstrip profits. Instead of showing profitable returns to the farm as we intended with this diversification, it was soon apparent the business would become a burden. So a fresh look had to be made to see what was wrong. The mail order service was obviously not growing, so a fresh approach was made to the advertising programme, and as a result so far this year our clients have increased by nearly 500 to over 2,000. This proves that not only must one learn to grow bulbs, but one must learn to sell, advertise and find fresh markets.
All this is not without some changes in my life. A farmers' wife is always busy, especially if she takes an active part in community affairs, as well as home and farm life. But to run a successful business one must make adjustments. I have the advantage in my business, that my work does not take me away from home. Even so big changes have to take place in the household. I have found that the pattern of meals altered, although I do try to serve a good balanced diet, with preparation of these meals being done in the evenings or weekends, very often in bulk and making full use of freezer facilities. One is always on the look out for quick and easy recipes, such as a half hour pudding!

Like so many working women, household duties such as cleaning, washing and ironing take on a different meaning - they are not so important now the family has grown up, and especially with so many labour saving devices in the home. The garden is one area of change also. Living in an old family home surrounded by beautiful trees, I feel it important to keep attractive and tidy surroundings as I have many lily friends calling at home. Shrubs and roses now predominate over annuals and demand less upkeep. I feel it is important that one must not lose contact with friends or give up hobbies because of pressure of business. This can be a valuable diversion and refresher to the mind. The contacts made at social and community activities are invaluable to the person and the business.

This work is not without its frustrations, the greatest of which I think on looking back was my feeling of inadequacy to cope with this business virtually on my own. This sense of inadequacy led to a fear of making mistakes through lack of knowledge, and a fear of letting down the many clients who had placed orders for bulbs through the mail order service. This inexperience and lack of knowledge led to inevitable mistakes, often expensive as was the case on more than one occasion when sprays killed valuable plants and seedlings. These frustrations have been great at times, but are counteracted by the
joys one finds as one grows accustomed to the work. To find new seedlings, new flowers and good bulbs; to receive letters from satisfied customers, who in some cases relate their life histories - almost, is a constant joy and most rewarding. To help achieve this I am indebted to friends and lily growers with years of experience who have been only too willing to help with information, advice and encouragement. My family too have given their help and shown great tolerance. In a venture such as this a business could not be run without their understanding and co-operation.

And what of the future? What can we look forward to, or hope to achieve? Inquiries for new markets are being made from overseas for the export of flowers and bulbs; opportunities are opening up almost daily and there is every possibility of this coming into reality. The importing of new stock bulbs from overseas is another avenue, and one must be on the look out for new and exciting varieties, as this creates and stimulates interest. There is no end to the possibilities and potential to help contribute to the farm economy.

In conclusion, to be able to contribute to the farm economy in this field, one must feel confident that within a given time, it will show a reasonable return to the economics of the farm. This can only be achieved by being prepared to listen to others for knowledgeable advice, and learning to rectify mistakes by putting that advice into practice. We must also hope that nature will play its part, for to produce good lily bulbs and flowers, one depends on co-operation of both man and nature.