REPORTS BY SPONSORED DELEGATES TO THE 8th INTERNATIONAL GRASSLAND CONGRESS

Some of the Association's sponsored delegates to the Congress presented reports to the conference and expressed thanks for the privilege of attending the Congress.

SOME IMPRESSIONS OF BRITISH FARMING

C. E. IVERSEN, Lincoln College

My main impression from a visit to Britain in 1960 is that British farming is acquiring a "new look". This new look is not universal and does not apply to a large number of small, poor farms, but the upper strata of British farmers are making so much headway that New Zealanders could learn a great deal from them.

The basic factor in this new look is money, mainly from subsidies. The net farming income of Britain's 300,000 farmers is about £350 million, of which about £300 million comes from subsidies. While subsidies are essential for the survival of the smaller farmers, the upper strata are rapidly reaching a stage of efficiency where subsidies are not required. Whatever our opinion of such subsidies may be, we nevertheless have to live with this philosophy. Britain starved in two world wars and is determined not to repeat the process. As a consequence, all sections of the community are convinced of the need to subsidise agriculture. Subsidies do make for some incredible farm management, but they are providing the impetus for enormous development.

The first lesson I had to learn in England was that I had to change my ideas about the use of fertiliser nitrogen for pasture in that country. This was the most interesting and controversial session of the Congress with Mr J. O. Green, of the Grasslands Research Institute at Hurley, putting forward the new British view on nitrogen use, and Dr P. D. Sears very ably presenting the New Zealand philosophy.

For years we have had two opposing schools of thought: the New Zealand view of complete dependence on clover nitrogen, and the Dutch view of complete dependence on fertiliser nitrogen.

Britain and many other countries have compromised somewhere between the two viewpoints.

In 1956 at the 7th Grassland Congress Professor T. W. Walker introduced a controversial note by demonstrating that the use of nitrogen up to about the 6 cwt level achieved no increase in total production from the grass-clover sward. In the intervening four years several workers have repeated and confirmed these experiments. The British viewpoint has now swung this way: a straight grass-clover sward will produce about 4,000–5,000 lb of dry matter. A little (2–6 cwt) nitrogen does not materially affect this total; with adequate nitrogen a grass sward will produce 10,000–20,000 lb of dry matter, so that for high producing grasslands the pendulum has swung almost entirely to bag nitrogen. Many New Zealand visitors to Britain over the past ten years have picked up the compromise philosophy of using a little nitrogen, and there is a considerable use of this fertiliser in a minor way in this country. However, the weight of evidence seems to be against such use. The phrase "judicious use of nitrogen" is often heard. Perhaps there is some case for its use for preventing winter burn, for altering the season of growth, or for redressing the balance in a clovery sward, but the net gain is probably small.

To what species is high nitrogen applied? In England at the moment S22 Italian ryegrass is the grass considered most suitable. Clovers may be sown with it but are of no purpose. Irrigation is essential for full use of nitrogen, which is applied at 4 cwt per cut or graze, giving a total of 200–400 lb of nitrogen per acre. From our local viewpoint the cost factor is vital. Nitrogen is 6d. a pound in England and 1s. 6d. here; clover is inefficient in England and efficient here; the price of the animal product is much higher in England.

One immediate effect on New Zealand could be a lower demand for our clover and grass seeds. However, it is as well for us to realise that the winds of change are blowing in the grassland world and we may gradually find that our present philosophy is outmoded.

A further development of these high-producing grasslands is the use of zero grazing where the grass is cut and fed to housed animals. While this is not common, a few enterprising farmers are using it very efficiently on farms where pugging is severe and access is difficult. One such man is W. Smith, of Derby. He is essentially a cropping farmer with 170 acres out of 220 acres producing high yielding cereals and vegetables. Fifty acres are devoted to grass for dairy cows. This latter enterprise, while profitable, is mainly for fertility restoration. Mr Smith believes that grass grows by inches but dies by feet. His grass is S22 Italian,

left down for two years, irrigated and given 400 lb of nitrogen, 200 lb of P_2O_5, and 300 lb of K_2O annually. Five to six cuts are obtained, yielding 20,000 lb of dry matter over seven months. One such field produced 1,428 gallons of milk per acre over the growing season with the cows being given 3 lb of concentrates per day. With a harvester, one hour is required daily to feed 52 cow equivalents, surplus grass being made into silage. The saving in fencing, water supply, and access roads probably offsets the cost of feed cartage. The farmyard manure is applied to high producing crops such as potatoes or vegetables.

Another cropping farmer in Yorkshire was using a similar system for dairy cows and his aim was 50,000 gallons of milk from 50 acres of grass plus 1 lb of concentrate per gallon. Such production is so far ahead of average farms in Britain (and in New Zealand) that the system must be treated with respect.

The nitrogen influence has even spread to fat lamb farms where on perennial ryegrass 10 ewes are being carried and 400 lb of lamb meat produced per acre.

There are many more good cropping farms than there are good pastoral farms. In the best districts yields are extremely high in spite of very severe rotations. Good farmers expect between two and three tons of wheat, oats, or barley per acre. The use of high yielding (but often poor quality) varieties, extensive weed control, and heavy fertilisation on soils of good structure permits rotations such as winter wheat, spring wheat, barley, cocksfoot seed (one year). Expenses are low in that there are no fences, gates, water supply, or buildings required; also rents are low. The fertiliser programme for wheat of one such farmer with 250 acres was as follows: 60 lb of nitrogen, 60 lb of P_2O_5, and 60 lb of K_2O at sowing; 80 lb of nitrogen in the spring and 40–80 lb of nitrogen at shooting. He was earning 20 per cent on his capital investment.

Subsidies lead some farmers into peculiar farm management; for example, a Salisbury Plains farmer with 400 acres grew nothing but barley; he was selling it off the header at £16 per ton, but was receiving the Ministry's subsidy of £12 in addition.

To summarise: thanks to plentiful finance British farming is on the move. We can expect increasing competition in our traditional market for dairy products, fat lambs, and mutton. However, there are more people in the world every day and standards of living are gradually increasing. For the quality products we produce there is a world market, at a price. It behoves us to emulate some of the enterprise of the British farmer to produce more efficiently in order to compete effectively in such markets.

IMPRESSIONS OF TOURS TO FARMS IN ENGLAND AND WALES

J. O. H. TRIPP, Outram

One of the highlights of this tour was Mr Bomford's farm in Worcestershire, where we were most interested in cocksfoot seed production.

I believe that our average production here is about 200 lb per acre, whereas in England it is 400 to 800 lb per acre, and even as high as 1,100 lb per acre. As Southland is probably our biggest producer of cocksfoot seed, I thought I would find out how they did it.

To start with they don't sow it in a pasture for seed, but it is sometimes lightly grazed with cattle.

It is sown at 3½ lb per acre in drills about 20 in. wide. The first year 5 cwt of sulphate of ammonia is used in the autumn, and the second year 4 cwt is applied in the autumn and 3 cwt of nitro lime in the spring.

Interrow cultivation is sometimes used if weeds are bad, and also spray irrigation is used in this 27 in. rainfall area. Mr Bomford was the first man in England to use this type of irrigation.

The trouble with cocksfoot is that the tip ripens first and by the time the base of the head is ripe the upper part has shed its seed.

In harvesting as soon as a few seeds can be crushed out of a head in the palm of one hand, the header is brought in, the drum speed is set as low as it will go, say 450 revolutions, and the drum set as far from the concaves as possible. About 30 per cent of the seed is collected like this and the residue is left in compact windrows for four or five days, when it is picked up again by the header, this time with normal concave and speed settings. Another 30 per cent of seed is obtained like this.

The seed is then dried to 12 per cent by "in bag" driers, which can do 82 old fashioned big bags at a time. Bulk driers can also be used so long as cool air is used. 100 degrees F is the maximum heat to be used, as germination is easily affected by greater heat, in fact dried air rather than hot air is safest.

As there is a subsidy of 40 to 50 per cent on farm buildings, many farms are installing driers costing anything from several hundred to several thousand pounds.

I should say that this will also mean that grain and to some extent small seeds could be grown in slightly wetter districts than usual, so driers will mean greatly increased production. This would apply in New Zealand as well. Incidentally the average price per lb for cocksfoot to the grower for the last three years has been 1s. 11d.

One other important point is a clean burn just after harvest, mowing the stubble helps this. Many harmful insects and fungi are thought to be destroyed by this method. Three to five harvest years are normal.

At Aberystwyth we were shown the experimental plots of all the grasses, but my main impression was that it is palatability that counts. Some beautiful looking Danish grass had been grown with high hopes, but stock would not eat it.

Sod seeding was also demonstrated, and trials showed that a strip 1½ in. wide has to be cut out to allow the seed to emerge. A slit is not good enough, as it chokes the seedling.

At Trawscoed and Penglais, attached Varsity farms, it was shown that fertility build-up in grazed pastures is not lost through cutting hay or silage. Three seasons' work also showed that hay tedding, preferably with a special machine, immediately after cutting causes hay to mature much quicker and it can be baled 24 hours earlier. This bit of knowledge could save us thousands of tons of hay each year. I have used this method with success.

We went up and over some of the Welsh hills in to Mr Griffith's farm near Staylittle. The way that man had tackled those steep hills with a small Ferguson tractor amazed us. There were slopes of about 1 in 3 on which they had used a single furrow plough and gone straight down the slopes and up and around an easier way, empty, to the top again.

For clearing and ploughing this type of country a subsidy of up to £12 per acre is paid, if it can be shown that £16 per acre has been spent on it. Of course with fat lambs at £7 each it does pay well to plough this steep land. Cultivation was done in the same way, but rolling was impossible with a light tractor, so 1,000 sheep were driven backwards and forwards across it and did every bit as good a job as a Cambridge roller. This rolling method is not unknown here of course.

A £7 subsidy is paid for ploughing up a four year ley so farmers naturally take advantage of this and very little clover is sown with a short ley. Many crops are undersown with 20 lb of rye and 1 lb of white clover, and they get their nitrogen from the bag. Sulphate of ammonia costing £20 7s. 6d. per ton carries a subsidy of £9 19s. 6d., so it costs the farmer only £10 8s. per ton, not much more than a quarter what it costs us.

In Leicestershire we saw some really good pastures, especially in the Welland Valley. Some of these have never been ploughed yet were still fattening up to two steers to the acre. Sir George Stapleton selected some of his original plants from these fields, and one field, the mill field, was the most productive that he had ever seen.

Our last big visit was to the Cambridge Royal Show, which was huge. A map was needed to find our way about, and there was even a small train to take people around it. We had only two days there but it would take the full four days to see it properly.

A few interesting things I saw apart from the tour were:

An unusual crop that I came across was a dredge crop. This is a mixture of oats, barley, and wheat, rather less wheat than barley and oats. The varieties are carefully chosen so that they ripen at about the same time. The mixture of grain is used for feeding dairy cattle in winter. This saves the expense and time of mixing the grains.

A farm in Huntingdonshire that I visited had about 1,100 acres, all ploughable. Part of this was in wheat and barley and a large part in vegetables for the London market, including 250 acres in brussels sprouts. A labour force of 60 is normal, plus extra for seasonal work; 28 tractors are used. Early potatoes are also grown scientifically and although the tonnage per acre was a trade secret, I gathered that it was considerably greater than we get here.

The mechanical science used is remarkable; for instance, you know the trouble we have in losing potential growth through premature sprouting, or the sprouts not advanced enough; this farm has a big building in which the trays of seed are placed in long double lines with gaps of about 6 ft between each double line. Banks of fluorescent lights are hung on pulleys in the ceiling and these are lowered between the tiers of seed to simulate daylight at night and stop growth. The room is also thermostatically controlled for heat.

Then, about three weeks before planting the heat is turned on, the lights turned off, and the shoots are at the correct stage of growth, about one inch, at planting.

This man also had huge stacks of maturing soot in sacks, costing £6 per ton with not less than 7 per cent ammonia content, plus of course the various trace elements that are in soot. This is used at 3 tons per acre on the heavier land and is effective for three years.

He was also using shoddy on the lighter land, that is the waste arising from wool manufacture, and the actual off-cuts of woollen materials. This also has a guaranteed ammonia content of 7 per cent and costs £12 per ton. It is spread by muck spreaders before

being worked into the ground. Its effects last for about four years.

The sowing of small seeds such as cabbage is also highly scientific. Eight seeders are placed on the three-point linkage and are capable of sowing one seed at any spacing from 1 in. up to 8 in. These seeders are electronically controlled. There is a panel of coloured lights in front of the driver and if a seeder fails to drop its seed or sows two by mistake, the appropriate light flashes.

The main impressions of New Zealanders on this tour were:

The high efficiency in winter fodder conservation. The poor permanent clover pastures that were offset to some extent by high nitrogen topdressing.

The large acreages of cereals, due in large measure to the £7 per acre ploughing subsidy, and the efficient mechanisation of the farms.

SOME OBSERVATIONS ON THE 8th INTERNATIONAL GRASSLAND CONGRESS 1960 AND GRASSLAND PRACTICE AND RESEARCH IN OTHER LANDS

H. WOODYEAR-SMITH, Technical Fields Adviser, N.Z. Farmers Fertiliser Co. Ltd.

Probably the most important experience at Congress and visits to other countries was the opportunity to see, examine, and compare farming, farming costs, and agricultural research with those in New Zealand. Being away and able to make these comparisons puts these matters in their proper perspective. The natural advantages for grassland farming which New Zealand possesses over all other countries visited stand out in sharp relief. Why is it that on these fairly remote islands in the South Pacific we can still grow grass cheaper and better than any other country perhaps in the world? The answer is that climatically our position is unique. We have a temperate climate, a long growing season, and well spread rainfall, which mean natural advantages of untold value, for they are not enjoyed to the same extent by other countries.

There is nothing new in what I am saying. We have been told about their advantages over and over again.

These wonderful, natural advantages for growing grass in New Zealand really do exist. They are matters of fact, not opinion. They are no pipe dream or products of imagination. But they do truly represent the most important natural assets we have.

Knowing this, what should be our objective and the obvious prudent course to follow? Surely we should plan and devote our maximum financial, physical, research, and educational energies and resources to the safeguarding of these great assets. If we are to survive we must put them to good and proper use, to grow more and better grass and turn that abundant plant energy into butterfat, meat, and wool by ever improving the soil-plant-animal type of farming for which we are so well equipped. The standard of living of every man, woman, and child in this country depends on how well we do this. The world needs and will need our grassland products at reasonable prices. But if we continue to become complacent and allow these priceless natural advantages to become political playthings or frittered away, the costs of growing grass and using it will continue to rise until we finally succeed in pricing ourselves out of the market. The world will find other and cheaper

ways of producing foodstuffs, make no mistake about that. We hold no permanent exclusive world rights over the type of agricultural products we export. The farmers, scientists, and chemists in other lands are not blind. When the opportunity and incentive become apparent they will grab them. There is no sentiment in these matters. It is all a question of competition and costs. The untapped resources of the world for growing and producing foodstuffs and fibres for clothing are enormous. When one moves round, it is possible to appreciate this potential. It was discussed at the Congress. Other countries are spending vast sums of money in all branches of agricultural research. Extension services are being built up and improved. Incentives are offered to the practical farmers to change, improve their methods, and increase production, and this is taking place willingly and objectively in countries which do not live by exporting agricultural products, but the manufactured goods produced by highly efficient secondary industries operating in a tough, competitive field. New Zealand grassland farming and research enjoy a good reputation overseas; let us always plan and strive to keep it so.

In North America, the United Kingdom, northern and central Europe the growing season is short, in places barely five months of the year. During that time the farmer aided by the research worker has to utilise properly every hour of that growing season to carry him over the rest of the year.

On the successful, well run and managed farm there is no time wasted. Cultivation, preparation, fertilising, harvesting, or whatever it may be is done always about the time known to produce best results. Delay means costly failure or a partial failure to these overseas farmers. They are forced to squeeze every ounce out of the growing season. By making the fullest and best use of the time at their disposal, they achieve impressive results.

We could perhaps profit from this example and by doing so increase production materially besides getting a better return for the time and money involved.

An outstanding example of thorough, painstaking animal research work was done on pasture in California. A ranch owner, Mrs K. M. Mailliard, bought a pure bred line of New Zealand Merino sheep 20 years ago. At the same time she imported a few stud Merinos of the same strain from Australia. Then, with the assistance of the University of California, a carefully controlled progeny testing project was commenced to find out if successive generations of these Merino sheep could be improved without the addition of any fresh introductions. Nineteen years of progeny testing has resulted in:

A remarkably uniform dual purpose sheep.

The body weight has been doubled.
The yield of wool materially increased.
The sheep are uniformly clean faced.
The front "apron" has been almost eliminated.
The growth rate of the lambs much increased.

This new type of Merino has been produced under hard range conditions.

In the United Kingdom is to be found today some of the most progressive arable farming and the most highly mechanised farming in the world, and Britain still remains the home of the world's best stock. The permanent pastures of the United Kingdom and Northern Ireland do not generally come up to the standard of the best in New Zealand. But this modern farming miracle which has taken place since 1939 has in places produced pasture yields over a six months' growing season which are outstanding. According to Dr W. M. Davies, Director of the Grassland Research Station at Hurley, of the 36 million acres of grassland in the United Kingdom, 46 per cent consists of rough grazings mainly in the West of Scotland, the Lake District, Yorkshire Moors, parts of Wales, and large areas of light sand and gravel country in the South of England. These have yet to be exploited. The great proportion of grassland work in U.K. consists of short-term leys. In an endeavour to compensate for the short growing season, very large quantities of synthetic nitrogen up to 18 cwt per acre are used in topdressing. The use of good strains of clovers as a means of supplying nitrogen for the short life pastures is not general. Costs of production are high but are offset by the generous subsidy scheme. Britain provides a classic example of a country which lives almost entirely by the exports of its highly organised industries, and on its great commercial undertakings, banking, shipping, insurance, and tourist trade. Threat of war and food shortage focused attention on the agriculture of the country, the results of which can only be appreciated when seen today. It is a case of industry subsidising agriculture in a country able to give its people cheap food, clothes, and amusement, as opposed to New Zealand where agriculture subsidises secondary industries.

The United Kingdom is spending huge sums of money on agricultural research. This was considered to be a sound investment in a country which lives by its exports and not its agriculture. We can certainly learn another lesson from this. New Zealand is almost entirely dependent on her agriculture, yet the money made available for agricultural research and extension is only a fraction of that spent in Britain.

It was in this setting—a prosperous, balanced, tolerant country, the home of good, if subsidised, arable farming and first-class

stock—that the 1960 International Grassland Congress was staged. The Congress was opened by the President, H.R.H. Prince Philip, Duke of Edinburgh. Delegates from 54 countries attended and 150 papers on all phases of grassland farming were presented.

The Congress was well organised and planned throughout. It was a great gathering of research and extension workers and farmers of all nations, seeking to learn of improved methods to grow and use grass more successfully to produce food for the rapidly increasing population of the world.

The views of the New Zealand delegation, as representatives of the most advanced grassland farming country in the world, were eagerly sought. Dr P. D. Sears and Dr C. P. McMeekan were treated almost with reverence, so high do they stand in the ranks of the world's grassland research workers.

The leadership of Dr Sears was excellent and stimulating. The best and most controversial papers at the Congress were given by New Zealanders, including those by Dr Sears, Dr McMeekan, Dr P. Barclay, Dr R. O. Whyte of F.A.O., and Mr G. S. Robinson of Massey Agricultural College.

The number of papers presented at the Congress made the working sessions marathon-like and this form of cramming left insufficient time for discussion. This was unfortunate and certainly detracted from the value of the Congress.

The general impression which emerged from all the work at the Congress did not suggest any violent or revolutionary changes in the New Zealand system of grassland farming. Improvements and progress must be the order. Grassland research and extension must be developed on the same scale as that found overseas. The farmers of this Dominion and the thinly spread ranks of agricultural research and extension workers have done a grand job and have nothing to be ashamed of. But no one in New Zealand can afford to be complacent. If we are to hold our place as the premier grassland country, then action not words are needed.

It is clear that if we devote our major energies to the job that this country is best suited for, the growing of grass and the production of grassland products, then the agricultural future is bright and it is up to everyone of us to work to that end.

DISCUSSION

Q. Would the forage harvester be suitable for conditioning hay as against conventional methods?

A. No, experience showed ordinary swarth mowing and tedding into windrows was superior. A special type of tedder is used for meadow hay which crushes the material and makes it possible to bale 18 hours from cutting. Another type of tedder does not crush the hay and is used as soon as cut. This enables hay to be baled 24 hours earlier than usual.

Q. Have you seen the tripod method of haymaking?

A. Yes, the tripod making machine appears excellent and turns the hay out in neat dumps. The tripods are carried on the machine and when the chamber fills, the tripod is dropped leaving a neat heap of hay on the tripod.

Q. What other types of manures did the English farmers use, and how much?

A. At sowing, wheat is given 60 lb each of nitrogen, P_2O_5 and K_2O followed by applications of nitrogen in the spring. There appeared to be a tendency to use too much nitrogen and not enough phosphate or potash.

Q. Considering all the cost involved, what is the price obtained by farmers per gallon of milk.

A. 3s.

Q. What is the reason for lack of clovers?

A. Not really known, but suspect climatic and light factors. It could also be affected by £7 subsidy for ploughing a three or four year ley, in which it would be uneconomic to sow good clover with sulphate of ammonia so cheap.

Q. Is there any intention of reducing subsidies now that big progress is being made. Prof. Cooper has levelled criticism at the scheme in that respect?

A. Subsidies are being reduced and there is a tendency to do away with them. Much of the profit of farms is really the result of subsidies, in fact two-thirds of profits are from subsidies.

Q. When do they burn their cocksfoot stubble?

A. Immediately after harvest and before the crown makes new growth. Mowing stubble first is important so as to carry a hot fire.

Q. Is sulphate of ammonia the usual form of nitrogen used?

A. Nitrolime or nitrochalk are the main nitrogenous fertilisers used, there being very little of sulphate of ammonia used. The former is usually used in spring, the latter in autumn.

Q. Is some portion of subsidy recovered in income tax by the Government?

A. Same as here. The subsidy tax concessions are given to major development of land.

Q. What is the attitude to soil testing in Britain?

A. Soil testing in Britain is a poor service, as it is in most other countries visited.

SOME ASPECTS OF PEAT DEVELOPMENT IN ENGLAND, IRELAND AND THE U.S.A.

I. L. ELLIOTT, Rukuhia Soil Research Station, Hamilton

During my visit to Britain to attend the International Grassland Congress I took the opportunity of visiting the Fen District to study drainage and peat development in this area. Later I saw something of peat research and development both in Ireland and the United States. Because I have been associated with peat development in New Zealand, I have chosen this subject to speak about today.

Most of you are probably aware that peats vary widely, depending on the way they are formed, the plant materials whose remains compose them, the nature of the parent material on which they are laid down, the climate in which they are built up, and the nature of the drainage water moving into and out of them.

In New Zealand the largest and most important areas of peat land occur in the Waikato and Hauraki Plains districts, while another large area known as the Seaward Moss occurs here in Southland. All these areas have a potential which has so far only been partly explored.

In the brief compass of this article I can do little more than make passing reference to the areas I visited.

The Fens: This is a large area of swampy country lying roughly between Cambridge and the Wash into which it drains. It has been developed over a very long time and has become famous for its productivity. Not the whole of the area is peat; in some places the peat has virtually disappeared. The big problem of the area is to provide adequate drainage. In the pumping installation at St. Germans three of the pumps handle 1,000 tons of water per minute and the fourth 1,200. All pumps together can handle about one million gallons of water per minute.

To give some idea of the productivity of some farms on the fen, I quote a property of 2,000 acres staffed by 65 men returning over £20 per acre net. Crops grown are wheat, sugar beet, peas, and potatoes.

Ireland: Peat bogs of one sort or another are scattered over much of Ireland and traditionally peat has been used for centuries as a source of fuel for household and other purposes. During more

recent times many of the swamp areas have been developed by the Bord-na-Mona for the production of electric power, and special problems will exist in the rehabilitation of these areas after the peat has been won. The area which interested me the most is situated in County Mayo in the north-western part of the country. Here the peat is a blanket type peat covering gently rolling country to a depth of 12 or 14 ft. The peat is formed by a mixed vegetation of heathers, rushes, and various grasses. It is acid (pH about 4.5) and extremely fibrous. Water moves through it with difficulty so that it is difficult to drain. It has been laid down in a very damp climate, so that overdrainage and irreversible drying are unlikely to be significant.

It is mainly the difference in Ireland's summer climate and ours which makes the Irish method of reclamation a possibility. It is certain that such methods would be unworkable in the Waikato-Hauraki Plains areas. Early in their investigations Irish workers were using three tons of lime per acre. This has now been reduced to two tons and it is thought that even as little as 10 cwt per acre may be adequate.

Because of the open nature of the native cover of the swamp, it is possible to secure excellent establishment of grasses and clovers by surface sowing. Six cwt of superphosphate and 2 cwt of muriate of potash are applied at establishment, followed by maintenance dressings of 4 cwt of slag and 1 cwt of potash or 2 cwt of superphosphate and 1 cwt of potash in alternate years. If this procedure is followed, really good pastures can be developed on raw swamp.

Probably the greatest difficulty in developing this area of peat is associated with drainage. Many ingenious devices and much complicated equipment have been designed.

After a good pasture has been developed, the main difficulty appears to be to consolidate the extremely spongy peat to allow the passage of animals.

U.S.A.: Only a very small sample of the peats of the United States was seen during the visit. In Wisconsin, some 60 miles from Madison, the peat is used entirely for the production of horticultural crops. It is very spongy, has an initial pH of about 6, and is laid down in a rainfall of some 25 in. per annum. It is subject to extremely cold winters and warm summers. Crops grown are lettuce, celery, beans, and carrots. Yields are high and harvesting is mechanised to the maximum.

On two occasions now I have travelled overseas to the Northern Hemisphere and have used each occasion to look at the utilisation of peats. On both occasions I have returned to New Zealand filled

with enthusiasm for the potential which our peat soils here in New Zealand might be made to display. I am convinced, however, that the real future of many of these areas is not for pastures, but for horticultural and agricultural crop production. My great concern at the moment is that what we are doing to our swamps now will not preclude their effective use for crops some time in the future.

A FEW ASPECTS OF AGRICULTURAL RESEARCH IN GREAT BRITAIN

W. R. LOBB, Winchmore Irrigation Research Station, Ashburton

It is not possible to discuss many aspects of research in the brief space allotted. Therefore the important principles are those on which I wish to comment, more to draw your attention to my own reaction to these rather than to criticise the research being done; nor do I necessarily wish you to accept this opinion as being the correct one.

In New Zealand research with nitrogen has been quite limited, but there is quite obviously increasing interest in the possibilities of increased pasture potential from the use of artificial nitrogen with the possibility of local manufacture as adjuncts to either the oil refining process or the development of the low cost power here in the south. This will make cheap nitrogen available for use in New Zealand. Or that is what we may be led to believe.

It is because of this that I would like to comment on two important aspects of nitrogen research overseas.

In the first instance I was extremely disappointed with the quality of the pasture on which most of the comparisons between bag and legume nitrogen which I saw were being made.

To understand this one should briefly describe the pasture of southern England. The soils are good by our standards. They are similar to those of the limestone areas of Tokarahi in North Otago and have about the same rainfall. They produce similar wheat yields—about 80 to 100 bushels; in their case with heavy dressings of phosphorus, potassium, and nitrogen, in ours without any of these. In their case about ⅒ of the farm would be in grass, whereas in ours about ⅒ would be in crop. A substantial area of their crop would be used to produce grain to feed animals; none of our grain would be so used.

This emphasis on crops has brought about a completely different outlook on pasture from ours. Their main concern with pasture

is with its effect on subsequent crops in the rotation, and experiments to measure this are to be seen on all experimental stations, either Government or private, in the United Kingdom. The usual age is one year pasture, but the range over which they are interested is the one, two, or three year lea. I would be surprised if all this experimental work did not add up to the result that grass has little effect on the subsequent crops and that the only likely effect would be on structural maintenance, which might not be a cause of undue worry on many of their excellent structured limestone and flint soils. (A very similar situation appears on the vast Great Plains area, the "bread basket" of the United States.)

What then is their pasture?

It is sown with a grass-clover mixture, basically ryegrass-white, with red featuring in the one year leas (or I should say the mixtures for the one year leas). By far the greatest area is sown under a nurse crop of barley. This would not be so bad if one could understand the fertiliser practice. The barley is given a heavy dressing of a compound fertiliser of N, P, K (nitrogen, phosphorus, potash) at sowing. I presume from this that P & K are limiting factors and one would not expect to establish good clovers in their absence. The oversown pasture, however, does not receive fertiliser at sowing. Thus we have it competing with a ruptured crop while it is itself faced with limited P & K. We know how far we would progress with a young clover pasture under this circumstance. I was tempted to ask why they bothered to sow clovers at all under such circumstances, as there was little chance of ever seeing it.

To make matters worse, and the clovers a little poorer, they may give the barley crop a further topdressing with nitrogen. Then to complete the picture they have to give the young grass pasture nitrogen in the first spring to make it grow.

The utilisation of the young pasture is for silage, as conservation for winter feed is the most important single factor in pasture utilisation. This arises from the fact that most of their grass is used for winter milk production and in consequence the philosophy of making as much silage as possible, instead of as little as necessary, has become well established. To get this silage, nitrogen is necessary, so now we add the final devastating blow of competition for light to our sown clover plants; that is, the few which did survive the initial difficulties. This factor alone may be more important than the absence of nutrients (P & K) for the clover plant, as the heavy dressings of the latter which have been given over the intensive cropping period should at least provide some residual effect.

However, one still could not escape the possibility of there being

other deficiencies than P & K taking their toll of the clover plant, and it was interesting for me at least to see an excellent clover response to trace elements at the celebrated research area of Rothamstead. The manner of this too is of interest. They started the experiment with the set idea that trace elements were of no concern, so the six were all lumped together. The plots were included only to use up some spare plots in a standard N.P.K. experiment on the effects of grass on subsequent crops in the rotation. The response to the trace elements was an excellent one. My guess is that molybdenum may play a very significant part on a lot of the limestone soils and also in some of the very acid soils in the United Kingdom. However, they will have to sort this out for themselves.

This then is their pasture: little clover, given a bad start; forced with nitrogen to give a heavy cut of silage; exit clover; a complete summer slump and no production during that part of the season when we would expect the pasture to produce most. Then more nitrogen and so on.

These pastures are then used for research into comparisons of legume versus bag nitrogen. More often than not these comparisons are between nitrogen and no nitrogen. It is not surprising that bag nitrogen usually comes out on top. As on purely theoretical grounds this would normally be expected even with good clover conditions, it is not surprising that it should be so to the extent of being actually economic under the conditions mentioned above.

It appeared to me that in most cases the legumes in these short-term (one, two, and three year) pastures were non-symbiotic. This may be a direct result of nitrogen use on crops, as the residual nitrogen may be providing enough for the few poor clover plants that grow. It is noticeable that clovers provided with nitrogen were often better than those without, and one wonders to what extent the symbiotic behaviour of the clovers has been studied. Thus, while admitting that nitrogen, used well, may produce more grass than grass dependent on clover for its nitrogen, I would think the whole position of the relationship of crop to pasture and of soil fertility under a nearly total pasture system as against a nearly total crop system requires careful thought. Whereas the English farmer may use up to 15 cwt of fertiliser to grow an 80 bushel crop of wheat, we would need none, neither phosphate nor nitrogen giving worth while responses. And we do this on land of lower quality and in most cases very deficient in phosphates and nitrogen, and may be in other things such as molybdenum and sulphur as well. We can restore fertility in long-term pasture to grow crops without fertiliser. Under a nearly total cropping system it seems that crops don't build a fertility pattern in which you can grow

grass without fertiliser, and that residual values of past fertilisers are not great on the crops themselves; that is, judging by the way fertilisers are used.

Not only do clovers appear to lack vigour, but one finds under the intense cropping programmes that the soils appear inactive under pasture. There are probably no high worm poulations (in the soil) and this too may cause quite serious limitations in the nitrogen cycle.

I started by saying cheap nitrogen may be available in New Zealand. I would like to know if this would be so. Actually nitrogen in England is not cheap; it is cheap to the farmer because it is subsidised. Are we then to be dependent on a subsidy for our cheap nitrogen, and who will pay?

The second point I want to make is this: I was alarmed by the extent of agricultural research in England that was in the hands of the manufacturing firms. This has a great bearing on nitrogen research and on fertiliser research generally. Not only is the research field packed with commercial influence, but the extension field is also. This research is backed with the best facilities, the best qualified (or trained) staff available, and there is no appearance of lack of money. The English agricultural scene is a prosperous one and there is such obvious scope for this great incubus, supported not by the agricultural industry but by subsidies from taxpayers and the manufacturing industries, that one can almost see the path of the agricultural subsidy money as it goes from industry to farmer and is returned to the profits of industry again. At present the course of the New Zealand farmer is not made indecisive by the action of subsidy or commercialism and one would hope this position may continue.

TRENDS AND ADVANCES IN PLANT IMPROVEMENT OVERSEAS

P. C. BARCLAY, Grasslands Division, Palmerston North

During five months I have been privileged this year to investigate genetical and plant breeding research, farming practice, land utilisation, and collection or exchange of plants or seeds in nine countries. In addition I attended two conferences, the sixth meeting of the FAO working party on Mediterranean Pasture and Fodder Development in Rome, and the 8th International Grassland Congress in Reading, at which I presented a paper "Breeding for Improved Winter Pasture Production in New Zealand".

At Reading there were seven sessions, containing a total of 42 papers, that were of direct interest to the plant breeder. The

papers included such diverse topics as quantitative studies of production characters, inbreeding in a polyploid species, induced polyploidy, improvement of cross-fertilising, self-fertilising, and apomictic species, breeding for resistance to disease or pest, appraisal of varietal characteristics, herbage seed production and certification, testing of herbage varieties, and plant improvement studies in a number of regions of the world. Strong interest was shown in the many papers that had a bearing on the problem of the development of selection techniques for assessing individual plants and their progenies under conditions of controlled competition and defoliation. For example, the paper of Lazenby & Rogers, of the Plant Breeding Institute, Cambridge, showed that a 9 in. spacing of single plants of perennial ryegrass gave a similar assessment for dry matter production to that obtained from a sward, whereas a 27 in. spacing gave an entirely different assessment.

During a visit to Aberystwyth I discussed the work of Ellis Davies and his associates who are conducting similar experiments in lucerne and in white clover. In both species broadcast plots gave, in certain cases, very different assessments from those obtained from normal spaced plants, and in lucerne certain close spacings gave very similar assessments to those of the broadcast plots. In only one of this group of congress papers, that of Gardner describing a permanent wire mesh technique for use with simulated swards, was the grazing animal used.

Before the plant breeder can select improved types, variation must be available and this may be either natural or induced. Insofar as natural variation is concerned we already have at Grasslands Division introductions from Mediterranean countries that are proving useful in our breeding programmes. It was therefore of great interest to be able to visit Portugal and Spain, each for two weeks, and to make personal contact with many research workers from different scientific fields who will now assist us in a more intensive search for valuable new plants. For us, one such new plant might well be *Dactylis lusitanica* from Portugal. Aberystwyth are already multiplying this for release and it has been shown to have winter growth in Great Britain superior to that of any cocksfoot.

Later at the FAO conference in Rome I met representatives from eleven Mediterranean countries, as well as FAO specialists, and discussed with them problems of plant collection and exchange. At this conference Dr R. O. Whyte announced the convening of an international technical meeting on plant exploration and introduction to be held in Rome, probably in July 1961, and there was discussion on the possible establishment in a suitable

Mediterranean environment of a cooperative Plant Exploration & Introduction Centre. As adjuncts to this centre, Dr Whyte urgently recommended a network of areas throughout the Mediterranean and Near East, protected from all use by man and his animals or his plough and from fire. It is important that we in New Zealand have a vital interest in the preservation and collection of Mediterranean pasture plants and it is most desirable that New Zealand should be directly represented at any future international discussions.

With regard to induced variation I was able to visit three important atomic radiation centres—Brookhaven, U.S.A., Wantage near Harwell, U.K., and Roskilde, Denmark. I gained the impression that, insofar as beneficial mutations are concerned, greater emphasis is being placed on setting up experiments that will determine more critically the extent to which such mutations are actually induced by radiations. It was interesting, however, to learn at Wantage of Dr Davies's success in making for the first time certain wide crosses between brassica species after irradiation which apparently affected the constitution of the hybrid endosperm.

A number of recent research advances seen during my visits have a strong bearing on present New Zealand problems. Dr Hertzsch of the Max Planck Institute, Cologne, West Germany, has a complex intergeneric crossing programme between ryegrass and fescue species. His techniques, which are most elegant and include dissection and culture of hybrid embryos, are of distinct value and will be incorporated into our own programme.

Red clover is well known as a shy seed setter. One frequent cause is the lack of suitable bumble bees. Norgaard Holm of the University of Copenhagen has achieved complete domestication of two species of bumble bees, *Bombus terrestris* and *Bombus lapidarius*. *B. lapidarius* is regarded as most suitable for red clover in Denmark, but is not found in New Zealand. I would strongly recommend that the further introduction of suitable bumble bees into New Zealand be reconsidered.

Many countries now have induced tetraploid red clovers of great promise, as we have in New Zealand, but all are poor in seed setting. Dr Akerberg and his associates at Svälov, Sweden, have made selections for long and short corolla tube within tetraploid red clover and have found that bumble bees visit and pollinate the short selections but do not even visit the long selections. This is an important contribution and must be taken into account in our own studies.

Again, in red clover, Stoddart at Aberystwyth has greatly increased the flowering of their variety S123, without changing

either the height or the time of flowering, by spraying at appropriate times with an antiauxin substance TIBA.

During a visit to Oregon, U.S.A., I was very impressed by Dr Hardison's researches on the effectiveness of sanitation methods, especially the autumn burning of seed crop residues, for the control of plant diseases such as ergot in *Paspalum dilatatum* and tall fescue, blind seed disease in ryegrass, leaf rust of *Poa pratensis,* and foliar diseases of cocksfoot. However, in wet years the method is not so effective and Hardison has developed high octane flaming equipment that is easily attached to a tractor and large areas of green grass can now be quickly flamed with good control of microorganisms and little damage to the pasture. This approach may be of value in the control of organisms such as the facial eczema fungus and the Argentine stem weavil.

(In the absence of Dr Barclay a summary of this paper was read by Dr P. D. Sears.)

SOME IMPRESSIONS OF THE 8th INTERNATIONAL GRASSLAND CONGRESS, AND A BRIEF GLIMPSE OF HILL FARMING IN SCOTLAND AND WALES

F. E. T. SUCKLING, Grasslands Division, Department of Scientific and Industrial Research, Palmerston North

With the primary object of the Congress in view, opportunity was taken to visit the major hill areas of the United Kingdom, namely, Scotland and Wales, to further my studies in hill pasture research before the commencement of the Congress.

8th International Grassland Congress

Although there were very many excellent papers presented by world authorities in various fields of agricultural research, I was disappointed to find that hill pastures as such were almost entirely neglected. In fact only one paper was presented on the subject and this dealt with grazing behaviour studies on hill pastures in Scotland. Sheep farming in general also received only brief attention, with only three papers on physiological disorders, three papers on internal parasites in sheep, and one New Zealand paper dealing with the identification of fragments of plant cuticle in sheep faeces as a means of indicating which plant species have been eaten. There were several papers on management, however, but these had an indirect bearing on the subject.

Grazing Behaviour Studies and Hill Farming Research

Approximately 14 million acres in the United Kingdom are utilised for hill sheep farming, which represents about a third of the total agricultural land. Although produce from hill pastures only represents about 5 per cent of the agricultural output, it must still be regarded as an important feature of British agriculture, for, as in New Zealand, the hill pastures are the breeding areas for store stock. Most hill sheep in both Scotland and Wales are maintained on the hills throughout the year with little or no supplementary feeding, and this, coupled with the general lack of fencing, leads to extreme selectivity in grazing by flocks. Research has shown that no long-term improvement is possible unless mixed grazing is introduced. It is also recognised that the natural environment of hill sheep will have to be changed to achieve improvement in production, and research is being directed toward this end, as well as to study the natural environment.

Impressions of Hill Farming

In both Scotland and Wales it was apparent that the lack of improvement is largely due to sociological rather than agronomic problems.

Many farms, particularly in Wales, are too small to enable full use of the latest technical developments to be made. In general farming is based on a long tradition of self-sufficiency and has become complicated by large families and over-subdivision of farms into uneconomic units. In Wales lead mining was at one time the major industry, with farming as a sideline, but today, with lead mining being uneconomic, it is necessary for many small farm owners to take employment elsewhere and run the farm on a part-time basis.

The average farmer is reluctant to change centuries-old farming habits and practices. Hill lands have in the main never been fenced. Each farmer "hefts" sheep on separate grazing areas where sheep remain without trespassing on an adjoining area. Shearing is usually carried out in July when the job is regarded as a social occasion. On bigger farms, with larger flocks, it was not uncommon to have up to 30 shearers with an average of about 20, and on smaller places about 10 men would be necessary. Today, however, in some more modern sheds portable plants are installed and only one or two shearers are doing the work in a fraction of the time. The change from the old to the new is very slow because of farmers' reluctance.

Topography

The hill country of Scotland and Wales ranges up to 4,400 ft, with many peaks up to 3,000 ft. The general topography becomes

more rugged and has steeper gradients towards the north of Wales and the north of Scotland. For the most part, however, the hills have relatively easy grades. A common feature of these areas is the plateau-like hill tops where blanket bogs and peat formations are frequent.

Climatological

There is no doubt that the hill farmer in Great Britain is under a severe climatic handicap when compared with his counterpart in New Zealand. He has to contend with high rainfall and low temperatures, particularly in winter. Sunshine hours are short and light intensities generally too low to allow good white clover growth.

From December to early May most hills provide insufficient feed to maintain the ewe in reasonable condition. High soil acidity, high rainfall, and cold, cut pastures to the extent that most sheep are from 10 to 30 per cent lighter during this period which coincides with pregnancy. Hence it is understandable that lambing percentages are low. The national average is 80 per cent and in many poorer hill regions is as low as 60 per cent.

Soil

Most of the soils of the hill areas of Scotland and Wales are very acid, some having a lime requirement of 7 tons per acre as well as being deficient in other minerals, particularly phosphate.

Light dressings of fertiliser as applied generally in New Zealand give no response in the United Kingdom and trials have shown that there is no escape from heavy fertiliser applications. The majority of hill soils require at least 2 tons of lime before phosphate will give its best return, although there are a few hill areas where responses are gained to phosphate only.

Pastures

Hill pastures are generally mixtures of patches of different associations. On the higher land, particularly in Scotland and to a smaller degree in Wales, there are deep blanket bogs on which one finds heather, nardus, molinia, and sphagnum moss. Other areas are dominantly of bracken fern, heather, nardus, molinia or agrostis, and fescue. On any particular farm one may find patches containing all the above mentioned species forming a mosaic of associations.

On the better grassy hills, with an association of agrostis, fescue, and nardus, approximately one ewe is carried to two acres. The poorer hills, on the other hand, with a mixed hill herbage of heather, rushes, scirpus, sedges, cotton grass, and molinia, carry

only one ewe to 10 or more acres. In between there are large areas of heavy rainfall where one ewe to four or five acres is maintained and on the dry heather hills one ewe is carried on three to four acres.

Each hill pasture therefore presents its own problems arising from the proportions and types of swards present. From the brief observations I was able to make bracken appear to have increased of recent years due to the lack of subdivision for controlled grazing and to the fact that on unfenced country there are now few shepherds available to husband stock so that weed control can be effected. Under the present system sheep graze at will and select graze the hills.

It is not uncommon to see men scything fern on the hillsides where regeneration has taken place through lack of grazing control, and in other less steep areas the mowing machine is used extensively to control bracken fern.

On the three hill farming research stations in Scotland and hill research farms in Wales every effort is being made to bridge the gap in pasture production during winter. This has so far been mainly with supplementary feeding with hay and concentrates. They have found that supplementary feeding is as good on alternate days as is daily feeding. They have also found that increases in production have resulted from mixed cattle and sheep grazing. As in New Zealand, they find that this beneficial effect of cattle is due to more efficient utilisation of a herbage that sheep alone fail to graze effectively.

It was very apparent to me that pastures were in the main, poorly grazed, and that the use of cattle on the hills was prohibited by the over-valuation of the breeding cow and steer through heavy subsidies. Similarly, I did not see a wether on my journey through Scotland and Wales. Because of the economic trend pasture and weed control has become most difficult.

Pasture Improvement

On several farms I saw areas which had been fenced, ploughed, and reseeded with great success. The Welsh Plant Breeding Station has produced strains of grasses and clovers for hill pasture use and of these species S23 ryegrass appeared to be very satisfactory. Kent white clover also appeared to be suited to the conditions, although in Scotland I saw New Zealand white clover thriving in an oversown pasture. One of the chief difficulties in ploughing hill country is the reversion to rushes which takes place after pasture establishment.

Several farmers have made excellent progress with oversowing pastures with improved strains of grasses and clovers, but in all

the farms visited where improvements had been made the improved areas were unfenced, which led to difficulties with selective grazing, and also in spring and summer there were not sufficient stock to control growth.

The impressions gained were that there was plenty of clear-cut knowledge on the technical aspect of hill farming improvement. There are, however, difficulties in integration of technical "know how" into a farm improvement programme. Fancy stock prices, lack of subdivision, inherent high acidity and poor fertility of the soil, and high cost of supplementary feeding are only a few of the problems the British hill farmer has to contend with.

THE ADVISORY SERVICE IN BRITAIN

B. T. JORDAN, Department of Agriculture, Dargaville

Until 1946 the farm advisory service in England and Wales was controlled by local government under county councils. After the war it was realised that for efficiency, cooperation, and effect the service needed uniformity under a central administration.

Today the 14-year-old organisation is to my mind efficient, effective, and competent. The despondency with which agricultural extension is viewed in this country was, as far as I could see, entirely absent. This remark is meant to be constructive rather than destructively critical. They have had a vastly different attitude towards agricultural extension. Britain, close as she is to the turmoil and crisis of a rather unsettled continent of Europe, must consider defence whenever she considers a national and economic move. The new advisory service was introduced immediately after a sickeningly destructive war, to take care not only of the needs of a rather backward agriculture, farmed by a group with a fairly low morale, but also to provide a team that could quickly organise the country's agriculture should the need arise.

A headquarters was centred in London and eight regional centres were established throughout England and Wales. Three of these regions were considered to be too big and at both the south-western and south-eastern regions sub-centres were established. Wales, the largest area, with 13 counties, had two sub-centres. Twelve experimental husbandry farms are run at vital points for the benefit of both advisors and farmers.

With a region or sub-region there are from two to seven counties each with its county officer controlling the district advisory officers and the horticulture, poultry, machinery, and livestock officers.

There are 60 county advisory officers alone in this area no bigger than the South Island and Wellington Province combined. The staff each county has varies, but there are in the vicinity of 400 district advisory officers plus the other sections I have mentioned.

Regions have a very important job, as they, at their centre, are really the diagnostic station for the area. They have two main sections, science and husbandry. Under science they have sections dealing with soil chemistry, nutrition chemistry, bacteriology, entomology, and plant pathology. Husbandry deals with crops, grassland, machinery, poultry, livestock, horticulture, and milk production. At one of these centres alone they have a staff of 230.

The experimental husbandry farms have a comparatively small professional staff of five or six and are used to explore techniques and practices suggested by the universities and research stations before they are passed on to the farmer.

County officers hold an extremely high position in both the public service and the community as a whole. Their grading varies only slightly from that of the regional directors and in fact I believe the salaries are similar except that regional directors have an expense allowance.

Although district to district variations changed the circumstances, it was found generally that the county officer's deputy did most of the regulatory work—serving on committees, attending to the whims and fancies of various callers, and really doing what we commonly know as the donkey work. The county officer, besides directing the staff under his control, spent a lot of his time in the field with his staff and at times on his own.

Where the counties are small the deputy, who is often a youngish man, would have a small district to look after besides his other duties.

It is a massive organisation and like all big companies and businesses it has its misfits, but these are few. The most common failing I saw was to have a highly qualified man, say a Ph.D. as county officer. As a research worker he was probably in the top line, but as a staff organiser and generally good relations officer he was quite hopeless. I'm sure these men realised their failings and this made the position worse, as they had no idea of how to overcome the position.

Most of the staff I met were enthusiastic and very sound in all phases of management. It was of real interest to me to see how contagious enthusiasm could be. From meeting the county officer I could judge what sort of attitude to expect from the district

officers. It was wonderful to see the spirit in the Gloucestershire County and how Mr Barber's drive had been instilled in each officer I met.

Advisory officers go about their daily work in much the same way as we do here, but I feel because of the compactness of their territories they have less of the particular and regulatory work and are therefore more able to concentrate on the advisory side. They have very few trials, as most of this is carried out on the experimental husbandry farms or left to a staggeringly large team of commercial research workers attached to one of the firms like Boots, I.C.I., or Fisons.

Many of the advisory officers conducted only one or two trials annually. They have no direct control of the Young Farmers' Club, as this is under a separate organisation, one which to my mind bears investigation, as it seemed to be most efficient and inexpensive. However, the officer was called on to give lectures as he does here.

Soil sampling was another of the small jobs which in Britain was generally handled by a technician.

Budgeting has become increasingly important, especially for sorting out the inefficient sections of the many enterprises on the typical English farm. In one county alone 600 farmers have asked for assistance in preparing budgets.

Farmer contacts per man are between 300 and 400 annually. Of course there is a much greater possibility for requests when a member of the N.A.A.S. staff is on the farm at least three times a year for subsidy purposes.

I feel that the method of technique in farmer approach and introduction of ideas has not been well studied by our English neighbours. Not that I believe our service is any criterion on which to base my criticism, but there are always two ways to approach a subject and the straight line, although the shortest, can sound brutally blunt.

The English advisor has a number of advantages when compared with our own service. He has a smaller district, which means he becomes well known. The number of properties he services will depend on the average area, but it will vary from 400 to 1,200. He has greater research facilities on his doorstep in the regional headquarters. The distance to his immediate controller, the county officer, is short. One's work is more confined to the one particular job and there is more opportunity to concentrate on just that.

I believe a greater incentive is provided for the extension worker in Britain than for his counterpart here. I have been told that this factor doesn't count, but I'm sure it is important for the

well being and contentment of staff as well as in drawing the best out of a man.

Whether or not you take frequent shifts as being an advantage depends upon one's own likes and dislikes, but it is the view of those in authority that it is advisable to shift a young officer while they can, for experience. They do not leave him too long in the most progressive nor the most backward districts and also believe that if he is to be of use to the service later his experience must be wider than the small district he may serve as an advisory officer.

On the debit side of their organisation, I did not like the way a senior officer could come into a district just to satisfy the snobbish landlord, who did not want to be bothered with a "lowly" district advisor.

Trial work is only now being correlated and recorded in a worthwhile manner. Too much emphasis is placed on the results of commercial firms. They are no doubt true, but I think they must naturally have a bias towards the products the firm wishes to sell.

In general the organisation and attitude of the extension service appealed as highly efficient and well directed. Their praises were sung by many farmers when asked on the quiet what they thought of the service.

Subsidies, of course, have brought the advisor more into direct contact with the farmer just as the use of television for farm discussion groups has helped the farmer to feel he knows the advisor even though in actual fact he is a complete stranger. It all boils down to business principles. If you want to provide a service, then that service must be advertised.

We in New Zealand cannot hope to increase the volume we already do, but the Englishman is on a different footing; he wants to sell the service, he wants the farmer to become efficient so that in a time of crisis he can maintain the greatest morale builder of all—food.

DISCUSSION

Q. What basis is there for worry about commercial firms handling a large amount of research in the U.K.?

A. (W. R. Lobb): The amount of research they do is not the worrying factor, rather the direction of the work which appeared to have commercial bias in answering specific problems.

Q. Are there better opportunities for an advisory officer to go through the more comprehensive administrative levels which exist in U.K. than in N.Z.?

A. (B. T. Jordan): There is more opportunity for an officer to go through the various levels. He can obtain more complete administrative and field experience.

Q. What effect has the subsidy system on the rate of progress of development of hill country?

A. (F. E. Suckling): There are too many small farms that hold back the rate of progress. In general it is having only a small impact on the rate of development.

Q. To what extent is the subsidy system being used by hill country farmers? There has been no figure given of the average amount paid to farmers for various work.

A. (F. E. Suckling): I know 70 per cent of hill country farmers are on subsidy but it would be difficult to work out the average payments for certain jobs.

Q. Is there any evidence of work on development of lower altitude common lands?

A. Not a great deal. The question of finance looms higher than the technical problems.

Q. What does the panel think of meadow fescue as a pasture species?

A. (F. E. Suckling): It isn't a particularly high yielding grass.

Q. Is the English subsidy system in farming resulting in more private money being made available to farmers?

A. (I. L. Elliott): There is no bar to how much land a man can own, consequently highly efficient people gaining big areas do channel money into agriculture.

Q. Would not increased availability of money be rechannelled back to the Government in increased taxes and death duties?

A. (I. L. Elliott): I did not have much opportunity to study finance and taxation, but quite obviously much of the subsidy would be returned to the Government through taxation. I gained the impression that investmen in land was largely used as a means of protecting capital assets.

Q. What comparison was made with the National Advisory Service in England and the University service provided in Ireland and Scotland?

A. (B. Jordan): I liked the Scottish system of University attachment. The Advisory service is better accepted in Scotland since University and Public Service are not associated in the minds of farmers. Farmers much prefer to call in a University man than they do a Public Servant for assistance.

Q. Is any work being done on timbered peat bogs in U.K. or elsewhere? Our (Southland) peat areas contain heavy timber. The subsoil drainer you mentioned may not work under such conditions.

A. (I. L. Elliott): Agreed it would be impossible to use the subsoil drainer. No, I didn't see anything quite like our timbered peat areas.

Q. To what extent are firms offering extension and how is it being received by farmers?

A. (B. T. Jordan): A good deal of such work is being done, in project form using budgetary systems and it is well received.

Q. I understand English extension has been in progress only some 14 years. Has its worth been measured at all in comparison with previous periods?

A. (B. T. Jordan): They are taking a good look at it and are starting to realise its value.

Q. What salary differential exists between the advisory officer in N.Z. and U.K.?

A. (B. T. Jordan): A probationer in U.K. starts at £850 per annum and a regional officer obtains £2,500.

Q. Would somebody enlarge on the Gloucestershire scheme of advisory service as a new system in the U.K.?

A. It is a system of channelling the farmer into the type of economy to which he is best suited. Full financial details have to be made available for such work. The New Zealand farmer is not quite as willing to turn over full account data to the Advisory Officer.

Comment (R. H. Scott): From the experience of the Department of Agriculture in New Zealand there is no difficulty in obtaining financial data from farmers. In fact we now have about 400 farmers supplying us with this information, and from it we are compiling financial and physical standards for farms on some of our main land classes. Also the N.Z. Society of Accountants is working on a standard code for the presentation of farm accounts, and eventually it should be possible to compare any set of farm accounts with the appropriate standards and thus diagnose some of the weaknesses in a farm enterprise.

PRE CONGRESS TOUR THROUGH SCOTLAND

G. S. ROBINSON, Senior Lecturer in Soils and Field Husbandry, Massey College

An advantage of reaching England some time before the Grassland Congress was that I was able to go on one of the pre-Congress Tours which had been admirably organised by the Congress Committee. Some of the highlights of the northern tour are mentioned below, but it is impossible to convey in words the value of such a trip made in company with eminent grassland workers coming as they did from eleven different countries. Discussions on the tour gave a much better picture of the grassland set-up in those countries than did the papers at the Congress itself.

Appropriately enough, the tour started at Newcastle and the first visit was paid to Prof. M. McG. Cooper's Cockle Park Experimental Station. In addition to him, two other New Zealanders, and two men who have spent some time in New Zealand, are on the staff operating the research projects there.

This farm of 650 acres is the place where the first great grassland workers of Britain, Somerville, Middleton, and Gilchrist, carried out their manurial experiments, some of which are still in

progress. A wide variety of new research has been recently started, but I was particularly interested to see some of the classical experiments which have been in operation for over 60 years. It was on this farm too that the famous Cockle Park seeds mixture was first used, a move which paved the way for our present day simple seeds mixtures of four or five species compared with the complicated mixtures of twenty to thirty species used not so long ago.

Current work includes an investigation into fat lamb production. Parasites of the *Nematodirus* species are a special problem in the United Kingdom and at present limit the running of ewes and lambs at high rates per acre to alternate years on any one pasture. Farmers who have experienced trouble with the same parasite in New Zealand will be pleased to know that the problem is being intensely investigated in Britain. Cockle Park have been the pioneers of creep grazing of lambs in the north. Results have been very good even by New Zealand standards. There are several variations possible in operating a creep grazing system, but the one used successfully here enables the lambs but not the ewes to move forward to the next paddock in the rotation and return at will. This implies that a rotational grazing system is in use. With set stocking, creep grazing entails fencing off an area to which the lambs have access either at the side of or in the centre of the paddock.

The next main centre visited was Ayrshire, a county noted for its dairying. One aspect of this type of farming that was impressive was silage making, which appears to have gained ground at the expense of haymaking in many dairying districts. For milk production cutting in the leafy stage of growth is an accepted practice. We could learn much about methods of storage and their effect on wastage. In particular, the use of the walled clamp has been extended and has resulted in a marked improvement. Of interest, too, are the methods of feeding silage. Winter housing lends itself to self feeding with its open yards paved with stone or concrete. The advantages of such a system of feeding are so great, especially on wet soils liable to treading damage, that serious thought should be given to the adoption of some such scheme in New Zealand. A cheap method of obtaining a hard ground surface and the provision of some shelter for the stock are of paramount importance.

An interesting sideline was seen at Lessnessock Farm in Ayrshire, where silage was being made by the continuous topping of swards with a Gang-Mo Loader. On this farm, which runs one of the world's best pedigree Ayrshire herds, 70 to 100 acres is cut up to seven times annually, producing about 450 tons of silage of around 25 per cent protein. Returns from pasture on this farm are high and indicate very efficient utilisation of the grass grown.

Visits were paid to a number of hill country farms and the main impression gained was that relatively little hill country pasture development was being undertaken. What was seen, however, indicated that great improvements in carrying capacity would be easily attained. The biggest mistake being made is the application of phosphate fertilisers to pastures devoid of clovers. As in New Zealand, the response to such treatment is very poor. Oversowing of clovers has seldom been done, but with topdressing a ready improvement can be effected. However, rapid results need not be expected, because the system of land tenure and the fact that much land is held solely for its sporting value are factors holding back development. Once they are overcome a big increase in sheep production from the hills can be expected.

Good arable farming is a feature of the Aberdeen area. Pastures generally remain down for four or five years and they contain more clover than those in many parts of England. Clover is relied on to provide the bulk of the nitrogen, while artificial nitrogen is more commonly used for special purposes. It was difficult to pass judgment on these practices, but it appeared that on these bigger farms where intensity of production is not so high, clover can compete satisfactorily as a supplier of nitrogen. On those English farms where artificials are being relied on more and more, clover does not appear to meet the requirements of a more intensive type of farming with its higher per acre production.

Coming down from Aberdeen to Edinburgh a visit was paid to Sir Thomas Wedderspoon's 400 acre farm. On this he milks 130 cows. This is done on about 200 acres of grass with crops and crop residues, and is high production in this district of 30 in. rainfall. An interesting adjunct to the farm is a plant for washing and treating seed and table potatoes. The capacity is about 10,000 tons during the harvest period. Twelve minutes' immersion in a mercury solution gives a guarantee against dry rot. This is followed by sponge drying and packing in thin jute bags, which are left to dry for a fortnight before being stacked to prevent the collapse of the potatoes that has occurred in some New Zealand attempts to introduce washing.

Near Edinburgh at the School of Agriculture farm, zero grazing has been under test for the last three years, a comparison between two herds of about 40 cows on each treatment showing no real difference in production. Extra costs for machinery and transport are cancelled out to some extent by reduced fencing and water requirements. A serious disadvantage is that stock residues have to be distributed manually and utilisation of nutrients is less efficient. There is little commercial exploitation of the technique yet.