The Australian Nuffield Farming Scholarships

Report of Visits to The United Kingdom

By
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The Australian Nuffield Farming Scholarships

The Australian Nuffield Farming Scholars Association was formed by ex-scholars in 1974 to continue the Scholarship scheme started in 1950 by Lord Nuffield in the U.K.

The U.K., Canada, New Zealand and Australia participate in the scheme and Australia, through the Australian Nuffield Scholarship Trust Fund, finance two scholars each year to travel and study for six months, principally in the U.K. and Europe.

The Australian Trust Fund has been supported by a large number of companies, organisations, individuals and ex-scholars.

Additionally, Qantas have given invaluable support by flying scholars to and from the U.K.

Scholars, upon their return, are expected to report on their experience for the benefit of all. Copies of their reports are freely available by contacting the Secretary, Australian Nuffield Farming Scholarship Association, C/-Royal Agricultural Society of Victoria, Showgrounds, Epsom Road, Ascot Vale 3032.

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AUSTRALIAN NUFFIELD FARMING SCHOLARSHIP TRUST

Report on "TRENDS IN BEEF CATTLE BREEDING" by J. Murray Garnock

THE DAIRY INFLUENCE

Unlike beef production in Australia and North America, that carried out in Britain is based on the dairy industry. Milk production accounts for 25% of total ex-farm sales in UK, and this figure reaches 30% if one considers the production of beef encompassed by dairying. Britain imports butter and cheese, in fact about 30% of its dairy product consumption, and there is concern that other European countries may capture most of this market unless it warrants the British dairy farmer to produce more. Overshadowing decisions made at farm level are those from the agro-political machine in Brussels which juggles self-sufficiency and surplus, farm lobbies and consumer groups, food costs with farm inputs, world prices and export restitutions — the simple theory of supply and demand becomes somewhat distorted.

It is expected that the UK dairy cow population will remain fairly static and that the proportion bred to beef bulls will not vary much from the 40% currently joined. If one considers the cross-bred herds, mainly in the non arable hill areas, and the pedigree beef herds throughout the country as well, only 56% Britain's total beef production is actually sired by a beef bull. Canadian Holstein blood is being used more and more in the traditional British Freisian herd to improve milk yields. Concern is widespread about the Holsteins' less desirable beef conformation and carcass shape, the ramifications of which will be followed with interest.

Annual milk production peaks in late Spring, thus a premium is paid for winter production which generates a supply of Autumn born calves for beef production. These together with the Spring calves are purchased and grown out, aiming for the better fat and store markets of the Spring with 18 and 24 month old cattle. The bulk of cattle sold from the commercial beef herds come on to the market in Autumn. A major factor influencing the profitability of grass fattening is to exploit compensatory growth following over-wintering at maintenance level or at a modest gain.

Those dairy-beef cross heifers not needed for restocking the hill herds are often secured for finishing on less sound land or for quick turnover. They are cheaper than steers due to their tendency to lay down excessive fat before reaching a marketable weight. The practice of growing out bull calves is gaining in popularity as producers recognise the advantages in rate of gain and feed efficiency and as consumer interest in lean meat is generated. About 5% of current UK beef production is from entire young males.

In practice there is considerable variation in the levels of fatness at which cattle are slaughtered. Recent studies in Britain have suggested that about 20% (or 53,000 tonnes) of the fat produced by cattle each year arises from feeding beyond the point of optimum efficiency for the particular breed and sex of the beast.

BREEDS

The factor that has predominated and preoccupied beef production in Britain for the last 10 years is resistance by the consumer to purchasing excess fat. Concurrent with this development has been the growth in influence of the Continental breeds of cattle (and sheep). The end result is that the commercial breeder now has the opportunity to choose amongst the breeds and design a beast to suit his feed and management conditions. Large differences in growth rates and slaughter weights occur between breeds and their crosses; a striking feature is the consistency of ranking of breeds for these factors under different production systems and environments. The heavier the sire breed the higher these traits tend to be : they eat more and have to be fed longer but there is little difference in feed conversion efficiency.

Most producers recognise these differences and handle the various breeds and their crosses accordingly. For example, although the popular Hereford/Freisian cross steer is capable of growing slightly quicker than the pure Freisian and will attain the fat cover demanded by the market much sooner, the producer exploits these inherent differences by feeding the crossbred a high forage/low concentrate diet so that an acceptable fat level will coincide with a satisfactory carcass weight (over 250 kg.). A later maturing steer, e.g.: a Charolais x Freisian, would require a high performance ration for it to express its full genetic potential; to allow it time for maximum muscle growth requires later slaughter and a heavier carcass otherwise there is too much bone in relation to meat. The early maturing breeds were developed to fatten on low quality roughage — on the same diet a late maturing breed would not deposit any fat, muscle development would be retarded and fertility problems may arise. The Australian consumer's requirement has traditionally been for a smaller joint or cut of meat than that demanded in Britain or North America. Each country has to produce the ideal size carcass to suit market demands and climatic conditions. Observations made during periods of rapid escalation in prices in UK reveal that the housewife often selects a smaller cut in an endeavour to keep down her food costs before adapting to the higher values. A few of the Continental breeds, e.g.: Simmental, will have an impact for their maternal qualities under American and Australian conditions; their main influence will probably be felt in breeding terminal cross cattle for feedlot fattening where growth rate is profit. These breeds have had an indirect impact on the British breeds of cattle, the breeders of which have responded to this challenge to mould their product to meet the modern situation. For example, the 1979 USA National Poll Hereford Champion at 29 months weighed a tonne, measured 149 cm. at the hips with 1 cm. of backfat together with desirable conformation and breed type. This development with size and elevation as common denominators has been achieved in a comparatively short time and has not yet brought uniformity of type. The cattle are in a transitory stage, developed to meet a situation of changed demand, where the new types are primarily "changer" bulls and not necessarily the final product sought.

SELECTION CRITERIA

The trend in the 50's for small compact beef cattle in Britain and USA was followed so enthusiastically by some American breeders that the maturity of their cattle was brought forward so markedly that low slaughter weights became uneconomic. It took about 20 years to reverse the trend and return to more productive growth patterns.

The necessity for change has not been universally accepted by all pedigree breeders in Britain, those marking time and awaiting for a recurrence of demand for the traditional type of bull are in a minority. With 20 beef breeds competing strongly in the bull market the necessity to follow demand is vital. The commercial breeder is seeking bigger, slower maturing, clean fronted cattle less prone to the deposition of fat. The Continental breeds are historically bigger cattle than the British breeds, as were their ancestors — the Hereford sire "Cotmore' weighed 38 cwt. (1900 kg) in 1839. Although some current individuals may equal or even out-perform Continental cattle, modern demand is for the British breeds to close the gaps whilst still retaining their easy-care virtues. The increasing use of Holstein blood in the British dairy herd is resulting in big, lean heifers that physically require a tall leggy beef bull to cope. The need is also for a heavily muscled bull to sire the crossbreds that would not otherwise produce economical feeders with a suitable carcass. The Milk Marketing Board has embarked on a scheme to identify those Freisian and Holstein sires that produce better carcasses by assessing their bull and steer calves as well as the productive daughters for beef shape. A premium would be warranted for semen from those sires whose progeny have superior milk yields *and* more acceptable beef shape. Beef bulls whose semen is used in the dairy herd have been progeny tested for weight gain for some time, now the Board is ranking these sires on crossbred calves saleability as well. A premium would also be expected for semen from a sire whose calves sell well *and* grow out above average.

The value of selecting beef cattle for superior growth rates has been universally accepted for years. Improvement in this trait is strongly correlated with mature size and here is where the debate is taking place: How big should a bull be? Why feed a big cow all year? Where will it all end? Like all natural biological systems nothing is cut and dried, variation will still occur amongst cattle — and breeders! Supply and demand dictates price levels and high values attract attention which often accentuates the cycle. Big money is paid in Canada and USA for extremely tall British breed bulls and everyone is on the bandwagon — not necessarily a bad situation assuming the trend will do no harm. Consistent rearing conditions, similar to those experienced commercially, the ability to exhibit cattle at shows without excess fat cover endangering their productive value, and a common goal lend themselves to the widespread acceptance of objective values for assessing and comparing stock.

Selection amongst a closed line of Herefords at a Research Station in Montana purely on performance characteristics — fertility, milking ability and growth rate — since 1935 has yielded a source of genes much needed by breeders. The herd is between 15% and 25% inbred but still carries no genetic defects hence could be regarded as a model or criterion by which to compare progress. It will be interesting to see the results of another decade of selection for the extreme frame size now popular in the American show ring — will they be more efficient converters of grass to beef than cattle selected purely on growth rate? There are indications that unless muscling and natural fleshing ability go along with a gradual increase in frame size the cattle can lack adaptability and not be able to withstand stress conditions, they can be difficult to fatten and may be less fertile. Some work is being done on applying a beast's height:weight ratio to estimate muscling and condition. Evidence indicates there to be no contradiction between height and muscle, except in extreme cases, with muscles in taller cattle being more elongated and flatter but with the same volume or weight as those on a shorter thicker animal.

An extremely large cow can be the result of either i) exceptional growth genetics, ii) remarkable nutrition, iii) failure to calve regularly, or iv) inadequate milk production for her calf. US field research has suggested that the ideal cow size for economic efficiency in commercial beef production is 525 kg. (1150 lb.) Assuming that the pedigree cattle that produce the bulls to sire those commercial cattle are run under above average conditions and that a lot of commercial herds have cows lighter than this figure then selection for mature cow size is valid. In fact one stud breeder in Canada culls cows below 135 cm. (53") at maturity and will only use bulls out of cows weighing over 725 kg. (1600 lb.)

As the cattle producer selects for growthier animals he also tends to get heavier birth weights and an increased chance of calving difficulty. Such selection also tends to increase frame size and the pelvic area of heifers thus allowing a heavier calf to be born. The selection of bulls with a low birth weight but still with good growth performance offers a solution to this "chicken before the egg" dilemma as birth weight is highly heritable. There is a growing trend to castrate bull calves over 48 kg. (105 lb.) at birth that may have eventually gone into commercial herds. A selection programme is underway amongst the high performance line-bred Hereford herd in Montana for high yearling weight and low birth weight — the deviation above or below the average birthweight is multiplied by 3.2 and subtracted from or added to the yearling weight. A herd in Britain is comparing the width of a bull through the shoulders with that through the stifle area to identify sires that may cause problems. A Canadian breeder is persisting with measuring height at the shoulder of a beast, contrary to the more consistent repeatable and easier method of measuring over the hip, and suggests that by keeping the spinal processes above the top of the shoulder blades — thus stretching out the coupling of the whole shoulder region — may produce a calf less prone to a difficult entry into the world.

A trend evident in most progressive North American pedigree herds is their utilisation of high generation turnover; maximum genetic gain is being made through their young heifers being bred to a yearling bulls. Cows over five years and bulls with two seasons behind them were retained only if they produced top progeny.

ASSESSMENT

Although there is some dissatisfaction about most of the government sponsored or breed society performance testing schemes currently operating, they are widely recognised and used by breeders within their herds. Slight adjustments are consistently taking place to adapt the programmes to the needs of the cattleman, rather than those of the scientist, as a tool to assist in the selection and promotion of his stock. The schemes operating in North America are based on 200 day and 365 day weighings, with some offering an optional weighing at 450 or 500 days. The weaning and yearling weighings are typically made at the start and completion of overwintering in a feedlot — a system which parallels commercial production. Most steers are sold at 500 to 550 kg. liveweight which would be the equivalent of a bull calf's 365 day weight. Further assessment of weight and height of individuals is often made at two years and at maturity, as at the yearling stage it is difficult to predict the age at which growth will slow down and fat deposition will occur. Although the 200 and 365 day weighings are vital in the initial selection of replacements and a cow's worth in the herd, the measurements made later tend to be emphasised in the description of cattle.

1400 herds from 23 breeds in Britain participate in the Meat and Livestock Commission's within herd programme. Although weights can be recorded every 100 days up to 600 days, those made at 200 and 400 days are regarded with more significance as they fit better into herd management. Rather than comparing performance as a percentage variation around the herd average, as is done in America or Australia, the MLC compares an individual's performance with the rolling breed average for that trait. It was interesting to note that the average 400 day weights for bulls of most breeds declined from 1968 to 1978 as more economical and commercial feeding practices were adopted and as the common age for selling bulls was delayed. This decline has now been reversed and sustained improvement now depends on breeders access to and the use of better performing animals.

The small herd size and widespread calving patterns are a major drawback to the value of within herd comparisons in UK, thus the use of the breed average as a yardstick and the necessity of having central testing stations for bulls. These centres, with standard management procedures, give bulls equal opportunities thus yielding more precise information on their breeding value. Ten to twenty bull calves with superior weaning weights are generally chosen for the test which concludes at 400 days with assessment for weight, height, backfat thickness and feed conversion efficiency. There is some conflict of interest in that breeders would like the test to conclude at a later age and the test centres prefer to increase throughput by testing younger bulls — they quote an 85%-90% correlation between weights at 400 and 500 days and suggest that height and fatness indicate a bull's state of maturity. The seven month test costs approximately $500 per bull.

Most provinces and States in North America now have bull test centres, in the 25 years since their inception their esteem and popularity has flourished. About 2000 bulls of all breeds are tested each year in Canada alone, one of the largest is in Alberta where 260 Hereford bulls undergo the 140 day weight gain trial following a 28 day settling in period. Upon completion of the test the yearling bulls undergo a veterinary stock check for physical soundness and scrotal circumference, those which are satisfactory and have average or above growth rates — generally 100 bulls — are offered for sale at auction in early Spring.

The large cattle population in Canada and USA, together with the prevalence of large commercial herds and the consistency of rearing conditions in each region lend themselves to the operation of successful progeny testing programmes. Using Alberta's scheme as an example, initiated in 1971 by a group of Hereford breeders wishing to identify sires with superior genetic merit, 83 bulls have been screened so far over 66 commercial herds. Semen is supplied free to the co-operator, who must breed a minimum of 50 cows and keep relevant details of calving ease, birthweight and weight at weaning, at which he receives a $100 premium above market price for each steer calf delivered. These steers are fed for at least 140 days in a feedlot, are weighed then sold for slaughter and carcass appraisal. The heifer progeny are retained by the commercial breeder. The overall cost to the owner of each bull in the 1975-77 test was $2381 less Federal and State government assistance of $1500 per sire.

The UK Meat and Livestock Commission has embarked upon a "Young Bull Proving Scheme" with the co-operation of the participating Breed Societies, a progeny test within pedigree herds of promising junior sires. The Milk Marketing Board's progeny testing scheme for beef bulls mentioned earlier, although based on the Freisian cow has identified many sires worthy of further scrutiny by the stud breeder. In 1977 the Animal Breeding Research Organisation established a 200 cow pedigree Hereford herd to be used for breeding research and development with its main aim being the selection for efficiency of conversion of feed into lean meat. Progress will be compared with three other lines within the herd i) a control base using semen from the progeny of the original cows in a rotation so as to avoid inbreeding, ii) an open herd using semen from top progeny tested sires, and iii) another line selected for muscle growth rate. Bulls from the control line will be submitted to national performance and progeny tests to measure genetic trends within the Hereford breed as a whole.

PROSPECTS

Economic reality has enforced a more practical approach upon the British pedigree breeder, there will always be interest in stud cattle as a hobby and as an investment or ego trip for the city financier, but those breeders who are confused by the future and have no breeding policy are dispersing their herds. The use of artificial insemination has replaced the trade for bulls for crossbreeding with a demand for a very limited number of top stud sires. The continuing decline in beef cow numbers and a temporary reduction in the dairy herd threaten a reduction in beef production beyond 1981 and an increasing dependence on imports.

A comparison of the net balance of energy and protein between a crossbred beef farm and a dairy unit illustrates the high potential of the dairy system but also the very high levels of input required. This analysis is unimportant if cereals and proteins for animal feed remain plentiful and cheap when compared with animal products and the basic ingredient of fuel and nitrogenous fertilizer — oil — is plentiful; we are entering a period when resources

are becoming increasingly expensive due to scarcity and farming systems will need to adjust to a more efficient usage.

To warrant running beef cattle on the high priced land in Britain and for returns not to lag too far behind those from cropping, store cattle must grow fast and reach marketable weights in the minimum time. With the cost of cereals, and hence concentrate feedstuffs, exceeding returns from pasture production, fattening cattle to the required slaughter weights on grass and conserved fodder will be the mainstay of British beef production.

Production trends in North America should maintain their cyclical nature with adjustments for drought and economic circumstances modifying the pattern. Competition between stud breeders is fierce, for both the volume trade and the high priced sire market, consequently the progress of those who can anticipate demand and adapt their cattle and marketing accordingly shall be watched with interest by some Australian breeders.

The success of a co-operative, as opposed to an informal syndicate, formed in UK to purchase top sires should warrant further interest. Cattlemen with a common aim to their breeding programmes formed this self-regenerating co-operative, aided by UK and EEC funds for such schemes, to secure elite — and thus expensive — bulls for joint service amongst their own herds, and for semen production and sales to finance promotion and the purchase of new genes. Another development worthy of attention is the progress being made in non-surgical embryo implantation throughout the world. For the breeder to be able to collect embryos from his outstanding females without them leaving home, to supply recipient cows of his choice and there being no need for expensive operating facilities opens up a vast potential for cost savings and genetic advancement. The technology to freeze ova for storage and for transport to other countries is well advanced, thus offering to animal breeders the opportunity to import new breeds and bloodlines at reasonable cost.

Of all the industrialised countries, Australia has the lowest cost of production of protein and fibre — both vegetable and animal — and for us to maintain and benefit from this enviable situation requires constant monitoring of developments overseas, the recognition of feasible innovation, and the political courage to demand changes where warranted for the benefit of all.

AUSTRALIAN NUFFIELD FARMING SCHOLARSHIP TRUST

Report on

"FARM USE OF MICRO-COMPUTERS"

by J. Murray Garnock

We live in an age which is increasingly influenced by computer technology; computers are now well established in industry and commerce. The development of the silicon chip and the micro-computer has brought useful systems within reach of the small businessman.

EQUIPMENT —

The main part of any micro-computer is the central processor — the size of these can now be smaller than a matchbox and cost between $10 and $100 to manufacture. In addition it is necessary to have a keyboard for information input, a memory unit plus a visual display and/or printer to retrieve and present the information. These additional pieces of equipment are not usually cheap, the "hardware" suitable for farm office use is unlikely to cost less than $7000. The computer itself, complete with memory input and output mechanisms is of no use without programmes (or software) to tell the computer how to handle the work. These programmes must either be purchased or written by the operator.

APPLICATIONS —

Accounting: Financial accounting is fundamental to all businesses; except for the very large operation, tax and management accounts carried out by the computer would be difficult to justify. Those likely to obtain full benefits of a computerised accounting system are few, it has been estimated that about 5% of farmers in Britain could warrant using such a plan at this point of time. There must be a definite need for continual management information to control operations and effective use must be made of the information produced.

Given these criteria the computerised system can have a great deal to offer:

a) To produce financial summaries in any desired format when required; b) for immediate up to date information on creditors, debtors, bank balance, material stocks and livestock numbers; c) to produce cash flow forecasts and re-draft them as circumstances change; d) whole farm planning and profit forecasts and monitoring actual results with those budgeted; and e) processing payrolls, printing cheques, addressing envelopes, etc.

Livestock Control: The more intensive livestock operations such as dairying, poultry and pig production with regular outputs and inputs, high turnover and close supervision lend themselves to a computer system more so than extensive beef and sheep businesses. Handling information for genetic improvement and recording offers the main scope for these latter enterprises. The advantage of the computer is in its speed of retrieving the data and in its calculation of the necessary indices for selection. Nutrient requirements, ration formulation and feedstuff stock levels also involve tedious calculations which could easily be done by a programmable calculator or computer.

Cropping and Pastures: There are less obvious advantages in storing this information in a computer than with livestock, but would allow quick access to paddock histories and yields, soil nutrient levels, seed spray and fertilizer rates, input stock control, disease diagnosis and control information.

Other Uses: Parallel developments are taking place in the use of computers for automation. The main thrust has been in dairy application — with each cow carrying a transmitter that activates the computer's memory and dispenses appropriate amounts of concentrate feed, records milk yield and cow health status. Developments are taking place in the environmental control of glasshouses and intensive livestock buildings to activate fans, heaters, watering systems as required. Micro-computers are being used increasingly in farm machinery with application to crop spraying, harvester control, grain drying and crop storage.

ALTERNATIVES —

Farm Secretary: In deciding whether or not to adopt new technology one ought to consider the alternatives available. On a large farm a full time secretary could do the book keeping, pay wages, and accounts, keep the necessary enterprise records and produce an annual set of management accounts, plus be able to furnish some management information. As the business grew, a stage would be reached where one secretary could no longer cope and employment of an assistant or a micro-computer would be considered. For the smaller sized business, employing a part time secretary, installation of a computer is unlikely to be justified. The deciding factors to warrant usage, rather than there being a threshold turnover or livestock number, are the real need for information, the number of enterprises and the degree of capital management required (especially important if overdrafts and interest rates are high.) Many farmers don't need a machine to remind them what bills he owes or how much his bank account is overdrawn!

Secretarial Agencies: These services are more common in Britain than in Australia, and provide part time secretaries, mail-in accounting systems and often themselves use a micro-computer package. Accountants and consultants frequently utilise a computer system and offer their own management service to farmers.

Commercial Bureaux: Several British firms e.g.: ICI, Barclays Bank, Milk Marketing Board, provide a management accounting service by post to farmers and many offer a dairy analysis service. The Meat and Livestock Commission provides beef, sheep and pig costings together with an assessment of genetic performance. The feasibility of using on-farm-terminals to a central computer is being studied. The farmer would have to purchase the terminal plus a printer and be connected to the central computer by telephone, with distance and interference being the main problems.

THE DECISION —

If a landholder can decide what the problem is with his present situation and the various alternatives are considered, partial budgeting should pin-point the best solution. Invariably however, whilst it is easy to set down the extra costs involved many of the advantages are difficult to quantify in financial terms; the final decision will be subjective and depend on personal inclination. If a farmer has, or thinks he needs, a fairly sophisticated accounting method with better accessibility to detailed financial information and tighter control of resources, a computer system could be worth investigating. Application of the system's resources to non-financial management widens the scope — if the machine can do what is wanted.

Having defined the need for a micro-computer system and considered the price range warranted, the farmer must select the right one. As the industry is so dynamic, new firms are coming into the market offering "hardware" and/or "software". The integrity of the supplier and its after-sales service need consideration so as to benefit from new technology and programmes as developments occur, as well as ironing out any "bugs" and mechanical problems. Choosing a package deal where computer plus programme are sold together would suit most circumstances. Rarely is a self-written programme comparable in quality or cost with ones currently marketed by reputable companies in Britain.

FUTURE —

We are now only at the beginning of the micro-computer revolution. Applications so far have been relatively limited. Several companies are in the programme writing business thus as the number of uses for computers increase more of the farming fraternity will justify their acquisition.

During the next five years it can be predicted that the cost of these small computers will continue to decline and their computing power will increase. The possibilities for economies of scale, vertical integration and more widespread sharing of software should lead to lower prices. Improvements can be expected in silicon chip production and in memory storage systems. Parallel developments will continue to take place in farm automation especially in dairying, pig and poultry production and in controlling various machines in crop handling. It is worthwhile to reflect that so often in the computer field the technology is available but practical implementation lags behind.

Television information services have been launched in Britain and technology hopefully should reach Australia in the not too distant future. The BBC and ITV systems broadcast about 800 pages of information, ranging from market reports and the news to recipes and crossword puzzles, as part of the normal television signal. The pages are transmitted in rapid sequence and are received as dots just above the screen, a decoder and keypad allow selection of the required page of information. Programmes from such a service could be directly fed into the on-farm computer and analysed for immediate reference.

Our attitudes to the machines are likely to change as they become more and more commonplace. In a few years time we could well regard the micro-computer as being as essential as the calculator is today. The computer can't replace the farmer; it can't replace his experience and expertise. All it can do is enable him to make better informed decisions.

"SHEEP IN BRITAIN"

INTRODUCTION

The British Sheep Industry is based on a system of stratified cross breeding which enables land of widely different quality to be utilised for sheep production. Up on the hill and mountain areas breeds such as the Scottish Blackface, Welsh Mountain, Cheviot, Swaledale and Speckle-face perform a vital function in utilising the extensive regions with little or no supplementary feeding. About half the UK ewe flock run in these harsh areas, the main products being store lambs, ewes for breeding and wool.

In the upland areas, between 500 and 1000 feet above sea level, the Clun Forest, Devon Closewool and Dartmoor — to name a few — combine with purchased hill ewes and are crossed with Longwool breeds such as the Border Leicester, Blueface Leicester and Teeswater to produce the high performance crossbred ewes for sale to the lowlands producer. The sale of store wether lambs and wool are of lesser importance. Selection within the longwool breeds for greater size, prolificacy and milk production is necessary in improving the viability of the crossbred ewe.

On the Lowland areas, in addition to cross ewes, breeds such as the Dorset Horn, Poll Dorset, Romney Marsh and Lleyn are often crossed to add specific characteristcs or kept as self-replacing flocks. The Downs breeds sire most of the terminal cross lambs; for the fast maturing early lamb the Dorest Down, Hampshire Down or Southdown are commonly used; the Suffolk is the most widely used ram breed of all leaving fast growing lambs which suit a variety of systems. From the Continent, the Texel is becoming popular with its late maturity, leanness and muscling.

Sheep production is a high cost — high return business compared with Australian operations. Even though lamb prices are two to three times ours, the cost of servicing or renting land worth $2000 to $4000 an acre at 20% interest rates together with the price of fuel and most living costs being about double those in Australia, plus the expense incurred in overwintering stock the British producer has his share of worries.

MARKETS

The European Economic Community is a net importer of sheepmeats, being only 65% self sufficient. The UK which holds 43% of the total sheep flock together with France, with 32%, dominate production. Census figures for both countries show an 11% increase in sheep numbers over 1970-75 levels, whereas sheepmeat consumption has fallen 3% over the same period. Reduced imports from New Zealand and a swing to pork balance these figures.

British sheepmeat exports have increased dramatically in the last 10 years from being less than 10% of her production in 1968 to about one third her total output in recent years. This export trade, together with its political implications, has led to quite wide fluctations in the prices received by the producer. Current returns per ewe (not adjusted for inflation) have fallen by 30% in the last two years compared with the previous four years average. This led initially to a carryover of last years lamb; uncertainty over the export market to France, the high rate of exchange for sterling and no big reduction in imports from New Zealand have combined to put pressure on a usually bouyant market between March and June. Higher than normal lambing percentages this spring over most of Britain could lead to a market glut in the Autumn when most lambs are offered. Pressure is being applied to the UK government to adjust their sheepmeat price support system by lowering the maximum weight to receive the guarantee from 50lb to 45lb and to reject the overfat carcasse rather than the lean one with export potential. A surplus of overweight and overfat carcasses would be difficult to market.

WOOL

British sheep producers account for 1.2% of the country's total livestock output, much less significant than the dairy industry's contribution but nonetheless there are 90,000 wool growers producing 35 m Kg of fleece wool from the 20 m sheep shorn each year. (Another 14 m Kg of wool comes from the 10 m sheep slaughtered each year.) With an average clip size of 420 Kg and over 400 known breeds and crosses of sheep yeilding an extreme variety of types the British Wool Marketing Board is an essential ingredient in the industry. The Board was set up in 1950 to strengthen the selling power of the producers and promote the image of wool against competition from the synthetic fibre industry.

The majority of shearing is done in the summer months. The growing interest in housing sheep for the winter has led to some producers shearing at that time instead. A year round shearing season could be possible if EEC slaughtering requirements are tightened to make pro-slaughter shearing mandatory. The Board runs a shearers training scheme with the assistance of over 100 part time instructors who conduct several hundred shearing courses throughout the country.

Each fleece is rolled separately and packed in low density bales. The Board is responsible for the transport of the wool to a regional depot where it is graded into one of about 300 types and weighed. The price paid by the Board for each grade is adjusted annually before the main shearing season (the price stabilisation scheme applies only to fleece wool). Payment is within a few days of the Board receiving weight and grade details from the depot. Sale by sample auctions of pooled lots of approximately 5000 kg are held regularly at three centres throughout the year. The Board's product development and sales departments operate a direct selling and mail order network, offering goods manufactured solely from British wool. Profits from this venture is spent on further promotion.

PRODUCTION TRENDS

Hill Flocks —

The grazing of sheep in the mountains and hills is one of the most efficient industries in Europe, there is a frequent intrusion of a few beef cows or a plantation of conifers but the hill ewe is a most economical converter of grass to protein under the harsh conditions. A flock of 450 ewes with 105% lambing percentage typifies the scale of operation. Less than 10% of the producers returns comes from the sale of wool, and a subsidy is paid for each ewe kept in the hills (an EEC scheme aimed at income comparability) which accounts for about 18% of the income received. There is scope for elevating the prolificacy and growth rates to enhance profitability but the breeds have evolved in the harsh environment and any intensification could prove counter-productive.

Upland Flocks —

The sheep breeder in the lower regions of the hills has a bit more flexibility as he can run a greater variety of breeds, beef cattle are better suited and some cropping can be done on the better sites. The average flock consists of 400 ewes with a 130% lambing, a subsidy of around 10% of returns is received. There is scope for raising the weaning percentage and stocking rate, but higher input costs could swallow the advantage. Effort has been put into breeding a crossing ram that will sire highly productive ewes from the hill breeds. The traditional crosses such as the Mule (Blueface Leicester X Swaledale ewe), Greyface (Border Leicester X Scottish Blackface) and Scotch Halfbred (Border Leicester X North Country Cheviot) have a fair toehold in the intensive lowland areas but "synthetic breeds" have made an impact. The Colbred, Cambridge and ABRO Damline have various proportions of Finnish Landrâce (for prolificacy), East Freisland (for Milk), Border Leicester (for size), Dorset Horn (for breeding out of season) or Clun Forest. Lambing percentages have risen from 175% to over 200% by changing the sire of the crossbred ewe.

Lowland Flocks —

Under these conditions, the profitability of sheep production has to be competitive with that of cereals. Grain prices of $160 to $200 per tonne over recent years have led to the ploughing up of great areas of traditional grazing country; the probable oversupply of grain in the EEC could put a stop to this trend. At average cereal yields of four to five tonnes/hectare the sheep operation has to turn off 25 lambs at $50 each off each hectare to remain afloat. Most arable farms operate on a rotational cropping basis which usually includes a period under grass to enhance soil structure (especially on the heavy clays and the lighter chalk and sandy soils) and keep crop diseases to a minimum.

The typical lowland flock has 350 ewes with 150% lambing, in fact anything below 150% is losing money under current circumstances. To improve returns either stocking rates, prolificacy or slaughter weights can be increased. Elevating the number of ewes carried to fully utilise summer feed production has led to the need to overwinter and lamb down under cover or under intensive conditions on ground that can sustain severe stock pressure e.g.: land to be ploughed in the spring or light free draining soils. Removing sheep from the grazing areas for the winter and early spring can boost stocking rates by 25%. Lightly grazing autumn sown wheat crops in late winter/early spring can be a cheap way of getting over the problem without affecting yeilds greatly. The attention required at lambing time increases considerably above the 160% level, with more small lambs and the need to foster. For each ewe to rear two lambs — allowing for barren ewes, ewe deaths and lamb losses — the actual weaning percentage to ewes joined is around 180%.

Two of the major costs in lamb production are ewe maintenance and ewe depreciation. Providing stocking rates are adjusted, a small ewe can be as economic as a larger ewe but management is more demanding and lamb growth rates may not be as high. More ewes can be housed in a given area if they are shorn, but they tend to end more and consequently have heavier lambs. There is a clear relationship between weight of lamb and fatness within a breed; with the high cost of producing fat and the need to avoid any penalty for overfatness, various breeds, crosses and production systems can be chosen to produce lean lamb of the required weight. Lambs by a Downs breed ram will start to put on excess fat at 20 kg carcase weight, those by a Suffolk ram at 22-24 kg and by a Texel at 30 kg. The choice of ewe will modify these weights.

In view of present prices, the advantages of crossbreeding may need re-examining. A self contained flock with a modest lambing percentage can leave a better financial margin than a really prolific flock using purchased replacements, especially if surplus young ewes can be sold as breeding stock. In 1974-75 a two-tooth replacement ewe cost 150% the price of a sale lamb, in 1978-79 this rose to 250%. Disease problems can be reduced in a closed flock and new breeds can be added to the gene pool to fulfil definite requirements. The existence of so many crossbred ewes has considerably limited the material in purebred flocks available for genetic improvement. As in most countries, there is a genuine need to identify the top genetic material within breeds.

OBJECTIVE SELECTION

The Meat and Livestock Commission operate a sheep improvement service for purebred flock owners able to identify and weigh individual sheep. Over 300 flocks covering 36 breeds and 40,000 ewes are co-operating so far, and as production costs continue to soar the technical minded sheep breeder will be looking for seedstock that will be more efficient for his operation. Tradition and show ring performance have more influence in Britain than in some north European nations where, admittedly with much smaller sheep populations, up to 50% of all ewes are recorded and sheep cannot be exhibited without records.

Ewe selection amongst lowland breeds is based on her fertility, prolificacy and milking ability as measured in the total weight of lambs at eight weeks (12 or 18 weeks in the extensive hill areas), corrected for sex of lamb and age of ewe. Additional weighing of ram lambs from meat breeds is done at 21 weeks. The requirement for fast growing later maturing lambs has led some breeders to weigh their ram lambs at seven months and selecting the heavier lamb with more muscle and less fat deposition. As most breeders sell their rams at between

six and ten months of age the final weighing would have to fit into his clients' demand patterns, thus a uniform recording programme could have problems.

Within the Dorset Horn and Poll Dorset breeds, 7500 ewes (about one third of total ewe registrations) from 40 flocks participate in the scheme, and at the Annual Spring Ram Sale the MLC produce a list of those superior rams with the following performance standards: 1. Dam's adjusted weight of lambs at 8 weeks if in the top 20% of the flock; 2. Dam has lambed in the Autumn from the age of two years (or has lambed three times in two years); 3. At 21 weeks the weight of the ram if above the flock average, and 4. The ram has been chosen by his breeder on type, soundness and conformation.

For 13 years Welsh Mountain flockmasters have operated a regional performance test centre, into which ram lambs are entered at seven months and are evaluated at 13 months on a basis of final body weight, conformation and fleece weight and grade. The 1979-80 test involved 160 rams from over 30 flocks and is a positive method of selecting superior stock in a nation with relatively small flock sizes.

The first Group Breeding Scheme to be set up in Britain has been within 13 flocks of Lloyn sheep — a medium sized Welsh breed with a lambing record over 200% and high milk production. Selection within the 100 ewe nucleus is on prolificacy, milking ability (lamb weights at 8 weeks), and precocity (all ewes must lamb at 12 months). An auxiliary pool is maintained with each breeder contributing his top 3½ year old ewe each year. The ram lambs from each nucleus flock are pooled and the best are chosen for use within the scheme.

FUTURE

It is not thought that the total ewe flock will exceed its current 14 m. Further intensification on lowland areas is expensive and there is a limit to the output from the higher country. Increasing the turnover from each flock by combining sound genetics, cheap housing for over wintering and feeding good silage for maintenance and production could be the trend.

The low returns per ewe for wool compared to sheepmeat and the cost of shearing, crutching, dagging, checking for fly trouble and cast ewes has kindled interest in breeding sheep that shed their fleeces in the spring — as would a horse or cow — though infusion of the Wiltshire Horn. It has been found that the greater milking ability of the woolless ewe more than compensates for the lower skin value of her lamb. This approach is being coupled with minimum care at lambing having as the ultimate goal a low input easy-care sheep system. EEC slaughter regulations require the heads to be skinned to enable veterinary inspection. This is a difficult process especially with a horned sheep, and has hightened interest in breeding the horns off some of the indigenous breeds.

The British sheep producer is becoming increaingly aware of the need to effectively market sheepmeat; promotion campaigns at home and on the Continent have been limited by finance. The housewife is very price sensitive in her choice between lamb, beef, pork, poultry and textured vegetable protein and is not overjoyed at buying fat or bone. As in most meat eating countries the way is wide open for promoting easily prepared boneless cuts in the supermarket and aiming at the burgeoning "take away" trade. All that is required are the three ingredients for modern day marketing — experience, time and money, plus the will "give it a go"

"OUR TIMBER RESOURCES"

WORLD FORECASTS

Predictions suggest that world timber consumption will increase by 80% by the end of the century and by more than 200% by the year 2025. Populations and incomes are increasing but world timber supplies are likely to fall short of demand, as forestry investment is not keeping pace with the growing demand for timber. Between 20 and 30 hectares of forests over the globe are being felled each minute — 24 hours a day, 365 days a year. This situation places on governments and their forestry administrations an even greater responsibility than ever before to arrest degradation and manage every hectare of forest to the best advantage for all people. This was emphasized at the 7th. World Forestry Conference: "Unless effective measures are taken the world's forests will be unable to make the future contribution to mankind of which they are capable". Sooner rather than later there will be a global shortage of timber.

Forecasts indicate that by the year 2000 there will be a deficit of about 10% in total world supply and that this deficit will increase rapidly, putting strong pressure on prices.

Europe is a timber deficient area, it imports 60% of its needs and accounts for one third of the world trade in wood products. The forests of Europe are exploited more intensively than forests in the rest of the world, but prospects for increased production are poor unless substantial afforestation schemes are undertaken. Although 21% of Europe's area is under forest the potential yields per hectare is relatively small compared to that from warmer countries closer to the equator.

BRITAIN'S FORESTS

After oil and food, timber is Britain's third largest import; only 8% of current demand is supplied from local forests, and it is unlikely to become more than 15% self sufficient by the turn of the century. The main sources of supply are Russia, Canada and Scandinavia. Almost half the UK timber consumption is in the form of pulp and paper, a third is solid wood and the balance is in panel products (chipboard, etc.) Over the next 20 years consumption is expected to rise by 50% and to double in the next 50 years with pulp, paper and panel products expected to be the main growth areas.

Of Britain's total area of 23 m. hectares, 3 m. are covered by cities, roads, etc. and are hence irretrievable, 12 m. are — for a better word — ploughable and 8 m. is classified as nonarable hill land of which 5 m. hectares are farmed. Two thirds of the remainder is forest and woodland of which 80% is managed for timber production (about 1.7 m. hectares). Conifer plantations occupy a majority of this area and occur mainly in Scotland.

After widespread fellings for the war effort, the Forestry Commission was set up in 1919 to promote forestry and take an active role in supplying timber. Fiscal and financial incentives since 1945 have encouraged private forestry to the extent that their conifer plantings together with their existing broadleaved (or hardwood) woodlands which are mostly in southern England now account for half the British forest area.

If future planting were made at the maximum speed of afforestation currently attainable, 2 m. hectares could be added to the forest estate in the next 50 yeras. This would enable the UK to be 26% self sufficient in timber by then. The proportion of land under forest would nearly double to 16% and mean the transfer of a quarter of the remaining hill land out of agriculture, plus the usage of all unused common land and bringing most of the unmanaged woodland into production. Lack of available land and its cost are a major restraint on state afforestation at present. The extent of additional planting will depend on 1) funding both state and private afforestation, 2) constraint by the environmentalist and conservation lobbies and 3) the political and technical question of reducing the already scarce agricultural area — Who will decide whether cellulose is more valuable to humanity than animal protein? Integration of forestry and farming offers the likelihood of greater productivity than can be obtained from either activity alone.

FORESTRY AND AGRICULTURE

The main reason for antipathy from the farming community towards forestry is because the two have never been synonymous — as is the case in say Scandinavia. If these attitudes are to change both sides must be willing to get away from historical perspectives and adopt a more forward looking approach to their common problems. To encourage a multi-disciplinary approach to land use there is a strong case for bringing agricultural and forestry tuition more closely together at a tertiary level.

Besides a change in attitude, the main problem for a farmer taking up forestry is capital and the long wait for any return. Once established in any sort of ratation trees are a very flexible source of income as harvest can take place over a ten to twenty year perod. Various methods of integration can be considered by the landholder, either 1) incorporating a forestry enterprise within the property, 2) selling off the less desirable farming land and using the capital to improve the balance, or 3) enter into a lease or partnership agreement with a forestry company and retain control over the land.

Forestry is an investment in both land and timber and it is expected that over the long term land values will rise at least as fast as inflation whilst timber prices rises will rapidly exceed the inflation rate. Several private investment and forestry management organisations exist in Britain to assist established forest owners and to channel investment funds into the industry. Services provided include: financial and tax planning, valuation and purchase of land, management and supervision and execution of the forestry and farming programmes, review investment strategies and handle property sales. Investors can choose either to establish new plantations with the aid of grants and tax relief or to purchase existing forests for capital appreciation. Provision is also made for the smaller investor who can join a forestry co-ownership Trust and jointly own 400 hectares of forest with a spread of localities, species and age classes.

To promote private forestry on farms the Forestry Commission has three levels of assistance. For areas greater than 10 hectares a grant of approximately $200/hectare for conifers and $450 for the slower growing hardwoods is available for new planting, replanting or rehabilitation of unproductive woodland approved by the Commission and managed in accordance with their objectives. Due to the concern about the loss of small areas of woods — of aesthetic and conservation value as well as a timber resource — grants of between $500 and $600 per hectare are available for the management of areas 0.25 to 10 hectares in size and at least 30 metres wide. Funding towards the establishment of shelter belts in less favoured agricultural areas of up to 50% of the costs incurred is offered to the hill farmer.

THE FARMER AND NATURE

Most farmers are aware of the public concern with changes in the environment resulting from the intensification of agriculture over the last 30 years, and have a general sympathy towards the landscape without feeling the need for personal action. His lack of knowledge and awareness about the trees on his land has led to the slow erosion of woodlots from the British countryside — they are not on his "mental map". If trees and woods have no apparent function, are a haven for pests and weeds and bring in no income why not reclaim them for farming or grazing? The problems of dereliction and deterioration of woodlands opens the possibility of total disappearance, with a significant impact on landscape, wildlife, recreation and micro-climate.

Growing awareness and prosperity amongst landholders in the intensively farmed areas of Britain may alter attitudes towards existing woodland as they are able to move from a solely profit seeking management strategy to one of stewardship towards the neglected trees. It is a little ironic that the wealth created by intensive farming which has led to the concern by conservationists, may now lead to positive environmental measures.

Although the main aim of the Forestry Commission in UK is to produce wood, its objectives have been broadened to include the provision for landscape design at planting and felling, recreation and nature conservation as well as the integration with agriculture and creating employment in rural areas. The Commission provides public access to much of its forest and land with picnic sites, walks and trails, camp sites and cabins. Add the visits made to the private estates to the 24 million people who visited the above facilities last year and one realises the pressure put upon available leisure areas in Britain.

FORESTRY AND SOCIETY

The British forest industry employs about 15 000 people in the forest and another 8000 in supporting services, and a further 15 000 jobs in sawmills, pulp and paper mills, haulage and nurseries are dependent upon forestry. More intensive use of the remoter areas for timber production will enhance regional development and employment prospects, as most of the new production will be in these locationally important zones. Following the period of initial development, plantings and harvesting can be timed to give a steady demand for labour, sustain decentralisation and reduce rural migration.

The standing value of timber in small farm woodlots in UK is $3000 million — a significant, under used and understood natural resource which if properly tapped could release useful capital to the community. As most of this timber stands on lowland farms away from the areas of planned forestry development the local contract and sawmilling industry would welcome and co-operate with action to bring these small areas of woods under management and smooth out as well as improve the supply of homegrown timber. The inexperienced farmer often encounters difficulty in negotiating with sawmills and contractors e.g.: with price, damage to roads and paddocks, selective felling and waste. The frequent downswings in the trade tempt some operators to cut corners which is damaging to the trade as a whole and doesn't encourage the new producer venturing to find a reputable merchant.

POINTS TO PONDER

A positive programme for afforestation and woodland rehabilitation is necessary throughout most countries. On a local level — following the formulation of a land use policy — special advisors could operate in regions, being broadminded and experienced in forestry matters with an ability to relate to the problems of farm managment. Their function would be to inspire, advise and assist in planning, supervise progress and plan marketing. Those landholders not wishing to be involved in the decision making and managment, but welcome the investment and diversification, could lease or sell appropriate land to a Trust to supervise.

Initiatives along the lines of a work experience or training schemes could be incorporated into the structure as trained personnel would be always required. Financial assistance, in lieu of unemployment relief, could be a practical way of overcoming the problem of working the widely scattered woodlots inherently unsuitable for mechanisation.

There would be a need to study current tax laws and remove any disincentives against timber production, and an effective lobby be maintained to ensure that future politicians show confidence in the industry and understand the time and capital required for timber production.

The future of farm forestry must be seen in its economic and social contexts as well as the conservation context. And these must be in turn set within the increasing international awareness of finite world resources and the increasing costs of energy and raw materials. Energy production from timber already accounts for 50% to 80% of world consumption of timber and is expected to be the major growth area with demand doubling in the next 50 years. As a renewable resource of fuel, burning locally produced timber would allow the more valuable energy sources — coal and oil — to be transported for industrial and urban purposes.

Trees are a part of our heritage. A balance can be achieved both on a local scale — between immediate financial pressures and an aesthetically pleasing productive landscape — and a global balance of the demands for protein and timber products. This is a moral responsibility and the necessary interest can be aroused, for whatever the circumstances our descendants will be universally grateful for the positive action we must take.