

AUSTRALIAN NUFFIELD FARMING SCHOLARSHIPS

REPORT BY

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OBJECT:

TO STUDY IN THE UNITED KINGDOM, WEST GERMANY, HOLLAND,
BELGIUM AND FRANCE, ALL ASPECTS OF POTATO PRODUCTION,

MELBOURNE 1985

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INTRODUCTION

Since I started to work on the family farm in 1966, I have taken a keen interest in the potato side of the farm operation and through that I have become involved in the potato section of the V.F.G.A. Vegetable Division, at State level and over the last 10 years as a member of the Committee which represents suppliers of potatoes to the Victorian French Fry Processor, McCain Foods. Through these two groups I have been able to meet other people from the potato industry in Australia, as all suppliers of potatoes for processing have been working towards a price for their product which will keep them viable and the processors competitive.

It was through my work supplying processing potatoes that I realized the need to see for myself, and to study potato production in other parts of the world. Thanks to the Nuffield Farming Scholarship scheme I was able to fulfill this ambition to travel and study overseas.

It is hard to make comparisons between Australia and other parts of the world but I have found many similarities in potato production for processing and the world market.

In Australia we virtually have a protected industry. Firstly because of distance from the other major potato processors in the world and secondly because of tariffs on imported potato products. But we can still find potatoes in processed form coming into Australia and competing with the only market we as growers have - 'our own internal market' - because the distance stops us from being exporters in any large way.

It is my aim in this report to describe in general terms what I was able to see, not only on potatoes, but in other areas. If any person reading this report would like more detail on anything mentioned I would be glad to supply what information I have.

THE ORGANIZED INTRODUCTION

For the first seven weeks in the U.K. and Europe, I travelled with five other Nuffield Scholars, two New Zealand, one French, one Zimbabwe and one other Australian. Our programme was organized for us by the U.K. Nuffield Association.

Arriving in London on 21 February, 1985, we spent until 28 February in London, where we met National Farmers Union people, our Australian agricultural representative and Ministry of Agriculture, Fisheries and Food (M.A.F.F.) officials.

We then went to Wye College and were lectured on the E.E.C. by the Director of the Centre for European studies Mr. Ian Reid.

We then travelled to Brussels in Belgium, the Capital for the E.E.C. and spent three days there. Two of these days were taken up attending lectures by representatives of various commodities, who were of different nationalities within the E.E.C.

From Brussels we went to Paris and there we attended the Paris Agricultural Show for two days and visited the Rangis Market (Paris vegetable, meat and fish market). Both the Show and Market are all under cover. We had four days visiting French farmers travelling north from Paris to Calis. We crossed the Channel from Calis to Dover in England where we were issued with our own cars, these being supplied by the English Milk Marketing Board in Dorking in the County of Surrey. From here we went our separate ways. I spent five days with my farmer host Roger Hobcraft and past Nuffield Scholar.

On joining up again with the other scholars we spent four days during which we were briefed by John North, M.A.F.F., Joe Read, Meat and Livestock Council, and John Green past Nuffield Scholar and successful vegetable producer, on our own particular aspects of study. During this week some

of us visited the M.L.C. and we all went to the Stoneleigh Agricultural Centre for a day and here we were briefed and shown experimental units for dairy cattle, sheep, beef and calf, and pig units, farm electrical centre, and farm buildings. We also visited the Agricultural Farming Board and Arable unit.

From here we had a two week tour of the Southwest region of England, during this time we visited experimental stations, research farms, grower co-operatives, individual farmers growing winter greens, potatoes, breeding cows, beef cattle, sheep and pigs. Dairy farmers making their own clotted cream and milk rounds. Abattoirs for beef, sheep and poultry. A pick your own operation and farm market, Twyford Laboratories working on micro-propagation, and a free range poultry enterprise.

We then returned to Captain John Stewart's home at Olney for Easter and then each of us departed our own ways to pursue our own interests.

I have to thank Captain Stewart, Director for Nuffield Scholars, for the way in which the first part of our trip was arranged. Not once during those first weeks did anything go wrong and the way in which we were received at the places visited was a great credit to the Nuffield Organization in the U.K. I found this first part of my trip excellent, because I was able to meet and live with people from other countries as part of a group. This enabled us to exchange ideas and views during our time together.

POTATO PRODUCTION IN THE EUROPEAN ECONOMIC COMMUNITY (EEC)1. INTRODUCTION TO POTATOES EEC

Potato production in the EEC is an enormous industry compared to our own potato industry in Australia and by comparison our own western Victorian potato industry (which is the largest district in Australia) is very small.

Total potato production in the EEC, which is made up of ten different countries with another two about to become members is the largest for size of countries and population of anywhere in the world.

Australia is one and a half times as big as all the EEC countries joined together but in population they have 280 million compared to our 16 million.

Potato production is 33,500,000 tonnes in the EEC countries compared to 900,000 in Australia, with production per head 121 kg. in the EEC compared to 56 kg. in Australia.

In the EEC the consumption of fresh potatoes is 74.6 kg. per head average and 15 kg. processed average, the balance goes into animal feed, seed, industrial use and alcohol.

With such a large amount of potatoes being grown (1,070,000 ha) and average yield being 32 tonnes/ha there are a lot of potatoes to harvest and place somewhere before the cold European winter sets in.

The temperature dropped as low as -25° C last year in a lot of places and these minus temperatures last anywhere from six to ten weeks.

In contrast to the Australian potato harvest where potatoes can be harvested all year round, or in particular, in our own area can be stored in the ground for a certain length of time EEC potatoes have to be harvested before the ground freezes.

2. THE FRENCH FRY INDUSTRY

The processing of potatoes in European countries is only small in tonnes compared to total production tonnage. 13% of all potatoes grown are processed for human consumption.

The French Fry Industry has only been operating in any large scale since early 1970 in the U.K. where our own local processor McCain Foods has three factories. They also have three factories in Holland and one in France.

In the U.K. the percentage of potatoes processed is 26% of total production which is 6 million tonnes. This 26% can be broken up into Crisps, French Fries and Dehydrated.

With the 26% accounting for 1,560,000 tonnes, McCain Foods use 30% of this amount and are the biggest French Fry producers in the U.K. with any other French Fry producers being in a very small way.

The Crisping Industry is dominated by three major processors being Golden Wonder, Walkers and Smiths. The dehydrated products are dominated by Dornay Foods. Most of the potatoes that go into dehydrated products are seconds out of packing sheds.

The processing industry is expanding at 1 to 1.5% per year but is having to compete with a very strong demand for fresh potatoes to be taken home by the housewife and prepared in a number of different ways. We do not see a lot of this in our country.

As in our own area the processors in Europe are very aware of the need for potatoes being used for French Fries to meet the following requirements.

1. Medium to large sizes tubers over 45 mm.
2. Shallow eyes and regular shape.
3. Cream or white flesh with no blemishes.
4. Freedom from internal bruising, disease, cracking and greening.

5. Specific gravity over 1.080 (20%) dry matter.
6. Reducing sugar content below 0.25% for French Fries and below 0.15% for oven chips.
7. No tendency to turn grey or black after cooking.
8. To be of good storage quality.

All my work on French Fry potatoes at processor level was done in the U.K., Holland and France using McCain Foods as my contact.

3. THE EEC POTATO MARKET

The French Fry industry in the U.K. is an expanding one but this is not helping the potato grower gain higher contract prices for his potatoes. This is because now the U.K. is a member of the EEC and there is no restriction on the imports of potatoes from other member countries.

Holland is the big devil in the EEC Potato Industry. They produce 6 million tonnes of potatoes and only have a population of 14 million people. This is 428 kg/head. Therefore Holland exports a lot of potatoes many to the U.K.

4. DEVELOPMENT OF NEW VARIETIES FOR PROCESSING

Each year the potato breeders hope to come up with the wonder potato, shaped and made like a brick, but it never turns up. The processors meet with the potato breeders and try and help them with what the processor is looking for in a potato.

I found this to be a good idea for the processor to get a potato perfect for them, but not right for the growers because the perfect processing potato is not always the best to grow.

At the present time they do not have a lot of new varieties showing any good qualities for processing. Potatoes being used at the present time are the varieties Maris Piper, Pentland Crown, Pentland Dell, Pentland Hawk, Pentland Squire and Wilja. Other varieties such as Desiree, Estima and Record may be used if the sample meets the factory specification and the price is competitive.

Pentland Dell in the U.K. is the potato being pushed in the French Fry Industry as the one to grow and there is a lot of field work being done on this variety at various places throughout the country. The McCain Company is paying a 10 pound/tonne (\$20 Aust.) premium for Dell this year.

Russet Burbank is being tried but is not doing any good at the present time.

In Holland the Dutch Bintje is the major potato with it accounting for 80% of potatoes processed, but in this country they were doing work on some unnamed varieties from private breeders and Marijke. This variety has good French Fry qualities but will not store and even if it is dug and kept for a few days it will not process because of an effect the Dutch call blueing. If it is processed straight out of the ground it is very good and can be used for all the top line chips for McDonalds and Wendys. There is field work being done with fertilizer and watering on this variety to improve its keeping qualities.

In France the French Fry Industry is very new and expanding at a very fast rate, but the potato industry is not geared up like the U.K. and Holland, and they are using varieties from each of these countries.

Russet Burbank in France looked a lot better than in the U.K. and once again it is a processor demand that this variety be grown. With the warmer climate of France where they were growing and irrigating they felt they could get the Russet up to a viable crop for the grower, but they had a long way to go.

It was interesting to see in France that the McCain Company was growing its own potatoes, 200 ha for commercial use through the factory. The purpose of this was to show the French farmers how to grow processing potatoes and that the price being paid was viable to the grower.

5. STORAGE OF PROCESSING POTATOES

The storage of processing potatoes can be broken up into three groups - short, mid and long term.

With the amount of potatoes being grown it is financially impossible for most growers to have all long term storage.

(a) Short Term Storage

The short term storage on smaller farms I was able to see was stored in the form of Dickie pies, Clamps or Pitts as we would know them here in Victoria.

The Clamps I saw had turned into mid term storage because of the market price and sales were slow, but the potatoes were coming out of them in good condition for very little cost of material but a lot of working building the Clamps. They were built by heaping the potatoes, then covering with straw, then covering the straw with soil.

The short term storage on the large farms was not so cheap to build but were only used for short periods. These were built on concrete slabs approximately 40 feet wide and various lengths. The potatoes were heaped with a piler onto the concrete slab and to contain them in a heap at the sides big square bales were placed two high giving a solid insulated wall 8 feet high, 4 feet wide and the potatoes would be stacked up to 12 feet high in the middle. Growers put air tunnels through the bottom of these Clamps. To cover these they put an A frame tunnel on top of the heap and then placed straw over the potatoes then covering the whole heap with black polythene.

At various intervals along the A frame there were air vents put in and these could also be used for inspection of the heap. Potatoes were stored like this for up to three months with good results and still maintained good processing qualities.

(b) Mid Term Storage

This would be of two types.

1. Potatoes dug and put into one tonne boxes and stacked in an insulated shed with some form of sheeting laid over the tops of all the boxes.
2. Bulk potatoes placed in insulated sheds which were not purpose built stores and bulk heaps in sheds lined with baled straw as the insulation.

Both of these bulk heaps were covered with baled straw of a light density. Heavy density bales did not allow the potatoes to breathe and this caused condensation on top of the heap causing rot to set in.

Both types of stores in this class had some form of air circulation in them, normally fans to circulate the air inside the building and the capacity also of these to draw air in from outside if wanted.

All temperatures and fan control in these stores was done by the human hand which meant checks to be carried out sometimes many times a day until the store had settled down.

(c) Long Term Storage

Bulk Stores

Ventilation arrangements for bulk potato stores differ from those for pallet box stores. The effect of stack temperature differential which increases with storage depth can be

offset by unnecessary air velocity through the stack. Storage at depths greater than the recommended three to four metres is common as it reduces the capital cost per tonne of new storage installations. However at depths of 4.5 to 5.5 metres it becomes more important to pay greater attention to detailed design of the duct work and the air distribution system.

Distribution arrangements used to introduce air to the stored crop are -

1. Ventilated floor systems.
2. A system of undercrop ducts.

Ventilated floor systems - the most common found was a hard wood flat floor - an arrangement which has had greater market acceptance in recent years has been the proprietary ventilated floor usually comprised of a built up hardwood flat floor with perforated or lowered metal sections let into it at regular intervals.

This type of ventilated floor has the advantage of presenting an unobstructed surface with a large pressure chamber beneath. The resultant low air velocities within the system in turn give rise to fairly uniform air distribution throughout the area of the store.

Under crop duct systems. By far the most common arrangement for introducing air to the potato pile is a system of main and lateral ducts. The laterals may be either above or below ground. Today the trend is for below ground ducts in order to obtain ventilating air throughout the store. The sizing and location of the ducts has a direct bearing upon the uniformity of temperature within the stack. The function of the main air duct is to provide a single attachment point for the fan and to serve as a feeder to the lateral ducts. In practice excessively uneven air distribution can occur when lateral duct length exceeds about ten metres.

Pallet Box Stores

Each individual pallet box acts as a miniature unventilated bulk store. Heat is lost from the potatoes in the box by a combination of conduction and convection until such time as the potatoes and the store air reach a state of thermodynamic equilibrium. If forced draught ventilation is used in a box store air will not pass through the box until the resistance caused by the speed of the air in the spaces between boxes equals the resistance of the potatoes to the air flowing through them. This seldom happens in practice. If boxes do not exceed 1.25 tonnes in capacity the centres will rarely be more than 1 to 2 deg. C above the surrounding store air temperature even if air cannot be positively driven through the contents of the box. A great variety of box designs are to be found on farms. For new installations box capacity is seldom less than one tonne. The 'Scotch Box' is now predominantly used. This box has dimensions of 1800 mm x 1200 mm x 900 mm deep including the pallet base and it has a nominal capacity of one tonne.

Stacked boxes impose no thrust on the walls of the store. This advantage should be considered when designing new box stores. Additional height in a building is provided at minimal cost. Potatoes in boxes occupy more volume than in a bulk store typically between 1.7 and 2.2 cubic metres/tonne as opposed to 1.5 to 1.65 cubic metres/tonne for bulk stored crops.

It is an accepted fact that a pallet box store costs 21% more to build than a bulk store for the same tonnage. All the pallet store operators, Merchants, Processors and farmers did not take this extra expense into account when put against the advantages.

All potatoes that go into storage for processing are treated with sprout suppressants.

Crisping and french fry processors have a percentage of storage for their needs but compared to the amount of potatoes being used through their factories it is a very small amount. The storage used by these processors are :-

Crisping	-	bulk and pallet box
French Fry	-	bulk

The best potatoes I saw coming out of storage were ones out of a pallet box store and were being used for crisping after being stored at 10⁰C for eight months.

6. PROCESSING PROBLEMS

Problems associated with processing are no different in Europe than Australia. The biggest problem the processors have is getting potatoes with the right colours and as the season goes this is an ever increasing problem.

The Dutch Bintje variety causes a problem sometimes when cut through a water-gun cutter. It has a shattering effect along the edges of the chip and when cooked the little breaks in the edges cook dark and cause a second grade product. There is increasing pressure on the processors to have a chip with long length for supply to the fast food outlets and as in our own area this is causing problems for the growers.

POTATOESPREPARING THE GROUND FOR POTATO PLANTING

The most common form of ground husbandry used for preparing the ground for planting potatoes in the U.K. and Europe is man using Nature to his advantage in ground preparation to grow a crop to feed the nation.

The farmers who are growing potatoes, will plough their ground with a moulboard plough, just as winter is setting in, November - December, which would be May - June in our area in Australia. By ploughing the ground at this time of the year the farmer is able to use the very cold frosts to break the ground down for him. This is using Nature to its best advantage, the frozen ground was -18°C this year in Europe and colder in some parts. The frosts are able to break the ground down better than any machine I have seen at home or in Europe, with the effect that come February, just before thawing starts, they can spread their fertilizer on the ground and not leave any tractor marks. As the ground thaws out they have to do very little work with it, thus any stone-free ground ploughed before Winter and then ripped just before planting with one pass of a power harrow, followed by the planter. Compared to home this is minimal cultivation done with machinery.

STONE GROUND

A lot of potato ground in England and Scotland has a very bad stone content, some places were stating 200 tonnes per hectare.

These stones are seldom beneficial to British crop production and in many areas are detrimental to the achievement of maximum productivity since they displace soil which could retain moisture and nutrients, therefore they represent an obstacle to the efficient operation of machinery.

As far back as the early 1960's certain Scottish farmers were experimenting with techniques for the removal of stones from the ridges into which potatoes were to be planted. Ideas were based around the adaption of a single row potato elevator-digger to lift stones, clods and soil from a pre-formed ridge, sift out the loose soil and then deposit the stones and clods in a windrow at the edge of the drill, where they were pressed into the soil by the tractor wheel in the following pass.

Apart from removing stones and clods from the soil from which the ridge was to be formed it was found that this operation was a very effective cultivation in itself, since it left a very fine seedbed in which to plant. It was not however, until the mid 1970's that stone and clod separation before planting potatoes, became an accepted technique amongst potato farmers outside Scotland.

There has been three types of stone treatment developed:

1. Stone removal
2. Stone crushing
3. Stone windrowing

The principles of these techniques are as follows :

STONE REMOVAL - This method entails the use of a stone picking machine to remove the stones from the soil and load them into a trailer for removal from the field. Whilst this method has some long term effect on the field stone content, the problems of carting and dumping large tonnages of stones makes the operation expensive, and time consuming and care must also be taken not to remove the top soil in the form of clods, along with the stones. A further major disadvantage is that stone removal is never completed since, contrary to popular belief it is not the stones that move towards the soil surface, it is the soil surface moving towards the stones. By removing 5% of the plough layer, a sub-soil may well contain a disproportionately large volume of stones or even the tips of large boulders which have to be dug out to avoid continued plough damage.

STONE CRUSHING - Stone crushers and land conditioning machines are designed to reduce the amount of oversize material present in the soil. Land conditioning machines are essentially heavy duty rotary cultivators which treat the soil where it lies, whereas the stone crushing machine separates the oversized material from the loose soil prior to crushing it between pairs of spring loaded rollers.

STONE WINDROWING - In the stone windrowing technique the separated clods and stones are deposited via a cross conveyor or chute to the valley bottom or a ridge, or bed reformed by an underslung or adjacent ridger body, thus retaining the separated material in the plough layer. This is a relatively low cost method of removing stones from the soil used to form the ridges and it avoids the problems associated with either removal or crushing, and it is particularly advantageous in soils containing both stones and clods.

In a three year experiment, potato yield was not affected by either stone removal, stone windrowing or stone crushing.

Fields with stone levels of up to 200 tonne per ha. of material over 32 mm nominal diameter can be reduced to 7 - 10 tonne per ha in the ridge by either stone removal or stone windrowing, but stone crushing had less effect. Harvester speed was increased by 43 per cent after stone windrowing and by 22 per cent after stone removal, but not after crushing.

On a manned single row, complex harvester, there was reduction in severe tuber damage of 13 per cent after stone crushing and over 30 per cent with the other two treatments. The decrease in tuber damage was due partly to the lower harvester web speeds which were only possible on the areas of low stone content.

A summary after the three years experiment found that the benefits from the stone removal technique are not as cost effective as the windrowing technique when applied to potatoes. Stone crushing as with stone removal, this method has a long term effect upon the amount of oversized material remaining in the soil. However, results from trial work relating to harvester output and severe tuber damage show little improvement.

The windrowing technique has largely superseded the earlier ideas of stone burying because of the high draft requirement of placing stones in the sub-soil and also because of the danger of forming stone drains which could over drain the land and reduce yields on lighter soils.

The end result of the trials prove clearly that there are distinct advantages to be gained from stone treatments in general and stone windrowing in particular, the combination of higher harvester rates of work or fewer pickers and less tuber damage makes windrowing the most economically viable, as well as providing an opportunity to attain some of the mechanisation benefits formerly available only to potato growers on stone-free land.

POTATO PLANTERS

With no cut seed being planted in Europe there were not any pricklerarm planters to be seen, but there were three distinct types to be found working.

1. The belt type planter for chitted seed.
2. The double row cup.
3. Cup planter on a de-stoner.

1. The belt type planter was used to plant mainly the early crops of potatoes, which were planted with a well chitted seed. These planters were very gentle on the potato sprouts which had all been hardened in the chitting

trays in purpose built stores. The English machine being used has been around for a long time and I felt that it only broadcast the seed into the ground as does our own pricklerarm planter. A machine made in Holland was doing a very good job, and I feel it had the potential to plant cut seed, but the manufacturers had made no allowance for making larger potato hopper, or fertilizer bins on it.

2. The double row cup planters were the same as the ones that are available here in Australia. They are good machines for planting round seed but not for cut seed of an irregular shape, plus once again the manufacturer does not put fertilizer hoppers on them and if there is they only hold a minimal amount and not suitable to our requirements at home.

3. The cup planter fitted to a de-stoning machine. This was a good idea using the one tractor and machine to de-stone or clod, do a final cultivation and plant potatoes in the one pass. Once again this planter would not plant cut seed very well and did not have any fertilizer hopper fitted.

The first two types would be found in two or four row types and the third type in two row only.

FERTILIZER FOR POTATOES

The most used practice of putting fertilizer on the ground for a potato crop in Europe is to spread it on the flat ground and work it into the ground before planting. It has been estimated a grower has to place 50 kg. per acre more fertilizer on the ground, doing it this way, than putting it all down the shute as we do at home. In most cases half the P. and all the K. will be ploughed in before the winter, then most of the N. and the rest of the P. just before the ground has thawed out. Some growers still put some down the shute but this is N. only and often in the form of liquid. The rest of the N. that has not been put on before the planting is spread on the growing crop about 30 days after emergence.

For a main crop of potatoes or seed crop an average fertilizer would be 15.15.22 at 1 tonne per ha minimum.

There are no results to prove that spreading the fertilizer on the flat is better but it has been proved that putting it down the shute gives the most efficient use of nutrients than broadcasting. In contrary to this the growers choose to broadcast their fertilizer giving their reasons as :

1. The high maintenance needed to maintain fertilizer bins on planters against corrosion.
2. Come planting time it is one job out of the way and planting takes place at a faster rate without having to put the fertilizer on.
3. That contrary to trials a lot believe they get the best results by putting fertilizer on in different types and amounts prior to planting, believing the ground needs time to take up the fertilizer, so it is readily available to the potato when it needs it.

Recommendations from the Ministry of Agriculture for fertilizer used in potato growing are :

Nitrogen - In most circumstances all the nitrogen should be applied at or before planting. For irrigated potatoes growing on sandy soils and very free draining soils experiments have shown that a split application of nitrogen is worthwhile. Half the application should be applied in the seed bed and the remainder at tuber initiation. Leaching risk is considerably reduced by this policy.

Phosphorus - Potatoes are very responsive to phosphorus, but the rate of response is lower at high soil indices. The whole phosphate application should be applied before planting. Only materials containing a high proportion of water soluble phosphate should be used for potatoes.

Potassium - The use of potassium sulphate instead of chloride produces tubers of slightly higher dry matter content. Large dressings of potassium chloride gives tubers with a lower dry matter content which are less susceptible to internal bruising. Application of the recommended potash, sometimes before planting is satisfactory. This will help avoid high seedbed potash fertilizer levels which may cause seed damage.

Trials have shown that there is no advantage of putting more than 300 kg of potash per ha on a crop of potatoes. After this it is found the specific gravity drops, but the chip colour or crisps improve slightly.

Muriate of potash is used as to sulphate because the difference is not enough to compensate for the extra price of sulphate of potash. As in Australia the processors in Europe do not pay a premium for higher solids in potatoes.

In Western Victoria where I farm it is not heard of to spread fertilizer on the ground and work it in before planting the potatoes. Small amounts of top-up phosphorus and potash have been spread this season, it will be interesting to see if any advantage is gained from this.

A method of fertilizer application I saw in Scotland I am sure would be successful in my area is to place all the fertilizer in the ground alongside a single sub-soil type mark directly below where the row of potatoes is going to be planted. This was done just in front of the planter in the same operation as bed forming in front of the de-stoning operation which had the planter mounted on it. This method gave an excellent deep ripped row already fertilized to sow the potatoes on. With the problem of powdery scab being helped with water logging and soil compaction, I think this was a very good way of placing fertilizer on the ground and at the same time giving a better environment for the potato to grow in.

SEED POTATOES IN GREAT BRITAINBackground:

Before seed of a potato variety can be marketed in the U.K. the variety must be included in the National List or on the EEC Common Catalogue.

Information on the Botanical, field and quality characteristics of these varieties is given in the National Institute of Agricultural Botany (NIAB) classified list of potato varieties.

More detailed information is obtained from widely replicated trials conducted over several seasons with a view to including the best varieties or the NIAB recommended list provisional information or the performance of new varieties in Scotland is given in the Potato Varieties publication, prepared by the Scottish Agricultural Colleges.

Detailed information on the storage properties of a new variety its susceptibility to mechanical damage and its marketability however, does not normally become available until a variety is grown, harvested, stored and marketed on a commercial scale.

To provide this information the Potato Marketing Board (PMB) carries out a series of commercial scale trials and surveys. The varieties in the PMB trials are selected on the basis of their potential and the probable interest that they will receive, the need for additional information about them and the likely extent to which they will be commercially promoted.

SEED POTATOES FROM GREAT BRITAIN

Seed potato production in Great Britain is largely concentrated in Scotland, although in certain regions of England and Wales, seed is also produced, mostly for local use. In Scotland and parts of Cumbria and Northumberland only basic categories of seed are grown whilst in other regions Certified Seed potatoes are produced.

In Scotland there are about 21,000 hectares of seed from which about 230,000 tonnes are sold to growers in England and Wales, and 60,000 tonnes to overseas markets annually. In England and Wales about 1,700 hectares are grown.

BREEDING NEW VARIETIES

In Great Britain there are two main potato breeding stations. One at the Plant Breeding Institute at Cambridge and the other at the Scottish Crop Research Institute at Pentlandsfield near Edinburgh. In recent years these research stations have developed some outstanding varieties, including, Maris Piper, Maris Peer, Maris Bard, Pentland Crown, Pentland Dell and Pentland Squire, which have gained a considerable foothold in the market.

SEED POTATOES FROM HOLLAND

Seed potatoes are a Dutch speciality. A historical development, you could say, for before the first inspection service was founded at the beginning of the present century, there were already farms concentrating on the production of seed potatoes. These were distinguished from the ordinary utility potatoes by their favourable properties.

The inspection system came into being in Holland's Northern Province of Friesland but acquired a national basis within a relatively short time. The use of Dutch seed potatoes has thus acquired two striking advantages. The material is healthy and naturally productive. More-over the large package of varieties makes a choice possible.

As a result, potatoes can be produced that give the highest yields and have a certain suitability for the market, thus fitting into the sales pattern. It is partly because of this that Dutch exports of seed potatoes were able to rise above 500,000 tonnes a year, making these exports greater than those of all other countries together. Nearly all Dutch seed potatoes grow below sea-level.

POTATO RESEARCH AND BREEDING

I visited the Scottish Crop Research Institute, and this Institute is broken up into many different sections and I was able to visit three of these sections.

1. Potato Research headed by Dr. P. Waister.
2. Potato Breeding headed by George McKay.
3. Agriculture Engineering Potato Machinery headed by Duncan McCrae.

Also while in Scotland I visited the Potato Seed Multiplication Centre a division of the Agriculture Scientific Services at East Craigs, Edinburgh East of Scotland College and North of Scotland College, Aberdeen, where research is being done into powdery scab in potatoes.

At the potato breeding section of the SCRI they were breeding new varieties, a sister breeding station to the plant breeding Institute at Cambridge.

There has been a boundary struck through the north part of England, this area and Scotland is the seed growing area and you are not allowed to bring any other potatoes into the area unless it has been passed virus free. The seed from this area is known as Scottish Seed.

I found the breeders were no more advanced than our own at home in the way they were doing their work. As potato breeders they were more aware of different parts of the industry needing different varieties of potatoes with different qualities and they appeared to be breeding along these lines.

At the breeding level of the new potato varieties there is a lot of work being done at the present time of trying to separate a certain part of one potato and infuse it into the present varieties being used for processing crisps and french fries.

It has been found in research that a particular variety of potato does not have sugar unbalance when stored at 3 to 4°C. Now potato breeders have isolated the gene in this potato that causes this and are quite sure they can get the present varieties to take it. But they do not know what will happen if for example the Pentland Dell takes this new gene. It is quite possible that if it does it will just make it possible to store Dell at 3 to 4°C for use in the French Fry market.

When they finally get a variety to accept this gene out of the other it is still going to take up to 10 years before they know exactly what it does to that potato by the time it is grown up and research is done at all levels.

They had also taken the course of breeding potatoes that were only good for export to other countries. From this they were growing the seed in Scotland and exporting it to other countries with 80,000 tonnes of Scottish seed being exported out of the U.K. last year. By doing this they are not putting potatoes onto the home market and there must be an opening for this type of export at home in the Seed Industry.

At Bush Estate the Commonwealth seed collection is also kept. This is a collection of all potato varieties ever grown and they are all kept in the form of potato seeds which at request are available to breeders or researchers to use in their work.

The varieties released from the breeding centre of SCRI are then grown under the control of the Department of Agriculture and Fisheries of Scotland (DAFS). The system here is the same as the Victorian seed scheme with the first plants produced in test tubes by micropropagation. This system leads to a rapid rate of multiplication and the young plants thus produced are completely free from disease. The microplant technique reduces the multiplication cycle, which means less time in the field for possible re-infection and as a result the healthiest possible initial stocks for distribution to approved raisers.

One difference in Scotland to Victoria is that microplants are planted straight into the field, whereas at home they are planted into a glass house.

Raisers whose facilities have been approved by DAFS continue the process of multiplication and at all stages rigorous testing is carried out to ensure complete freedom from disease. Each clone is grown on in isolation until sufficient seed is available for classification usually in the third year.

Seed potatoes classified at VTSC level are identified as VTSC 1, third year and VTSC 2, fourth year.

Foundation seed is now named Super Elite (SE) and the time limit on the classification of crops at this health level reduced from four to three years. Crops grown from VTSC seed and classified SE in the following year will be classified SE 1 to denote one year removed from VTSC class. When stocks are eventually classified SE 3 their produce will be eligible only for classification as Elite (E).

I stayed with James and Ruth Black from Forfar, Scotland. They grew 100 acres of certified seed potatoes. They were buying their VTSC stocks off a grower further north in Scotland. After growing these stocks for one year they were obtaining Super Elite. They would grow this out for one more year and get Super Elite 2. A lot of James' seed was sold to commercial growers at this level but some may still be grown out to Super Elite 3, denoting three years from VTSC. The rules allow potatoes to be sold as seed at later generations but you do not find any growers doing this.

CARE OF SEED POTATOES BEFORE PLANTING

Farmers take a lot of care in the handling of their seed and the conditions it is stored under during the winter months.

The main things they take care of are:

1. Physiological age.
2. Seed Potato sprouting.
3. Temperature.
4. Health and freedom from diseases.

Principles involved:

An understanding of the response of the seed potato to temperature and light is essential to the successful management of the sprouting process. Potatoes are normally dormant for some weeks after harvest. While there are exceptions most early varieties have a shorter natural period of dormancy than main crop varieties. During this time they do not sprout unless they are given special chemical treatment or are subjected to abnormally high temperatures.

The concept of Physiological Age:

The term 'physiological age' is used to define the stage of development of seed potatoes at the time of planting. It is influenced by the husbandry and time of harvest of the seed crop and, to a greater extent, by the management of the seed tubers after break of dormancy. Seed crops which are planted, burnt off and harvested early will give seed tubers which tend towards being physiologically 'old' (as for example 'once grown' seed from ware crops), whereas crops managed to a later timetable will give seed tubers tending towards being physiologically 'young'. Old seed will break dormancy early, with sprout number tending towards apical dominance, and is thus particularly suitable for production of crops for early harvest.

However the effects of seed crop husbandry can to a large extent be replaced by the management of the seed tubers during sprouting. The general effects of temperature can be explained in the following. It has been shown that physiological age can largely be defined in terms of the accumulated temperature input to the seed after dormancy break. This is expressed as cumulative day-degrees over 4°C . Thus seed subjected to 10°C for eight weeks will be physiologically 'older' than seed managed at 6°C for the same period. Seed held until planting at 4°C will be physiologically young.

Old seed will give marketable yield earlier, but the plants will also senesce sooner than plants grown from young seed. The latter's yield gradually overtakes the yield of the crop grown from old seed with a cross-over point varying with maturity class of the variety. Thus, while it will generally be advantageous to aim to produce old seed for planting crops to be harvested early.

SEED POTATO SPROUTING

The advantages of sprouting may be summarised as:

1. More rapid bulking of early crops to give marketable yield.
2. Usually higher yield of crops especially in seasons when planting is delayed or growth is curtailed by blight.
3. Reduction in severity of tuber diseases and opportunity to discard tubers which are seriously diseased.
4. Advancement of maturity in some varieties to meet special market situations.

The benefits of sprouting for very early crops are almost universally accepted. Early growers are also aware of the need to produce sprouts which are unlikely to be damaged during planting.

The advantages of sprouting main crops too are well established, experiments have shown that actual gains in yields vary considerably with season and site.

Cash outlay in sprouting potatoes:

In most cases the financial benefits of sprouting easily outweigh the expenditure involved. The costs of treatment, including depreciation and interest on capital equipment, extra labour charges and running costs varies from about 20 pounds per tonne of seed sprouted on trays in an existing glasshouse to 83 pounds in a new building equipped with full environmental control or 66 pounds where only ambient air is used. The amount differs greatly from farm to farm, according to circumstances.

Temperatures:

After the period of natural dormancy has ended sprouting can still be prevented if the temperature is kept between 3 - 4°C, above this temperature sprouting begins. After sprouting has started it may be slowed down considerably and virtually halted by again dropping the temperature to 2 - 4°C. Carefully controlled natural ventilation, together with some form of heating is the usual method of obtaining the temperature control which is essential to achieve results.

Seed Treatment with Fungicides:

It is now possible to treat seed potatoes with fungicides which limit the development of tuber diseases during storage and sprouting, and which also reduce the incidence of some of these diseases in the progeny tubers. The chemicals used are Thiabendazole TBZ applied as a mist spray at or soon after lifting and 2 - aminobutane which required special fumigating chambers and is applied only by approved contractors under license.

The use of tecazene is permitted on seed potatoes for the control of dry rot, but as this chemical is also a sprout suppressant it is essential that tubers so treated are well aired for at least six weeks before planting.

Seed may also be treated with tolclofos methyl (rigolex) or TBZ to control Rhizoctonia.

This trend is caused by a number of factors, but principally increased yields and what appears to be a continued reduction in the per capita consumption of potatoes.

Potato breeders in the state-aided plant breeding stations have therefore not been looking quite so critically at merely increasing varietal yields. Attention is now being directed and related to end use. This is why some of the newer varieties have been introduced, and one of the most popular is Maris Piper with its resistance to one pathotype of potato cyst, soft rot and good quality has become very popular with growers and the housewife.

At the present time the Plant Breeding Institute at Cambridge is looking at new varieties produced from Fenland Brown - Maris Piper crosses. This cross produces a very wide range of types and from very early to late main crops, and included seedlings with high quality for cooking and processing, good disease resistance and resistance to one pathotype of nematode.

The Scottish Plant Breeding Station is also looking at improving disease resistance and extending nematode resistance to the other major pathotype as well as improving quality.

TRENDS IN U.K.

Will the downward trend in crop area be halted? This obviously depends on increased utilization of the potato. Possibilities exist in starch production, an activity which

CROP AND VARIETAL TRENDS IN U.K.

There is a downward trend in the area of ware potatoes continuing in the U.K. Since 1978 there has been a 21% reduction in area up to 1984. 1978 saw 212,000 hectares being planted and 1984 saw only 167,380 hectares, a reduction of 46,640 hectares.

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is widespread on the Continent but absent in Britain. Reconstituted potato products are beginning to appear in the shops in addition to the conventional crisps.

Alcohol must also be a possibility as the price of oil fuel rises and the economics of such productions become more realistic. 'Gasohol' a mixture of petrol and alcohol, is already being marketed in the U.S.A. and Brazil. In the U.S.A. the alcohol is produced from maize and in Brazil from sugar syrup, but technically no problem exists in producing it from potatoes.

As these technological changes occur varieties will need to be bred to satisfy as fully as possible the new requirements. The net result could be an increase in the potato crop area by the 1990's.

WEED CONTROL IN POTATOES

Weed control in the growing crop of potatoes is a problem that is controlled many different ways from one end of U.K. to the other.

There is very little inter-row workings done in the growing crop, as research has proved that by working the ground between rows of potatoes restricts the final yield. With this in mind a large majority of growers now use spray to control weed growth.

The normal procedure is to plant the potatoes and hill them at planting or within one week. With this having been done and the slow emergence of potatoes because of the cold ground it is a long time before there is enough top cover to block out sunlight to weeds.

Growers with a weed problem will normally spray the paddock when there is about 10% emergence of potatoes with a quick

kill spray, just burning the top off, they claim any potato burnt is quick to recover with no resulting loss to the final yield. After this knock down spray has been used and there is regrowth usually about three weeks, and all potatoes are up they will use a spray such as Sencor or for the final kill a residual spray.

Inter-row workings are still the major form of weed control in my area, the Central Highlands area of Victoria, and growers overseas were amazed to hear that we remove the hills from the freshly sown potatoes with harrows as a form of weed control and then go about rebuilding them through the first eight weeks of the growing crop.

The method we use as to sprays has different uses other than weed control. With the major variety Kennebec being grown it has to be planted very deep to stop the greening of tubers in the mature crop. Deep planting means slow emergence and with cut seed being used, this means a longer time for the seed piece to contact disease before the plant can support itself. Removing the hills means for a faster emergence and less disease.

Because of pressure from the processing industry, Russet Burbank is having to be grown at home now and this potato is a lot different to Kennebec to grow. Being able to plant this variety a lot shallower, means a quicker emergence for a start, and I believe the practice of sprays could well be used in the growing of this variety with excellent results.

IRRIGATION OF POTATOES

The irrigation of potatoes is only just becoming a common practise for growers in the U.K. Over the last few years a lot of money has been spent on irrigation equipment to put the water on the crop. But I believe irrigation advisors had given little thought to the supply of water to be used through this equipment.

It is easy to criticise by looking over the fence, but being very dependent upon water to grow my own potato crop and in the last 17 years having grown through three droughts, I am very aware of the need to have a supply of water that will allow you to grow the potatoes in the worst times, not just enough to use in the best times.

The potato farmers in the reclaimed land had ample water and were able to utilise the water drainage system in reverse for an irrigation supply. I could not fault this system and with some linear move systems having been installed over large acres and the rest being hard hose irrigators, these growers were well set up for all seasons.

The growers on land where they had to catch the water were not as well situated for water. Unfortunately for these farmers they had utilized the water available to them with good results to their crop, but with the amount of expenditure they had placed into small water catchments and underground water mains, pumps and irrigators in a dry season when they most need the water they did not have enough. I believe some of the farmers had uneconomical irrigation systems due to the cost of equipment to the amount of water available. These farmers were farming on very dear ground and were reluctant to put a number of acres of good farming ground under water to be used on the rest of their farm. They also have to contend with the environmentalist people who are very strong and in a lot of places have had the damming of streams stopped and the placing of pumps on streams stopped also.

CONCLUSION

With this problem to contend with I believe these farmers are going to have to drill underground for water, as an alternative source. They also should start a strong lobby to justify that water dammed up has the opposite effect on the

environment and does bring wildlife to that area that would never come otherwise, and finally as a combined group, justify their case for water to Government to secure the future of coming generations of farmers who are going to be expected to feed an ever increasing number in population.

HARVESTING POTATOES

MAIN CROP

I was in the U.K. at the wrong time to see any of the main crop of potatoes being harvested. The same methods of bulk handling are used in Europe as in Australia.

The biggest difference is that most harvesters are unmanned and potatoes are dug straight into bulk trailers, which are then taken to a grading set-up in conjunction with the storage being used (Bulk or Bin Storage). Here as much dirt as possible is removed and the potatoes are stored under one of the three types, long term, mid term and short term storage.

The Grimme Potato Harvester Company had 80% of the U.K. market and a larger part of the Holland Market, along with the Amac Company. I was able to visit both these Companies, Grimme in West Germany and Amac in Holland.

HARVESTING EARLY POTATOES

I was able to see early potatoes being planted and returned to see them dug, twelve weeks later. This was on a farm in Kent. Trading as L. S. Sayer & Sons Ltd. and managed by Roger Hobcraft, my farmer host and ex-Nuffield Scholar. The whole of the Thanet area of Kent had early potatoes as one of their crops and they were harvesting three to four tonnes per acre. With the haulms still very green and showing no signs of dying off they were being pulverised and then dug with conventional two row diggers laying the potatoes back on the ground for pickers to bag up.

On this farm the day I arrived they had 138 people picking potatoes in the one field, the biggest percentage of these pickers being women. The farm did not employ these people, they worked through a Foreman or as further north in England, they were known as a Gangmaster. The Foreman employed the pickers and controlled them. They were paid an amount per bag by the farm and out of this he paid the pickers a pre-determined amount and took a percentage to cover his costs and pay insurance on his workers.

POTATO MARKETING BOARD IN THE U.K.

The Potato Marketing Board is a statutory organization currently constituted under the Potato Marketing Scheme, 1955 and subsequent amendments.

It represents the 28,000 potato producers of Great Britain and is essentially a monitoring organization with certain responsibilities. The Board comprises of 33 members of which 29 are elected by fellow potato producers and four are nominated by the Government.

The Objectives of the Board are:-

1. To manage the production and marketing of the potato crop in a manner which removes the worst features of a free commodity market.
2. To manage a Government support price mechanism, which will develop growers continuing commitment to the potato crop and a realistic level of re-capitalization.
3. To encourage the production of a high quality potato grown to meet the needs of the market and to protect consumers from the economic effects of supply deficits.
4. To encourage the increased consumption of potatoes by clear specific advertising and public relations activity.

5. To encourage by sponsorship a high level of research into all aspects of the production and marketing of the potato crop.
6. To collect and provide such statistics as may be required by Government and the trade for the good management of the industry.
7. To encourage the export of seed and ware potatoes.

COST OF POTATO BOARD TO THE GROWER

You can only grow potatoes if you own a licence to grow. The licence costs 70 pounds a hectare per year. (29 pounds per acre).

There is a sale for this licence so any grower leaving the Industry has a saleable asset and any person wishing to start to grow or any grower wishing to increase area has to buy existing licence. It currently sells for 1000 pounds per hectare.

If you want to grow in excess of your area under licence you can do this, but have to pay a fee of five times the licence rate of 70 pounds per hectare.

With this control on potatoes the PMB can restrict acres to be grown, e.g. 5% reduction of your licence for a year. With this power they could set production at a level of demand. Now the U.K. is in the E.E.C. restricting production and increasing price in the U.K. only opens the door to imports of potatoes from other E.E.C. members. This leaves a very difficult task for the PMB members as to the best decision to protect the growers of the U.K.

MARKETING POTATOES

Marketing of potatoes in Europe is no different to home in Australia, with nearly all growers hoping that the next crop will be the dear one and set them up for life. With this

type of thinking, when the time comes to sell and there is an over supply the grower has a very difficult year having to virtually peddle his crop anywhere he can. If there is a short supply they sell themselves so he does not have to do anything other than get them ready for market.

I could not understand why some growers in the U.K. and France belonged to grower Co-op's for all their buying and selling of farm produce except for the selling of their potato crop. When questioned about why they would not sell their potatoes through the Co-op they didn't have any reason except the fact that they were looking for that big price and they were not going to share it with anybody.

As potato growers we all know these good prices only come every now and again, and with today's costs only help to balance the books from previously poor years. With the farmers already set up to sell other farm produce, I believe they are losing in the long run with their potatoes. They had the ability to supply a market with a guaranteed supply of grade and quality from their Co-op and as a group could have secured a market which would have been profitable to them as growers as well as the buyer. Some of the growers doing this were not receiving really high prices, but they were also not receiving low prices either and I consider that these growers will be the ones still growing when the others have stopped or been sold up.

NUMBER OF POTATO VARIETIES

With a large number of potato varieties listed in the U.K and Holland, it must be a very difficult problem for a grower to select the right variety for his needs. There were 22 listed varieties in the U.K. and 48 in Holland.

When this subject was discussed with growers some said it was a big problem others said they used the local ADAS man to advise them as to the best variety for their area and needs. As an outsider I considered there to be far too many varieties and a lot of them were not needed because I am sure reading about each variety a lot of them cross over one another.

With our own Victorian Potato Breeders they have not released many new varieties over the years. I cannot condemn them for this as they will not introduce a new variety unless it is a long way in front of the variety it is to replace. With this attitude we only have a handful of varieties to choose from and it makes a decision a lot easier for the grower.

In Europe with plant variety rights there is a lot of private breeders, especially in Holland. These breeders are breeding all the time and releasing new varieties, but I think with no better qualities than the ones already being used. But as breeders they need to sell and there is always buyers looking for something new, in case it is good and they want to be first. With this happening there is an increasing number of potato varieties becoming available to the grower.

GROWER & COMPANY RELATIONS IN SIGNING OF POTATO CONTRACTS

The McCain Company, the largest producer of French Fries in the U.K. and owning three factories in Holland and one in France. Each year they offer a price for potatoes to be supplied under contract for use in the production of French Fries. The growers take it or leave it.

In the U.K. I spoke to a number of growers who had contracts for French Fries, but haven't continued with them because the requirements for production are now no longer just a

bulk line of potatoes. They now need to be of a standard no less than the best line of potatoes. To obtain potatoes of the right quality is an ever increasing problem for the grower and the inputs required to obtain this quality is high cost and high risk. With the growers having to put so much into growing they are turning to the more profitable packing and seed industries.

In France the Company does sit down and discuss their needs of supply with the grower, but from what I could see of this, the growers still had to accept the price offered. As an outsider to the potato industry in Europe it was quite easy to see a problem arising between suppliers and processors over the price paid for the quality of potatoes needed. The growers have been able to stay in business up to date, however as tax benefits, E.E.C. Grants and Food from Britain grants for U.K. growers are reduced, they will have to farm as we do in an unsubsidized way.

Grower & Company Relations

The price being paid for contracts will then have to be increased. The same problem exists in Europe as does here in Australia, if the price paid for contract potatoes does not keep the supplier viable and the company competitive, both grower and processor may well pack up now, as it is just going to be a slow decline down the ladder for a lot of suppliers. With less suppliers the price the processors will have to pay for potatoes from surviving growers will make the product too dear for the customer to buy.

Conclusion

If the Companies are going to offer contracts for processing potatoes, they should start paying a lot more for the potatoes and contract for a larger proportion of their needs. They say they cannot do this because of competitors. This is not

correct if the processors were to come clean and admit to the costly mistakes they have made over the years by trying to pick the low market as the grower tries to pick the high market. The potato processing market would become a lot more stable with a greater trust throughout the industry.

Companies are building stores meant for long term storage, but because they are not contracting a very big percentage of their needs they are having to use potatoes out of these stores early, thus not gaining the full benefits of the capital spent on the stores. Plus they then are paying a lot more for potatoes, than contract price out of poor stores giving the potatoes bad processing qualities. The grower is not given the chance to contract all his crop, so he cannot budget now on a very high cost of production crop. He has to grow a certain amount of a variety to cover his contract, but what does he grow in the rest of his acres? He has had to gear up for the contract proportion of his crop, but with uncertainty in the companies contracting and buying policies he is not able to utilize the full potential of his equipment. It is a situation where if the grower can use his land and equipment to its fullest extent, spreading his costs over a known return from a viable contract, the processing companies then can utilize their factories to their fullest extent with guaranteed supply of potatoes at a known price. With this, the company should be able to remain competitive because of the supply and quality of their raw product, and the growers remain viable because of a contract that is worth having.

Processing Companies are putting increasing pressure on growers to grow potatoes with better processing qualities. With this trend taking place worldwide it is becoming more difficult to grow the varieties needed for processing and maintain a profitable growing operation from signing contracts.

Growers should be turning the table on the processors and when processing factories are built in their area they should make sure that before they agree to supply, that the factory is built with the ability to make a top grade chip out of the average variety of potato from the area. The factory would cost more to build but as it is now they are paying more for the right potatoes to go through factories with insufficient processing abilities.

It is not very difficult to put a case forward to prove that 5% less paid for potatoes of lesser qualities and the factories take 2.5% less yield through processing, everyone comes out the same without a lot of pressure being put on the grower for the better grade potato and the ever increasing rejections taking place at the receival parts of the factories because the potatoes are not meeting the required standards.

NATIONAL FARMER UNION.

The National Farmers Union plays an important role in UK agriculture, having 135,000 members out of 250,000 farmers.

To be a member you have to pay a 30 pound fee, plus 4 pence for every acre you have regardless to the ground or the number of stock you have. The NFU owns its own building in London, known as Agriculture House with a current value of 12 million pounds. It has a staff of 1,000 people which come from all sections of it, with 230 working in the main office. Forty six group secretaries with 36 support staff to help them and 420 Branch secretaries.

When Officers are elected to the NFU for a first time it is just a clear cut vote, but if they stand for office a second time they have to gain a higher percentage of votes, e.g. second year 60 - 70%, third year 70 - 80%, fourth year 80 - 90%. This rule operates right through the system, from NFU Chairman down to local Branch Chairmen. It is a system that prohibits people rising to a place of office and just being left there because he is a good bloke.

The NFU has its own Insurance Company and out of 382 Insurance Companies trading in the UK, rates at No. 12, giving them a large say as to what is happening to the industry.

NFU office bearers are continually lobbying Parliament, which consists of 1,200 members, but at a normal sitting of Parliament 650 Commoners and 400 Lords sit.

In lobbying the NFU have a firm policy not to give a trumped up story of anything and only use facts that will stand up in any argument, never make permanent enemies or close their options. They are finding it harder to get a fair deal for the rural communities, as the Politicians are changing with a bigger majority of professional people becoming members of Parliament, these people are not rural minded. They take a very strong stand on any issue which is likely to create change to the farming communities and in recent times the straw burning problem has caused a very bad image of the farmers in the minds of the city dwellers.

Other issues they have a large say in, is helping the farmer through the committees for:

1. Marginal lands
2. Hill farming
3. Representation to Government on future farm size.
4. Land tenure and tenant farmer policy
5. Structural policy and investment aids
6. Less favoured areas
7. Rural development programmes

It is interesting to note that between 1967 and 1983, the number of full time UK farm businesses declined from 183,000 to 119,000, while the average size of the farms increased from 86 to 119 hectares. These changes enabled the industry to take advantage of economics of scale, the potential for which was raised by the development of modern production techniques.

The marginal lands and hill farming rates of compensatory for cattle and sheep are set by the Government for certain lengths of time. The NFU lobby strongly on these issues and last year saw some extra 1.3 million hectares being added to the less favoured areas of farming ground.

Just over half the total farmland of the UK is within less favoured areas, primarily hills and uplands, where livestock rearing is the main economic activity. Farming in these regions contributes a substantial proportion of the national requirement of breeding and store sheep and cattle, thus enabling better soils in the lowlands to be devoted to more intensive production.

The rates of compensation paid on marginal lands are:

1. 22.25 pounds for eligible cows.
2. 2.12 pounds for eligible ewes.

The rates for hill farming are:

1. 44.50 pounds for eligible cows.
2. 6.25 pounds for eligible ewes in specially qualified flocks.
3. 4.25 pounds for ewes in other qualified flocks.

MAKING FARMS VIABLE BY OUTSIDE MANAGEMENT

As farming is becoming more difficult to make ends meet a lot of the owners of the less efficient farms are having to look at alternative ways of becoming efficient to stay in farming.

The NFU and MAFF representatives have come up with a lot of suggestions, all of which are short term and are just sifting the problems from one area to another. But one of the more interesting ways I saw was the less efficient farms being taken under the management of the more efficient farms, or as a farmer became unable to work his

farm for a number of reasons it was joined together under a partnership agreement with a neighbouring farm which had the workforce, mainly father and sons, but were lacking acres to work.

I came across a number of these farms and the owners of the less efficient farms were more than happy with what they had done. It impressed me that these owners had been prepared to put sound economic discussions in front of personal pride to realise that their farms were not paying.

As we progress into the 1990's we will find more and more farms that become less efficient, these farms will have been owned by families for many generations but due to economic times they will be unable to keep ahead.

Under partnership agreements or management utilization and single plant operations farmers will be able to remain on their land for future generations and stop the drift of the rural communities to the queues of the cities unemployed, thus maintaining a balance of population in both areas.

COMMON AGRICULTURAL POLICY EEC. (CAP.)

In the setting up of the CAP there were five main objectives:

1. To increase agriculture productivity
2. To ensure a fair standard of living for the agricultural communities in particular by increasing the individual earnings of persons engaged in agriculture
3. To stabilize markets
4. To assure reliable supplies
5. To assure reasonable consumer prices

This policy consisting of the five objectives rests on the three following principles:

1. The single market
2. Community preference
3. Financial solidarity (ensured by the European Agricultural and Guarantee Fund (EAGGF)).

In all member countries of the EEC agriculture is a vital sector.

Its main purpose is to satisfy the basic and permanent consumer need for food. All farm policies aim to guarantee adequate and regular food supplies. Farming is at the mercy of the weather. Supply and demand rarely coincide and surpluses or shortages can easily arise. This clearly has a direct impact on the consumer. In the European community people spend an average of 19% of their budget on food. It should be pointed out however that this percentage is falling with the increase in the general standard of living in Europe. Food prices are also influenced by industrial and commercial input costs. It is now very rare for produce to be sold directly by the farmer to the consumer.

Agriculture is the main source of income for many people whose alternative job prospects have been destroyed by the economic crisis. Consumer demand has been slowed by the stabilization of population which is now barely increasing. The incomes of the communities 8.5 million farmers can therefore only be increased by technical progress and improved productivity.

RESULTS

Taking the five objectives of the CAP one by one it can be seen that all productivity has increased rapidly. In the first years at a rate of 7% per year and at a rate of 3% in later years. This advance is a result partly of technical improvements, but also the rationalization of farms and a reduction in the number of farmers. Since

1960 the number of farmers in the community has fallen by 55%.

Secondly between 1968 and 1979 agricultural incomes increased by about 3% a year broadly in parallel with other incomes. Incomes fell from 1979 to 1981 but recovered again in 1982. There are still vast differences in income between types of farming, sizes of holdings and different regions.

Thirdly, security of supply has been unbroken. Europe has not suffered any food shortages even though self sufficiency has not been achieved in all areas. The community is the world's largest food importer and can therefore hardly be described as protectionist.

Fourthly, reasonable consumer prices have been maintained for most products. Farm gate prices have increased less than food prices in the shops and less than prices as a whole.

Fifthly, market stability has also been accomplished. Europe has been sheltered from periodic booms in sugar prices and sharp rises in cereal prices which had occurred in some previous years. On the other hand surpluses have accumulated in certain sectors. It has been necessary to dispose of these by costly and sometimes controversial methods.

CONCLUSION

With the main objectives having had time to take their own course it seems that in some areas the EEC members are no better off now than they were before they entered the common market. With the community being the largest importer of food nothing they do will change this as the foods that are imported into the countries will never be produced at self sufficiency, with one of the biggest imports being tropical fruits.

They seem to be obtaining large surpluses of the products they were almost self sufficient in for a start. Some of these are periodic and result from the uncertainty of farming and its dependance on natural conditions. Other surpluses are more serious. They are structural surpluses in other words massive and permanent. Each year the EAGGF finances the storage and dispersal of increasingly large quantities of surplus.

They have taken steps with milk quotas to try and reduce surplus, but I believe production had already gone too far for too long. It is easy for me to say this but from the countries point of view milk production is a vital source of income to many small farmers. The milk issue has got to be a social issue now more than a production one. With the introduction of quotas everywhere there were cries of doom and bunkruptcy among the smaller producers. What do the governments of the countries do now as a percentage of these farmers will have to be restructured somewhere in the system.

The surplus of cereals especially in the UK has got to be a concern to everybody. I believe the standards set for grain to go into the EEC intervention stores were set too low and enabled the cereal growers to grow vast quantities of poor quality grain with a known home for it at harvest. Conditions for grain into intervention storage allowed 16% moisture and 5% screenings. I did see sand being added to grain to take the screenings up to 5% and some very good equipment capable of adding moisture to grain that had been stored on the farm at 14%. The farmers claimed the extra 2% water was worth a lot of money. Things like this have enabled vast amounts of normally pasture land to be put into cereal production to grow a grain, an Australian sparrow would not eat. With a large grain surplus this is creating cheap stock feed for cattle just to add to an already beef mountain. The EEC is going to have to restrict production on cereals too just as they have done in the dairying industry, thus taking away the ticket to print money they have had over the last few years.

With the oversupply of dairy products, cereals and beef, as an Australian it is very important that our Government and Agricultural representatives make sure that our existing export markets are made secure from the threat of intrusions from cheap EEC surplus.

Finally as being totally unaware of the exact structure of the EEC until my Nuffield trip, I cannot see why the countries are injecting large amounts of money into agriculture to create surpluses of products they were almost self-sufficient in. To me I believe the politicians have other theories in their minds why all these countries should be united in trade when they were all at war 40 years ago. Maybe they see the EEC as the Third Super Power.

SUMMARY

There is just no comparison between farming and in particular potato farming in Europe and Australia.

1. With the scale of production and the per capita consumption of potatoes in the EEC Countries, Australia is a long way behind. In comparing my own Western Victorian potato growing area, the largest growing area in Australia, on average we are so small and so far behind in farm technology it has to make one think, is there a future for us as potato growers?

I must state that this is on average, because there is a percentage of Western Victorian growers well up with the best in Europe.

2. Since the Second World War ended it has been the policy of the UK Government to become self sufficient in food production, something they will never do, because of their climate and as throughout the EEC countries they have an imbalance of production, a large excess of the things they do well, and a shortage of the ones they cannot produce.

To achieve this the governments have allowed large amounts of money to be directed towards agriculture in the form of subsidies or straight out grant payments, structural and drainage improvements on farms. These payments have created an imbalance in production with over supplies occurring in dairy products, beef, cereals and wines. This open ended deal, where the farmers have had to be paid subsidy money to produce and then the governments give a guaranteed price for their products, has enabled them to expand at a rate far greater than probably any of their counterparts throughout the world.

These farmers have learnt to farm in a high cost way, with high returns, but now the governments are saying we have to stop because they are not achieving total self-sufficiency, but instead the large surplus of some products.

The subsidies are being phased out along with the grants and tax incentives, as these all go they will have to farm as we do, in a totally unsubsidized way. It is at this point the Australian farmer will come out in front, as he has learnt to farm in a lot of cases by doing the job under his eyes with the tools in his hands, which, over the years, has made him one of the most efficient farmers in the world.

3. The trend to market farm produce in the UK is to look at what the consumer wants, sell it to him then go and produce it. This is a good system as the farmer that can supply the customer what he wants and does it well is being very well paid for it, with a handful of UK vegetable growers building up large growing, packing and marketing operations.
4. As all the incentives the European farmers have, are all slowly removed and they are farming on their own performance we will possibly see a large scale

restructuring of European agriculture. The more efficient farmers will do well with very little change. The less efficient will have to change. Those prepared to accept change will remain with reconstruction. Those who do not and still need handouts will go.

To sum up what farming is all about in Europe and Australia, if one is to stay afloat, I quote a comment made by a mixed farmer harvesting flowers from his bulb operation :-

"It is no good having white flowers the Sunday after Mother's Day".

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