THE COMPARATIVE PROFITABILITY OF FAT LAMB RAISING AND WOOL PRODUCTION IN THE GLEN INNES DISTRICT

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FOREWORD

The cost-price squeeze in the sheep industry poses special problems for operators of smaller holdings and calls for careful consideration of possible adjustments in farm organization and production. Many woolgrowers on improved pastures will be interested in the relative profitability of alternative enterprises and particularly in whether a shift to fat lamb production would yield them a better income.

Mr. James' report discusses the technical and economic factors to be considered in making such a choice. It reviews the suitability of various breeds of ewe and ram for fat lamb production under New England conditions. It also provides comparative budgets to show the incomes and returns to capital obtainable from fat lambs and woolgrowing and finally presents three case studies of properties of less than 500 acres, which are engaged in fat lamb production, showing their financial results over the last five years.

Much of the material for the study was obtained from interviews with fat lamb producers in the Glen Innes district. The results will, however, be rather more widely applicable and will, it is hoped, be of assistance in farm management planning throughout the New England Tableland. The University is grateful for the ready co-operation of producers in the project and also for the generous assistance of the officers of the Glen Innes Pastures Protection Board.

The report is the second produced by Mr. James as part of a programme of farm management research being carried out by the Faculty of Agricultural Economics under a grant from the Wool Research Committee. The earlier report, which aroused considerable interest amongst producer organizations in New England, dealt with an economic survey of grazing properties in the Armidale Pastures Protection Board district. The assistance of the Wool Research Committee in making possible this series of investigations is very gratefully acknowledged.

University of New England,
Armidale, N.S.W.
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INTRODUCTION AND SUMMARY

The long, cold winters and the summer rainfall of the New England region mean that, in the absence of conservation of surplus summer grass, wool-cutting properties tend to be overstocked in the winter and understocked in the summer. The closing up of relatively frost-resistant improved pasture in the autumn for later grazing in the winter does help, however, to level out that pasture production which is consumable on the hoof. Even so, the existence of improved pastures capable of rearing milk-fed, fat lambs has inclined many graziers towards running their properties, all or in part, under fat lamb rearing systems. As they see it, this simplifies management problems relating to stock numbers.

The size of the ewe flock is solely determined by the number of ewes which it is considered a place can carry through the winter. If, as is usual, cross-bred ewes are used and the replacements are bought-in there is scope for easy adjustment of flock numbers to accord with the current seasonal conditions. The lambs reared by these ewes are drafted off the place before the onset of winter, having been fattened on the luxuriant growth of summer grass. Thus, the humps in pasture production and in animal numbers

coincide and it seems a classically simple solution to the problems of full utilization of pasture growth and stock numbers during the winter. An attitude reinforced by falling wool prices and future uncertainty in the textiles market.

Simplification of management, however, is not to be endorsed as an end in itself if it produces attendant economic losses (unless, of course, a grazier rates freedom from worry as something thus worth "buying").

The comparative profitability of fat lamb rearing as opposed to wool production is affected by many considerations. The basic accountancy will depend on the extent to which loss in wool receipts (probably in both "per ewe" and "per acre" terms) is counterbalanced by the sales of young surplus stock taking the form of prime fat lambs out of crossbred ewes which are also more prolific than Merinos. There are other considerations peripheral to this basic issue. Fat lamb production, for instance, is usually considered to require a higher capital investment in the way of more subdivision and extra watering facilities. Strong, steady growth is essential for the lambs and a well sustained milk supply from the ewe is the easiest way of ensuring this; for maximum milk production the ewe requires ready access to water at all times.

The present writer went out and talked to nearly thirty fat lamb producers to obtain an understanding of their problems; to learn something of the technical considerations and find out what production performances lie within the scope of efficient managers (as well as determining what are present average prices, etc.).

Budgets based on the material gathered appear to show (given, always, the correctness of certain stated assumptions) that there is little to choose between efficient fat lamb rearing and wool production as a means of obtaining good returns to labour and management and to the capital invested in pasture improvement. This being so it is realized that a grazier's personal attitudes and aptitudes and, possibly, his assessment of long-term trends in the markets of the products concerned, will play some part in determining which system(s) of production he chooses.

The budgets are based on a hypothetical 1,000-ewe flock run on 600 acres. Producers stressed the importance of the "attention to detail" aspect of successful fat lamb production and it is a widely-held view that once past a flock size of, say, 1,500 ewes, there may be some slight loss in per lamb returns as a result of less concentrated managerial supervision.

There is less incentive, also, to producers of flocks greater than 2,000 sheep to switch from wool production, for there is not so great a need for intensification and accordingly "per sheep" returns can be allowed to fall as a result of conservative stocking rates or bought-in feed without too adverse an effect on Farm Income.

All the data were gathered in the Glen Innes Pastures Protection Board area, where the swing over to fat lamb production following upon pasture improvement has been most marked. The figures quoted on page 5 are by courtesy of the Glen Innes P.P. Board, to whose officers thanks are due from the writer for their general help and advice.

1. FAT LAMB PRODUCTION

The Economic and Marketing Background

A survey[1] of wool production, previously made by the writer in the Armidale Pastures Protection Board area, revealed a tendency for graziers to be thinking more and more of fat lamb production as the solution to both economic and management problems. The survey showed fat lamb production in a comparatively poor light but there were special circumstances attaching to the production systems of each of the seven properties (out of a sample of fifty) concerned. Interest in fat lamb production (which, if it represents an intensification, may be the best system for improved smaller properties) was fostered by talking to those producers who had turned to this system of animal production as a way out of their economic difficulties.

The economic aspects had not usually been thought out to the extent of drawing up budgets. The general attitude was that wool prices being what they were, and are, a producer could not be worse off by turning to fat lamb production. Wool can still be cut from the ewe portion of the flock and the biggest difference between fat lamb production and straight-forward wool cutting, the drafting of all the wether lambs each year as fats rather than keeping them as wool-cutters, is a proposition which has appeal to many graziers on economic grounds but which nearly all find attractive from the point of view of the general management of a property.

A wether has to be kept through the winter and, although he does not need much pampering, in hard winters losses do occur. These losses may not be severe but the presence of the wether portion of the flock does strain the feeding resources of the property during the winter and thereby a wether is competitive with the more nutritionally susceptible ewes. (Hay-making does not find favour, for many reasons, with the generality of New England graziers.)

Fat lamb production has an obvious appeal to graziers who have a winter feed problem as flock size is determined solely by the maximum number of ewes which a place can carry safely through the winter. The fat lamb progeny of these ewes provide the mouths to eat off the summer growth of grass and are drafted off the place by the autumn ; there is an attendant saving on handling and drenching costs in the winter—nor do they have to be sheared.

The early drafting of lambs can create a feed problem of a different nature. If the lambs are fattened early, their mothers tend to become over-fat for there is usually plenty of feed available at this time of the year in the New England Region. Over-fat ewes do not have good breeding performances and on properties which are almost wholly improved this is becoming a serious problem. Several graziers mentioned the possibility of having to arrange for agistment of poor land (or to buy some) to which they could transfer the ewes after the lambs are weaned in order that the ewes could be brought down in condition before mating. (Also, this would make it easy to flush the ewes, and so encourage twinning, if this were considered

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[1] Reported in this *Review*, Vol. 29, No. 4, (December, 1961).

desirable.) Agistment could probably be arranged on a reciprocal basis with a mutual transfer of sheep between one place and another; over-fat sheep from the good place to the poorer and less well-fed sheep from the poorer place to the better (so putting some condition into these latter sheep before the onset of winter). This possible arrangement raises the issue of introducing disease, particularly foot-rot, but the alternative procedure of densely stocking the ewes in small paddocks could lead to increases in the incidence of worm infestations—although routine drenching would probably take care of these if they did arise.

On properties which are almost entirely improved pasture (and which therefore have less severe winter feed problems—as paddocks can be autumn-saved and closed up) the presence of sheath rot has been another factor leading towards the adoption of a system which keeps wethers off the place. It is not possible to assess the economic importance of this condition (which is now fairly easily controllable anyway) and it is sufficient to note here that sheath rot considerations have helped to lead some graziers to make decisions in favour of fat lamb production.

Thus, the circumstances of falling wool prices; the New England climate (summer rain and long, hard winters), which makes it difficult for a grazier not to be grossly understocked in the summer and overstocked in the winter with wool-cutting flocks, and the advent of pasture improvement (and thereby of pastures capable of raising quick-grown, milk-fed, fat lambs) have conspired to produce an economic and managerial background against which graziers could be expected, whether rightly or wrongly, to turn more and more to fat lamb production.

In the Glen Innes Pastures Protection Board area of the New England region the "drift" to fat lamb production following pasture improvement has been very marked. The data, only for those sheep sent across the border into Queensland, for the Glen Innes P.P. Board area are given below:—

Year	Fat Sheep to Market (nearest 500)
1956	13,000
1957	15,500
1958	22,000
1959	31,500
1960	38,000
1961	51,500

The present investigation is an attempt to assess the economics of fat-lamb production as opposed to, or in co-operation with, wool production and to evaluate the various systems of fat lamb production practised.

Firstly, however, a brief review of the general fat lamb situation as it affects producers in northern New South Wales.

THE FAT LAMB OUTLOOK

Nationally

The potential market, in its wider sense, is of great importance to graziers thinking of entering fat lamb production or expanding their present enterprise for the market which determines the general level of lamb prices is beyond the control, or even influence, of individual producers.

How elastic is the demand for lamb? How much further can lamb consumption be increased here in Australia and what opportunities are there for expanding exports? If extra supplies go ahead of increased demand to what level can lamb prices be expected to fall and at what price would fat lamb production cease to be profitable? Some of the factors which influence both international and domestic demand for lamb are:—

(1) Supplies and prices of beef, mutton and poultry—especially broilers ;[2]

(2) consumer preferences with regard to these meats and the various cross elasticities of demand—of which little is known ;

(3) sizes of populations ;

(4) standards of living and their effects on meat-eating habits.

These considerations are all subject to numerous imponderables and certainly this is not the place for a detailed discussion of the issues raised.

On the export side the U.K. market is tending to over supply as a result of increased home-production and stepped-up New Zealand production and exports which, because they provide a more uniform product,[3] are better favoured on the U.K. market than Australian lamb of comparable quality. New Zealand lambs are also offered over a longer season. New Zealand lamb is already finding its way into Asian markets, e.g., Japan, and New Zealand is also turning its attention to the U.S.A. ; both these countries could provide potential markets for Australian lamb exporters but competition from New Zealand will be keen for reasons indicated in the above paragraph.

On the Australian domestic market it would hardly seem possible to increase the high *per capita* consumption of meat in general and therefore any expansion in fat lamb production can be absorbed only at the expense of beef or by increases in population. It seems likely therefore that in a few years time a greater proportion of New England fat lambs will have to be sent to Newcastle and Sydney (where the market is more likely to grow than Brisbane) if the present upward trend towards increased fat lamb production continues.[4]

The Brisbane Market

Most of the lambs produced at the moment in northern New England go to Brisbane. Brisbane is a weekly market notorious for its fluctuations of supply and consequently price. (See the Appendix). These fluctuations stem from the sources of supply and the limited market outlet.

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[2] See the Smithfield report in *The Meat Producer and Exporter*, Vol. 15, No. 7 (July, 1961), p. 5. "Importers competed keenly for the declining demand for frozen lambs temporarily displaced—it would appear—by the increased sales of poultry with broilers at 6s. to 10s. each available in glut supply to the public". U.K. broiler production is expected to expand considerably over the next few years and if so it will affect the demand for Australian lamb at Smithfield. It seems certain that more broilers will be produced in Australia too in the future.

[3] Attempts are now being made by the Australian Meat Board to raise the status of Australian lamb at Smithfield; particularly by restricting exports to top-grade, spring lambs.

[4] Although one knowledgeable producer has hopes that markets may be created in the coastal towns of northern Queensland which could be described, in relative terms, as a beef-eating state.

Lambs from the Glen Innes area provide about 20 per cent of the total yearly yarding at Brisbane. Most of them go in over a December to June period and more than half of these are sent in the four months of February to May inclusively. At the start of this period lambs are being sent from the Darling Downs and if heavy rains make the black soil roads of the Downs impassable by heavy transports, New England producers may have the benefits of a shortly supplied market. They will, however, have to share the crash the following week when it becomes once more possible to take the Downs lambs into Brisbane.

Additionally, and unpredictably, occasional large lots are sent in from non fat-lamb producing areas of north-western New South Wales and from Queensland. Although these young sheep may not be "fat lambs" in the usually accepted sense of the term, their presence is enough to depress the market according to their quantity and quality. It has been known for 2,000 lambs to reach the market from these sources with dire results for other producers. A market which is under-supplied at 3,000 sheep, nicely supplied at 3,500 to 4,500 sheep and greatly over-supplied at 6,000 sheep cannot absorb 2,000 sheep from "out of the blue" without a violent reaction. An additional uncertainty factor has been the sending up of loads of slaughtered lamb from Melbourne by refrigerated road transport. The amounts sent are small in relation to the total yardings but, "as everything happens at the margin", their presence cannot but be felt if the market is tending towards over-supply. However, it is a long haul from Melbourne to Brisbane and in the hot, summer weather it is not so feasible as it is at the beginning and end of the New England fattening season.

Fluctuating supplies immediately react on prices as Brisbane is essentially a local market serving a geographically circumscribed area and not diverting any of its surpluses into export channels. The nature of the Brisbane market inclines most producers to send their lambs in regular weekly lots spread out over as long a season as possible. The fact that a producer sends his lambs in over the longest practicable period partly ensures that he will have his share of both the ups and the downs of the market; the longer the duration over which he sends in, the more likely is his average price to approximate to the market's seasonal average. Additionally there are no savings in transport costs if lambs are sent off in large lots. There is a slight saving if a producer can fill a float completely, or even half a float; but the saving is small. Not many producers have this number of lambs ready at any one time and, even if they had, few would be willing to risk sending a big mob off and possibly hitting a bad market (unless, of course, production is on a big enough scale that large numbers can be sent every week and so still average the market variations).

The lots are sold in Brisbane in pens of twelve sheep and therefore lambs are usually drafted in multiples of twelve. Just twelve lambs, in fact, are often sent but the usual drafting is of the order of 48 or 60 lambs. The auction agents draw for their order of appearance on the pen rails to do the selling and whether the sheep are sold first or last on a particular day can make as much as 5s. per head difference. If it is a heavy marketing it is usually advantageous to be on first and if it is a light yarding the sheep sold last could fetch a better price. This gamble element is disliked by most producers and it is the custom of many of them to

average daily prices, as distinct from weekly fluctuations, by sending sheep to each of three selling agents on the same day. They certainly have nothing to lose by doing this except perhaps the cost of an extra couple of telephone calls. One very successful man is strongly of the opinion that a producer should stick to the same agent as then the latter has a greater interest in selling the particular producer's stock: but the agents sell on commission at auction and it would seem therefore that there can be no direct financial gain from this nor any validity to the argument.

Some of the bigger producers occasionally have large, i.e. 200 or more, drafts of sheep all ready at once and in these circumstances buyers are prepared to buy in the paddock and some lambs in this way find their way "down to the coast". Also lambs are sent to both Newcastle[5] and Sydney (the latter although not having such a high average price as Brisbane over the season is a steadier market:—"If it's 85s. in Sydney this week, it won't be less than 80s. next week") and some lambs are sold on local markets. The bulk of the lambs, however, certainly go to Brisbane.

These, then, are some of the general background factors against which a grazier must make his own production decisions. These considerations having been noted and described one can now turn to the possibilities confronting an individual property.

The basic farm management issues are:—

(*a*) whether fat lamb production is to be run in conjunction with wool production or to replace it as the main enterprise, and

(*b*) deciding which is the most profitable of the many systems of producing fat lamb.

Some Technical Factors Mainly Relating to Breeds

Farm management considerations facing the fat lamb producer cover a wide range. The most fundamental are those decisions which relate to the degree of interest the grazier wishes to retain in wool production—either on economic grounds or because he likes being a wool producer. He must determine whether to

(1) run fat lambs as a supplementary enterprise to wool production (either by taking crossbred, fat lamb crops off, say, the last two lambings of Merino ewes before they are age-drafted or by running a separate flock of crossbred ewes for fat lamb production) ;

(2) retain the pure-bred wool interest by using Merino ewes as fat lamb mothers, selling off all the crossbred progeny and buying in all replacement ewes (or by running a Corriedale flock) ;

[5] Newcastle is a "local" market in more or less the same sense as Brisbane. Producers maintain that the buyers at Newcastle are more concerned solely with carcass qualities than they are at Brisbane. At Newcastle, the skins, apart from being assigned a fair value, are ignored. It is widely stated that the carcass values of sheep sent shorn to Brisbane are less than they would have been if the sheep were sent in the wool and that a quality fleece helps to raise the price realised by more than the market value of the skin. This appears to be a slight anomaly of the Brisbane market. It must be borne in mind, however, that sheep in wool are less likely to suffer bruising in transit and in the market place than are shorn sheep.

(3) be a fat lamb producer entirely and ignore or subject all considerations regarding the value of the wool cut from the ewes to subsidiary status, i.e., concentrate on those breeds of sheep which yield the most profitable meat and skin production from the lambs and treat the wool cut from the ewes more or less as a by-product[6]; or

(4) organize his property to be a microcosm of the fat lamb industry as a whole and run all aspects of it as separate enterprises on the one place.[7]

The "whole-farm" approach of the economist demands that all the variables must feature in any accounting process and a producer should attempt to maximize profit for the property as a whole. This is already known to many producers; for whereas one may declare, "I am a fat lamb producer and therefore should not be, and am not, interested in the lamb's skin value", there are others who equally strongly affirm that skin values are important.[8] Obviously total returns must be the criterion.

What are the variables where fat lamb production is concerned? (We will ignore for the time being its profitability relative to wool production. Greater capital investment is certainly required for fat lamb production, as paddocks need to be smaller than for wool production and also need to be amply supplied with water—for the benefit of the ewe, whose milkiness is a critical factor in successful fattening.)

The technical and economic variables are listed below in appropriate categories:—

(1) *The Ewe*:

The cost of the breeding ewe; her life expectancy; her depreciation cost; the number of lambs she can be expected to bear (this is related to both her capacity to have twins and her ability to raise them); the density at which she can be stocked per acre and, finally, the quantity and quality (and therefore income yield) of her wool clip.

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[6] As it is in the U.K.—but, then, there are no Merinos in the United Kingdom and lamb prices are relatively higher, too.

[7] For example, one of the most successfully efficient producers runs (on just over 2,000 acres) around 3,000 ewes; 1,500 Merinos and 1,500 Merinos x Border Leicester. The organization of the flocks is as follows:—

A. 750 of the pure-bred Merino ewes are joined to Merino rams and, with 90 per cent lambing, produce around 675 lambs. The female half is retained and with losses this allows for flock replacement of Merino ewes every five years; the Merino wethers are sold in the autumn.

B. The other 750 Merino ewes are joined to a Border Leicester ram. The female half of the drop is retained to maintain, with five-year replacement, the flock of 1,500 crossbred ewes; the crossbred male progeny is all sold fat.

C. The 1,500 crossbred (Merino x Border Leicester) ewes are mated to Southdown or Dorset Horn rams to provide, with 120 per cent lambing, 1,800 three-breed-cross fat lambs, all of which go for slaughter. This type of organization, however, is only suitable for comparatively large properties.

[8] The skin is also a possibly more stable commodity than lamb meat. If there were an over supply of carcasses in the future skins could more or less hold their values, as they are easily stored and also go on to an international market; indeed, their price fluctuates with, although probably more sharply than, that of wool. In the past during a period of falling prices, short-woolled skins declined much more sharply than shorn wool and this may be a general tendency.

(2) *The Lamb*:

The price of rams of the various suitable breeds; the number of both carcass and skin values and the relative importance of these varies with the breeds used and also with the age of the lamb. The younger the lamb, *ceteris paribus*, the higher per pound is its carcass value of their wool. However, ram costs are small in relation to total has a greater skin value (because it is heavier) and a lower price per pound for its carcass—even so, the total value of the carcass may be greater than that of a lighter lamb because, after all, there is more of it. The age at which lambs are drafted will therefore be governed by the

(*a*) relative carcass and skin values at varying weights (closely tied up with breeding) ;

(*b*) amount of feed on the place for keeping lambs on to the heavier weights (if this is considered desirable) ; and

(*c*) state of the market at the time lambs are ready for sending away (however, this is largely unpredictable and, as described previously, graziers have to accept its fluctuations).

(3) *The Ram*:

The prices realized by the lambs. Their total yield is made up of ewes they can cover per season ; the length of their useful lives and the value usually and the lesser its skin value ; the older and bigger lamb costs and as, additionally, the ram provides half the breeding of the fat lamb, the sole consideration here can only be his effect on the rate of growth and the market value of his progeny.

(4) *Management*:

The advantages or otherwise of twinning (although, as already stated, on those highly improved properties suitable for fat lamb production, it is difficult to get the ewes low enough in condition to flush them) and the importance of pregnancy toxaemia.

All the factors itemized above are closely linked with breed characteristics and there now follows a description of the main breeds of sheep used in the New England region for fat lamb production.

Ewes—Advantages and Disadvantages of Different Breeds

PURE-BREDS

MERINO

A self-contained Merino flock can be used to produce fat lambs (as a by-product of wool-cutting) by putting a meat type ram onto the ewes for, say, their last two matings, and/or on any ewes not suitable for breeding flock replacements. (These opportunities only occur when circumstances are such that not all newly-born stock are required as replacements.) Alternatively, a producer can run a bought-in Merino ewe flock and put mutton-breed rams over the whole of it and sell all the cross-bred progeny as fats (although some part of the ewe portion could possibly be retained for use as cross-bred mothers).

Advantages of Merino Ewes

(1) Retain graziers' interest in Merino wool-cutting;

(2) when crossed with Border Leicesters, the lambs have high skin values;

(3) can be more heavily stocked, probably, than cross-bred ewes (some graziers disagree);

(4) are said to give their milk at a constant rate over a long period and to be better milkers than is commonly thought.

Disadvantages

(1) Few twinnings,

(2) although normally requiring little care and attention at lambing, they can have trouble with large framed, cross-bred lambs;

(3) their total milk supply less than that of cross-bred ewes;

(4) lambs do not mature quickly (not a disadvantage if other rapid-maturing, cross-bred lambs are reared on the place as it helps to spread the marketing).

CORRIEDALES

Corriedales are difficult to replace by purchase and therefore are usually bred on the place and the fat lambs are usually pure-breds.

Advantages of Corriedale Ewes

(1) Used as pure-breds they produce a good wool income and the wether lambs make good fats;

(2) are good mothers and if crossed with a Dorset Horn, say, they rear younger, fat lambs than would a Merino mother.

Disadvantages

(1) Are hard to replace;

(2) not such good mothers as cross-bred ewes (i.e., not such high lambing percentages and the ewes have less milk) and the wool is not all that much better, in quality and price, than that of the Merino x Border Leicester cross.

CROSS-BREDS

MERINO (EWE) X BORDER LEICESTER (RAM)

This cross-bred (the ewe favoured by the most successful producers) is the animal upon which the New England, fat lamb industry is firmly and logically based. A fat-lamb rearing industry to be economically sound requires a reservoir stock of readily available, relatively cheap ewes. In the U.K. this reservoir is provided mainly by sheep roaming the hillier parts of Scotland—land which has little other economic use. Ewes from the breeds concerned (the Scottish Black-face and the Cheviot) are joined to Border Leicester rams to produce cross-bred mothers possessing plenty of milk (from the hill ancestry) for lamb rearing and whose lambs will, in part, inherit the early maturity characteristics of the Border Leicester.[9] The

[9] These cross-bred ewes, however, command very high prices and their transport is a further costly item. As a result, some fat lamb producers have turned to pure-bred ewe flocks of those breeds suited to rearing fat lambs off grass. A breed thus favoured is the Clun Forest which, coming from the Welsh Border country, has the added virtue of geographical accessability for rearers in Southern England.

cross-bred ewes are bought by fat lamb rearers on more fertile lowlands and there are crossed to rams which will impart the desired carcass conformation to the progeny. This ram is frequently a Suffolk, a breed not much seen in New England.

The Australian and U.K. systems are thus more or less analogous. Differences between the two systems arise from the breeds of ram used to impart the final carcass quality and the fact that the basic pure-bred ewe here is a Merino, which does not possess the mothering qualities of Scottish hill sheep.[10] Both the British and Australian methods are excellently organized and economically sound in that the stratification of the respective industries brings about the most efficient land usage and canalises for the benefit of the ultimate fat lamb, the qualities (economic and/or technical) of three breeds plus any side benefits to be gained from possible cross-bred vigour.[11]

Although the writer has heard the Merino x Dorset Horn cross highly spoken of as a fat lamb mother, the breed used almost exclusively with the Merino for the production of cross-bred mothers is the Border Leicester. The Border Leicester is a big sheep and so helps to produce large-framed, cross-bred ewes. (The Corriedale x Border Leicester is an excellent cross-breed ewe too, although little seen.)

The cross-bred ewes are usually produced (by specialist cross-breeders, mainly using the cull ewes of the larger Merino flocks) from the typical big-framed, strong-woolled sheep of the western area of New South Wales. Such sheep are much more suited to this purpose than the smaller-framed, finer-woolled sheep of the Tablelands. The breeding of these cross-bred mothers is a flourishing business and the people concerned have their own "breed" association.

Here in northern New South Wales, therefore, fat lamb and wool production are complementary. The draft and cull ewes from "out west" Merino flocks of suitable type provide an assured supply of female material for the breeding of cross-bred, fat-lamb mothers and the demand for this stock, by fat lamb producers on the lush improved pastures of the Tablelands, reacts to the ultimate benefit of those wool producers selling the draft ewes.

Advantages of Merino x Border Leicester Cross-bred Ewes

(1) A high twinning rate if required; the twins may be a month behind the singles but usually can still go as suckers;

(2) excellent mothers, i.e., plenty of milk and, therefore, quick-growing lambs;

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[10] The breeds concerned have only been able to survive under their hard, native conditions by virtue of this mothering quality and natural selection still helps to ensure the persistence of the trait of a copious milk flow, which under lowland conditions becomes a deluge. Small flocks of thus derived cross-bred ewes have been known to the writer to maintain yearly averages of 180 per cent lambings; occasionally going over 200 per cent in a favourable year. On the other hand, such cross-bred ewes are expensive, as stated, but Merino cross ewes are cheap and also yield a valuable wool income.

[11] Cross-bred mobs are usually much more uniform (an important economic factor) than pure-breds too. This mainly applies to two-breed crosses; at the three-breed stage there can be some loss of uniformity.

(3) the ewes will eat silage readily if feed is short during the winter and before lambing;

(4) the value of their wool clip is not much less than that of either of the above, pure-bred ewes.

Disadvantages

(1) Can possibly only run three cross-bred ewes where four Merinos could be run;

(2) as the ewes are normally, but not always, bought-in, transport costs are incurred in getting them on to the place from out west where they are usually bred. (This, however, is a very small item when spread out over four to five lambings.)

(3) the ewes sometimes produce too much milk (if this can be called a disadvantage) and, if they only have single lambs which cannot cope with the flow, this can lead to mastitis problems.

MERINO X ROMNEY

The writer came across a flock of this cross being used more or less experimentally by one grazier but it is to be discontinued as the yield and price of wool from the ewes was much inferior to a Merino x Border Leicester clip. (Mothering capacity and the lambs' performances were at about the same level of efficiency as the Merino x Border Leicester cross.)

The above are the main types of ewes used for fat lamb production in the New England region. Of course, every variation of breed combination is to be seen somewhere or other but any crosses outside those itemized above are rare and of very little commercial importance.

Breeds of Rams Considered

The genetic constitution of the ram is of outstanding importance for (i) a ram will be joined to sixty or more ewes; (ii) 50 per cent of the lambs' genetical maturation rates (i.e., as distinct from that portion provided by the environment of their mothers' milk production) and of their carcases and skin qualities will be derived from their sires.

There follows a description of the main breeds of rams used for fat lamb production in New England.

BORDER LEICESTER

Primarily used for producing cross-bred mothers, the Border Leicester is also used on Merino ewes to produce progeny which, on some properties, all go for slaughter.

Such lambs can be carried to heavy weights without becoming overfat and this is of importance in that this cross-bred has a high skin value. The skin value is rarely less than 20s. and can go up to 30s. or more at six to seven months and at dressed weights in the region of 45 lb.[12]

[12] One producer has realized a price of 2s. 2d. per lb. for a batch of 45 lb. d.w. Merino x Border Leicester lambs; allied to a skin value of 28s., the total return per lamb was 125s. 6d. with a net sale value of just over 110s. each.

One grazier produces fat lambs using Border Leicester on Merino x Border Leicester mothers, i.e., the lambs are 75 per cent Border Leicester. They have high skin values (big weight and fair quality) and the "leggi-ness" which could be expected is avoided in this instance because the producer has his own Border Leicester stud and he selects for the blockier type of ram. The lambs can be carried up to 56 lb. dressed weight.

The size of the Border Leicester can lead to difficulties occasionally at lambing when it is crossed with the small-framed Merinos commonly found on the Tablelands.

Dorset Horn

The most popular breed of ram used. It sires fast-maturing lambs which have carcase values of eight to nine shillings more than those from Border Leicester rams when used on Merino x Border Leicester ewes. The skin value is less than that of lambs from a Border Leicester ram on the same cross-bred ewe but only by about three to four shillings. The net effect is in favour of Dorset Horn lambs by about four to six shillings per head and they also mature very rapidly. Dorset Horn progeny are said to be very resilient and capable of taking severe knocks and yet still coming again —something denied to the Southdown, for instance, by its detractors. (The Southdown, however, is the fat lamb sheep *in excelcis* and was never meant for other than first-class, rearing conditions. This, plus its tendency to become overfat at heavy weights, means that it is not much seen in New England, but it is found in the Darling Downs area where it is partially crop, as opposed to grass, fattened.)

The main commercial merit of the Dorset Horn ram rests on its ability to sire quick-growing, medium weight (i.e., 34-38 lb.) lambs. Such lambs are said to "come quickly but then get no bigger" (except slowly) ; but this rapid growth to the 36 lb. d.w. region is their greatest virtue.

The horns of Dorset Horn rams are considered a nuisance by some producers because they seem to lead to aggressiveness which is all the more injurious because of the horns and they can also become entangled in fences. It is only a small proportion of rams which display troublesome behaviour, however, and flock, as distinct from stud, rams can always be de-horned anyway. An alternative is to breed a hornless line and the Polled Dorset will be a familiar sheep to anyone reading this.

As stated previously, producers have spoken favourably of the Merino x Dorset Horn cross-bred ewes as fat lamb mothers but they are difficult to obtain—but surely would not be so if there were a strong and sustained demand for them. However, such a cross-bred mother would seem to preclude the use of Dorset Horn rams to sire the ultimate fat lambs because then the lambs would be 75 per cent Dorset Horn and not 50 per cent as now; they would probably yield lesser values for both carcase and skin and also be less uniform than the three-breed crosses. One experienced producer who has tried many combinations of breeds said that the best lambs he ever raised were bred out of Merino x Dorset Horn mothers by a Cheviot ram.

Cheviot

The Cheviot is the major foundation ewe of the fat lamb industry in the U.K. where it is a hill sheep and when crossed with a Border Leicester ram produces the famous Half-bred ewe which is very much in demand at correspondingly high prices. Here in Australia it is the rams of the breed which are used—and to produce the final, three-breed-cross fats which are 50 per cent Cheviot and not 25 per cent as in the U.K. The breed is noted for its virtues of thriftiness and good constitution[13] allied to quick maturity and active foraging. The latter quality is not normally required of a fat lamb but on properties which have good grazing on higher land, the vigour of the lambs is advantageous in that they take their less adventurous, Merino-derived, mothers up into the top country with them. These lambs can go away as sucker lambs weighing 38 lb. to 40 lb. at four months.

Some people keep Merino x Cheviot wethers as wool cutters—"fat all the time and live on nothing in the top country"; the wool is of good quality fetching a corresponding price and the sheep will cut 11 lb. fleeces with little skirtings.[14]

A minor disadvantage of the breed is the wild, active nature of the rams which makes it difficult to yard them. (They are not as bad as the Welsh Mountain sheep which, ewes as well as wethers, used to enter the vegetable garden of the writer by scrambling over a 7-ft. high, dry-stone wall.)

Southdown

The butchers' beast—the minimum of wastage allied to the maximum development of the cuts preferred. The ideal breed for use in the export trade.

It tends to be over-fat at the heavier weights and is said to be unable to recover from a check. The skin values of Southdown crosses are less than those from any of the other breeds mentioned. The Southdown is little used in New England fat lamb production.

Suffolk

The present writer would like to have known more of the performances of Suffolk sires on the Merino x Border cross ewes. The black face and legs should not be detrimental on rams used solely to produce fat lambs which all go for slaughter. They would, however, produce large-framed lambs and not have very good skins.

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[13] Cheviot men say that their breed is even more resilient than the Dorset Horn or rather that Cheviot-derived stock do not react to adverse circumstances to the same extent, i.e., they actually maintain and possibly improve condition under hard going; in other words, the Cheviot is a good "doer". This will come as no surprise to anyone who knows this sheep in its native hills. The Dorset Horn, under good fattening conditions, will possibly produce a more valuable lamb than the Cheviot. The ability of the Cheviot, however, to thrive on adversity is a valuable insurance factor if for any reason conditions are not perfect or if there is any expectation of their not being so. The Cheviot therefore has a big appeal to men with improved rough, particularly if hilly, country as well as "lowland" pastures.

[14] Cheviot wool is used in the manufacture of the best class of Scottish tweeds which earn valuable export revenue especially in the U.S.A.

THE ECONOMIC VARIABLES

A fat lamb producer has many avenues along which he can travel in attempts to increase the efficiency and profitability of his production. He can try to:

(*a*) increase the number of lambs sold;

(*b*) increase the price received for lambs;

(*c*) increase the wool income of the ewes and

(*d*) decrease the annual depreciation cost of the ewes.[15]

All the above four production aspects are directly or indirectly under the management control of the grazier and increases in efficiency in any one, or all of them, will incur no appreciable additional costs—other than the mental effort and energy expended in the re-thinking necessary to better planning.

Before we look at the factors governing increases in efficiency along any of the above lines, let us briefly consider what a 10 per cent improvement in the first three of them could mean in terms of increased receipts. Assume

(1) a property on which 1,200 ewes are run with 100 per cent of lambs going to market;

(2) that the ewes each cut 10 lb. of wool which sells at 54d. per lb. (net) and that the lambs each fetch £3 10s. (net) i.e., transport and marketing charges and drenching costs already deducted.

We will raise in turn by 10 per cent the

(*a*) number of lambs marketed,

(*b*) price received for the lambs, and

(*c*) wool income of the ewes.

Before these adjustments are made receipts will be thus:—

	£
Fat lambs: 1,200 at £3 10s. (net)	4,200
Wool (ewes): 1,200 x 10 lb. at 54d.	2,700
Total	6,900

ADJUSTED GROSS RECEIPTS

A: Lambs marketed raised to 1,320 (i.e. 110 per cent)

Receipts:

Fat lambs: 1,320 at £3 10s. (net)	4,620
Wool (ewes): 1,200 x 10 lb. at 54d.	2,700
Total	7,320

Increased receipts = £420.

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[15] Increasing the flock size is not considered; at any given time size is governed by the grazing available during the winter months—unless we add the extra complication of bought-in feed and/or conservation.

B: Prices received for lambs raised to £3 17s. (net).

Receipts:

	£
Fat lambs: 1,200 at £3 17s. (net)	4,620
Wool (ewes): 1,200 x 10 lb. at 54d.	2,700
Total	7,320

Increased receipts = £420.

C: Wool clip of ewes raised to 11 lb.

Receipts:

Fat lambs: 1,200 at £3 10s. (net)	4,200
Wool (ewes): 1,200 x 11 lb. at 54d.	2,970
Total	7,170

Increased receipts = £270.

A, B, and C: 1,320 lambs marketed at an average price of £3 17s. (net) and 11 lb. of wool cut from ewes.

Receipts:

Fat lambs: 1,320 at £3 17s. (net)	5,082
Wool (ewes): 1,200 x 11 lb. at 54d.	2,970
Total	8,052

Increased receipts = £1,152.

The above calculations are based on obvious over-simplifications but the initial model is one which represents average-type performances and yet the final data are not rare occurrences with more successful producers.

Thus by all round improvements in efficiency of 10 per cent gross receipts have been raised 16 per cent, i.e., by an increase of £1,152 on an initial turnover of £7,200. Most of these increases can/could be achieved by better management at little additional cost and so any extra receipts will be mainly profit.

The increase in yield of wool from the ewes is perhaps the least easily achievable and could possibly be regarded as a side-issue in this context. As most fat lamb producers will be buying-in replacement ewes, the genetic make-up of the ewes is beyond a producer's control and therefore he cannot alter wool income in terms of quality as this is mainly determined by the ewes' breeding. The genetic potential regarding quantity is also given but the producer can influence this by the environment which his management imposes and the difference between good and bad management with regard to nutrition could easily lead to differences of 1 lb. in yield of wool. However, the main factor in determining the wool income will be the type of sheep chosen.[16]

Combined increases in the number of lambs marketed and the price received for them alone resulted in extra receipts of nearly £900 from the hypothetical flock. What are the factors at work here?

[16] The relationship between the income yield of wool from the various possible ewes (Merinos, Corriedales and Merino x Border Leicester crosses) and their several capacities as fat lamb mothers is a basic one. More will be said of the problems of evaluating this relationship elsewhere.

A: The number of lambs marketed

This will be governed by the—

(1) number of lambs born and

(2) post-lambing management to reduce lamb deaths.

The first factor (number of lambs born) will be determined, in part, by the breed of ewes; the nutritional status of the ewes during the winter; the incidence of losses from disease (particularly pregnancy toxaemia, which is related to nutrition) and whether or not the ewes were flushed (to encourage twinning) before joining.

The second factor (post-lambing losses) will mainly be governed by management but the mothering capacity of the ewe can be important especially with twin lambs.

B: The price received for the lambs

As has been previously described, the price received in any one week is largely a matter of chance.[17] The producer can average the variations by sending regular, weekly consignments and can raise his own average price by:—

(1) sending possibly predominantly early and/or late lambs;

(2) producing better quality lambs by reaching heavy weights at young ages and therefore getting "sucker" prices on large carcases (early maturity of the lamb will depend on the breeding of the ewe and ram and on good management—in particular seeing that the lambs do not receive any checks);

(3) possibly altering the breeds concerned so that total returns (i.e., carcass plus skin values) are maximized.[18]

The fourth opportunity ("*(d)*" of the opening paragraph) providing scope for more profitable performance is concerned with the depreciation cost of the ewe. (On a flock basis, deaths must enter the calculation also.) The variables here are her—

(1) initial cost;

(2) number of lambings in the flock;

(3) disposal price.

Once a fat lamb producer has decided on the breeding he wants, the price at which he buys ewes is mainly given.[19] Supply and demand will largely determine the price he has to pay for his chosen product apart from any

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[17] More than one producer stated that he received his worst price for his best lambs and his top price for his worst lambs. This could arise from the fact that the "best lambs" were fat and ready to go at the same time as everybody's else's best lambs were also ready—a result of seasonal factors; the instability of the Brisbane market is at the heart of the matter even so.

[18] What is possible by appropriate breeding and management is indicated by the fact that at Cannon Hill on February 6, 1962, the top price was realized by a 36 lb. lamb which not only fetched the best price per lb. (24¼d.) but also had the highest skin value (24s.).

[19] There is little incentive to a fat lamb producer to maintain his own breeding flock when suitable ewes are available at 60s. to 65s. and a fat ewe lamb can fetch 70s. net. Unless, of course, he wishes to retain the Merino wool-cutting interest by running a self-maintained Merino flock and possibly breeding his own cross-bred mothers too.

savings he can achieve by being a good buyer. "Windfall gains" may be made occasionally but they cannot feature in budgets; one can only be grateful when they do occur. They could arise from being able to buy cheaply because the seller is short of feed; from buying locally and so saving on transport costs; and possibly (by hard bargaining) from not having to pay the market value of the wool on the sheep's back. These are minor savings however and when spread out over a ewe's lifetime production are very small indeed.

The age at which the ewe is sold and her disposal price are related and this aspect is under the control of the producer. If the ewe is sold after five lamb crops it is quite normal to receive 35s. for her; whereas if she is kept for seven years it is not usually possible to get more than about 22s. The difference arises because as a younger beast she can be more readily fattened into a saleable product and fetches a higher price from the butcher; it is possible also that she can still be sold to another producer as a breeding animal and if her wool is a consideration it will often be of better quality at the younger age.

The respective annual depreciation costs are set out below based on the assumption that:—initially the ewe costs 60s. net, i.e., 65s. paid for her *plus* 5s. transport to get her on the place *less* the value of the wool on her back, say, 10s.

(*a*) Sold after five years for 35s.—

$$\frac{60 - 35\text{s.}}{5} = 5\text{s. p.a.}$$

(*b*) Sold after seven years for 22s.—

$$\frac{60 - 22\text{s.}}{7} = 5\text{s. 5d. p.a.}$$

Thus there is an annual difference of 5d. per ewe in the "rental" paid for her by the grazier which favours her being sold at the younger age.

It needs to be noted that the above only holds for the currently realistic price of 60s. (net) as the initial cost of the ewe. If demand for fat lamb mothers pushes the price of such ewes up and the same disposal prices still hold, the ratio of the respective annual rentals would alter, e.g., with the purchase price of the ewe at 70s.—

Five-year sale—7s. p.a.

Seven-year sale—6s. 10d. p.a., i.e., about equal, and at 80s.—

Five-year sale—9s. p.a.

Seven-year sale—8s. 3d. p.a.

However between the fifth and seventh years the quality of the wool from the ewe could deteriorate; the flock might have a lower lambing percentage and there would be more deaths. At present prices, everything seems to be in favour of selling the ewe at her peak at five years.

In terms of working capital requirements the age makes no difference for they compare thus:—

Assume:

A flock of 1,400 ewes, a total loss of 20 per cent over five years and a total loss of 30 per cent over seven years.

Fifth year sale—

	£
*224 sold each year at 35s.	392
280 bought each year at 60s.	840
Capital required annually =	£448

$$*280 - (280 \times \frac{20}{100})$$

Seventh year sale—

	£
*140 sold each year at 22s.	154
200 bought each year at 60s.	600
Capital required annually =	£446

$$*200 - (200 \times \frac{30}{100})$$

Although it would not be possible to maintain a flock of ewes in economic production up to the age of ten years one hears of the occasional long-lived ewe. It is interesting, perhaps, to note that the rental charge on such a ewe is about the same as that for those sold much earlier; assuming she can fetch a price of 10s. when sold—

$$\text{rental} = \frac{60 - 10}{10} = 5\text{s. p.a.}$$

It is not possible to lay down hard and fast rulings here because so much depends on the type of pastures over which the ewes have been grazing and the management to which they have been subject and, arising from the above factors, their general condition. One man, for instance, often receives 40s. for five-year-old cross-bred ewes and 35s. for seven-year-olds. These ewes are in excellent condition and are sold for further breeding. He had one phenomenal sale which is surely worthy of note. He sold a mob of 200 nine-year-old cross-bred ewes for 40s. each; the man who bought them took two lamb crops off them and finally disposed of them at 37s. 6d. a head. This example well serves to illustrate the range of possibilities and each producer must determine the optimal selling age of his ewes from his own known conditions using the type of calculations illustrated above.

2. POTENTIAL PROFITS FROM FAT LAMB REARING AND THE COMPARATIVE PROFITABILITY TO WOOL PRODUCTION

This section shows the production targets that would-be fat lamb producers must set themselves in order to achieve certain levels of Labour and Management Incomes and Interest Earnings on capital. Various possible combinations of results are shown by altering such variables as lambing percentages, prices received for lambs, the purchase price of ewes and the length of life of ewes in the flock.

Table 1 contains the basic data on the returns obtainable from lamb sales from which the material featured in Table 2 has been calculated.

TABLE 1

Returns from Lamb Sales (£)

(1,000 *Ewe Flock*)

Lambing Percentages*	Lamb Returns; Net (Shillings)†		
	60	70	80
90	2,700	3,150	3,600
100	3,000	3,500	4,000
110	3,300	3,850	4,400
120	3,600	4,200	4,800
130	3,900	4,550	5,200

* This represents lambs marketed and few flocks average a figure higher than 115 per cent. The ewes at their first lamb drop rarely do better than 90 per cent; subsequently they may go up to 130 per cent but even so an overall flock average of say 120 per cent is uncommon.

† Returns are net. An allowance of 1s. per lamb for drenching costs (materials only) has been made and additionally transport and selling charges have been deducted; just under 70s. is the average net return so realized by efficient producers. One producer averaged just over 75s. per head for the 1962 season, but it is most rare for the average to reach 80s. net. The occasional sale, of course, may bring a price of more than 100s.

It should be noted that at the higher rates of lambing, greater ewe losses could occur as high rates would depend on more twins and therefore one could expect possible trouble from pregnancy toxaemia. No allowance has been made for this in the calculations shown in Table 2—nor for the fact that twin lambs may fetch a slightly lower price than singles.

The Profitability of Fat Lamb Production

These figures can be used to suggest what orders of efficiency must be reached by producers to obtain various stated levels of Labour and Management Incomes and Interest Earnings on their invested capital.

THE ASSUMPTIONS

On an improved and well-managed property it should be possible to run 1,000 fat lamb mothers on 600 acres. Costs per ewe[20] for fat lamb properties of this size can realistically (i.e., based on material previously gathered by the writer from another source) be put in as 20s. a head for use in the calculations which follow. Therefore, on a "per sheep" (adult) basis, costs, as so far given, will amount to £1,000 annually.[21]

[20] These do not include the depreciation cost of the ewes but allowance was made for this, by subtraction, in deriving Table 2 from Table 1.

[21] The rams have not been forgotten; but as some ewes will die each year, these two have been allowed to cancel out and the assumption is that flock size will on average lie around 1,000 adult sheep.

TABLE 2

Net Returns (to the nearest £5) from Lambs—1,000 Ewe Flock*

Purchase Price, Net, of Ewes	Lambing Percentages	Lamb Prices; Net. (Shillings)					
		60	70	80	60	70	80
A		Ewes sold after five lambings			Ewes sold after seven lambings		
60s. 0d. ..	90	†2,350	†2,800	†3,250	(It is assumed that with the purchase price of ewes at 60s. 0d., there is no incentive to keep them for seven years).		
	100	2,650	3,150	3,650			
	110	2,950	3,500	4,050			
	120	3,250	3,850	4,450			
	130	3,550	4,200	4,850			
B	90	‡2,240	‡2,690	‡3,140	‖2,250	‖2,700	‖3,150
70s. 0d. ..	100	2,540	3,040	3,540	2,560	3,050	3,650
	110	2,840	3,390	3,940	2,850	3,400	3,950
	120	3,140	3,740	4,340	3,150	3,750	4,350
	130	3,440	4,090	4,740	3,450	4,100	4,750
C	90	§2,125	§2,575	§3,025	¶2,165	¶2,615	¶3,065
80s. 0d. ..	100	2,425	2,925	3,425	2,465	2,965	3,465
	110	2,725	3,275	3,825	2,765	3,315	3,865
	120	3,025	3,625	4,225	3,065	3,665	4,265
	130	3,325	3,975	4,625	3,365	4,015	4,665

* After the data of Table 1 have been adjusted to allow for the depreciation costs of the breeding ewes and for flock losses.

† It is assumed that the ewes are sold after 5 lamb crops; that the disposal ewes fetch 35s.; that annual flock losses are of the order of 5 per cent; and that the dead ewes are valued at 40s.

‡ Same assumptions as above except that the dead ewes are valued at 44s.

§ Same assumptions as both above, except that the dead ewes are valued at 50s.

‖ It is assumed that the ewes are sold after 7 lamb crops; that the disposal ewes fetch 22s; that annual flock losses are of the order of 6 per cent and that the dead ewes are valued at 34s.

¶ Same assumptions as for above (‖) except that the dead ewes are valued at 40s.

Also, there will be an annual ram replacement cost of some £100. (A ram will cover 60-80 ewes per season and therefore some 13-17 rams will be required; as rams have a flock life of about 5 years there will be an annual replacement rate of, say, 3½ rams. Rams cost from £25 to £35 to buy and therefore this annual cost is taken as £100.)

The cost of 20s. a head mentioned above was obtained from properties with only small expenditures on fertilizers, in terms of current costs, as most of the manuring costs were capitalized. Fat lamb producers stress the need for lush, green feed to keep the lambs growing continuously and strongly and fertilizer expenditure is usually higher than on wool-cutting properties. If it is assumed that the rate of fertilizer application is 1 cwt. per acre every two years, there is an additional annual expense of 15 tons of fertilizer at an approximate cost of £270.

The total costs of running 1,000 ewes on the suggested 600 acres will therefore be £1,000 + £100 + £270 = £1,370; say, £1,400 annually.

It is impossible to put a precise figure on the amount of capital required for this system of production. Land (especially on small properties) suitably developed to support such production could be valued at around £25-£30 or more per acre; the machinery will amount to some £1,000 and the stock valuation will vary between £3,000 and £4,000 depending on the price paid for the ewes. Additionally, there will be need for some working capital.

Total capital requirements are put in at £24,000.

It is assumed that the cross-bred ewes' wool clip will be worth £2,250 (i.e., 1,000 x 10 lb. at 54d.-lb. net) and that there will be net receipts from cattle trading of some £250.[22] Thus, fat lamb returns apart, there are total net receipts of £2,500 and total costs of £1,400 leaving a farm income of £1,100 plus the net returns from the sale of fat lambs. (The ram's wool clip which would not amount to more than £50 is ignored.)

We are now in the position, granted the validity of our broad assumption,[23] to estimate the type of profitability which goes with various levels of efficiency.

The Budget

Table 3 shows the net returns from the sale of fat lambs which are necessary in order for producers to attain various levels of Labour and Management Incomes and Interest Earnings on invested capital: viz., Labour and Management Incomes of £1,000; £1,500 and £2,000 and Interest Earnings (on £24,000) of 4, 5 and 6 per cent.

Table 3

Net Returns from the Sale of Fat Lambs Necessary to Achieve Given Labour and Management Incomes and Interest Earnings of Capital (£)

Rate of Interest Earnings	Labour and Management Incomes		
	£1,000	£1,500	£2,000
	£	£	£
4 per cent (£960)	860 (£1,960)*	1,360 (£2,460)	1,860 (£2,960)
5 per cent (£1,200) ..	1,100 (£2,200)	1,600 (£2,700)	2,100 (£3,200)
6 per cent (£1,440) ..	1,340 (£2,440)	1,840 (£2,940)	2,340 (£3,440)

* The figures in brackets give the total amounts represented by the nine combinations of the given Labour and Management Incomes and rates of Interest Earnings. (£1,100 of Farm Income has already been generated—as explained above).

Thus, from Table 3 it is possible to say (accepting the soundness of all the stated assumptions) that a grazier who wants to earn 6 per cent on the capital locked up in his property and who considers himself worth a Labour and Management Income of £2,000 has to obtain £2,340 net from his fat lambs to reach these targets. He can do this by means of any of the postulated levels of efficiency shown in the "A" section of Table 2.

[22] Whether or not this is a fair assumption can virtually be ignored as the amount is held constant in all the budgets and therefore does not affect the comparisons to be made between different systems of sheep production.

[23] The treatment throughout makes it easy for any grazier to vary the assumptions in accord with his particular circumstances.

It strongly needs noting, however, that in the previous calculations an allowance was made for a supposed 10s. worth of wool on the ewes' backs when bought. This wool goes into the wool clip, which has already been included as revenue in the budget. It cannot be counted twice and therefore the price at which most people buy ewes will, in this new context, lie between 70s. and 80s. and therefore beyond the ambit of "A" of Table 2.

Looking at "B", the more relevant section of Table 2, it is seen that by just bettering the minimal standards shown there (i.e., obtaining an average price of 60s. net for all lambs, which reach the market in numbers equal to 90 per cent of the ewes, which cost 70s. to buy) he can attain the "target" of £2,340. Any increase in efficiency (by means of more lambs marketed and/or better lamb prices,[24] whilst still holding the ewes' purchase price constant) will take him past the £2,340 mark. (See also Figure 1.)

Any fat lamb returns in excess of the figures given in Table 3 would be in the nature of Profit.

The Labour and Management Income is the reward to the grazier personally for his manual work and direction; the Interest Earnings on capital are the reward to his financial investment and anything over would be Profit, i.e., his reward for being willing to risk his money and for his general enterprise—in other words, the earnings of the "entrepreneur".

How does this compare with wool production?

The Profitability of Wool Production

The Assumptions

It is unlikely that properties as developed as those capable of producing fat lambs would rely on bought-in wethers for wool production and, therefore, we must assume a self-contained Merino flock breeding its own replacements.

On a property of 600 acres with a fair degree of improvement, it can be assumed that it will be possible to run 800 ewes and 400 wethers.[25]

It is assumed that a Merino flock is run and that the average clip is 12 lb.[26] for all sheep in the flock and that the wool is sold at 58d. lb. It will be assumed also that there are 5 per cent annual losses from deaths, that sheep are drafted after 5 wool clips and that the lambing percentage is 90 per cent, although this represents a high level of efficiency which is attainable but not often achieved. (Any falling off below the assumed 90 per cent will affect receipts from the sale of surplus young stock.)

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[24] 65s. to 70s. net is the sort of seasonal average price which can be considered possible by means of efficient production.

[25] The 1,000 ewes of the fat lamb system are equivalent to 1,500 dry sheep, i.e., 2½ dry sheep per acre. 800 ewes and 400 wethers are equivalent to 1,600 dry sheep, i.e., 2⅔ dry sheep per acre. The suggested number of wool cutters is therefore at reasonable parity with the fat lamb system because the 400 wethers can be pushed harder if necessary than an all ewe flock and help to buffer any pressure created by the extra 1/6th of a dry sheep equivalent per acre heavier stocking. Additionally the sheep are Merinos which are reputed to require less grazing area per head than cross-breds.

[26] A property next door to that of a fat lamb producer and under very similar conditions is known to the writer to produce 13 lb. as the flock average with the wethers cutting 15 lb.; so a 12 lb. average seems a safe assumption for a well-managed property.

EXPLANATION

Net returns from lambs, of £3,300, for instance, are generated by each of the nine possibilities which diagonally cross the vertical path rising from where £3,300 appears on the horizontal axis, e.g.:—

(i) { Buying ewes at 60s. Lamb marketing of 91%. Selling lambs at 80s.

(ii) { Buying ewes at 70s. Lamb marketing of 107%. Selling lambs at 70s.

(iii) { Buying ewes at 80s. Lamb marketing of 128%. Selling lambs at 60s.

N.B.—It is most uncommon (*a*) to buy good ewes for less than 70s. (when a transport cost is added and no allowance is made for the wool on their backs); (*b*) to be able to average more than 75s. net, for lambs; and (*c*) to exceed 120 per cent as the number of lambs marketed.

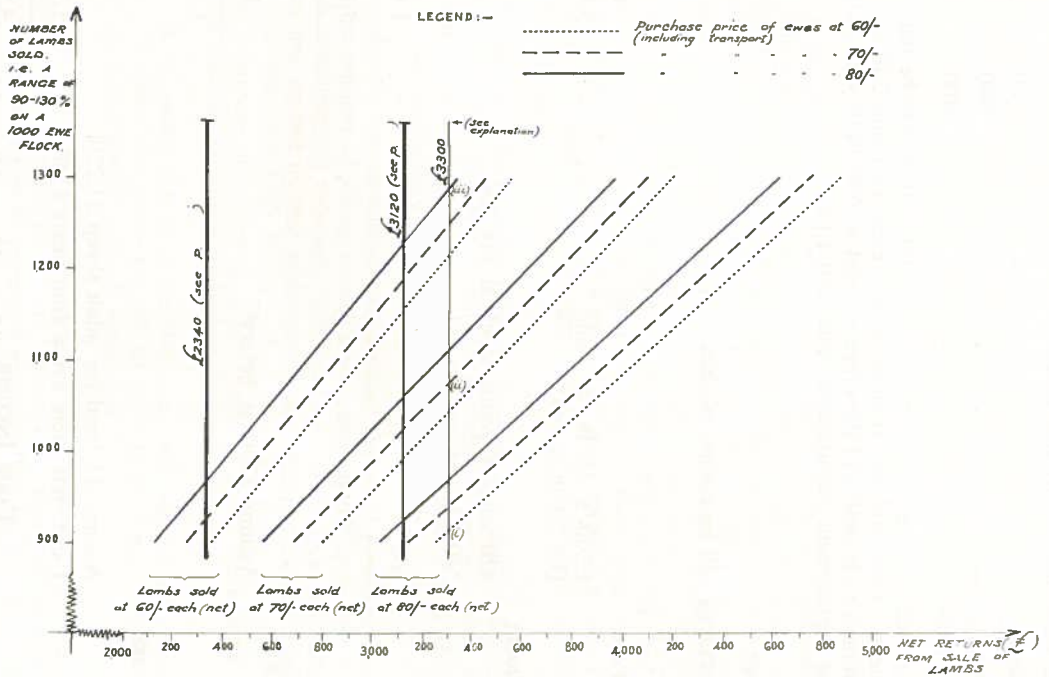

Fig. 1. The net returns from the sale of fat lambs from a 1,000 ewe flock when the percentage of lambs marketed and their sale prices are altered in conjunction with different purchase prices for the ewes and whose depreciation costs have been deducted in the calculation of the net returns obtainable from the fat lambs.

Thus, the basic flock is of this order:—

rams	20
ewes	800
wethers	400

Each year there will be 720 lambs born and 300 of them will be required as replacements (there will be 60 sheep deaths each year and 240 will be c.f.a.). Animals to be sold will therefore amount to 660 (420 young stock in excess of replacement requirements and 240 c.f.a.).

The Budget

Total Receipts will be composed thus:—

		£
Sheep:		
Wool:		
	1,200 x 12 lb. at 58d. .. .. .. (i.e. 24 lb./acre)	3,480
Stock:		
	420 surplus young stock at say 60s.	
	240 c.f.a. at say 32s. 6d.	
	660	1,650
	Total	5,130
Cattle:		
	Assume £250 as before[27]	250
		5,380
and Expenses:		
	Assume £1/head for adult sheep £1,220	
	1 cwt. fert./acre every four years £140 ..	1,360
	Farm Income	4,020

The capital outlay will probably be less for wool than fat lamb production and the capital is taken as being £20,000.

	£
If this is required to earn at 5 per cent it equals	1,000
and it leaves a Labour and Management Income of	3,020

Comparative Profitability

How do the above wool production figures compare with those previously given for lamb production?

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[27] There would be less scope for profitable cattle rearing under this system than the fat lamb system as slightly more adult sheep equivalents are carried through the winter, which is the time when cattle feed could be short.

There, INCOME (fat lamb sales apart) was

	£	£
Wool	2,250	
Cattle	250	2,500
and COSTS were		1,400
Balance		1,100

Therefore if the capital were required to earn at 5 per cent, i.e., earn £1,200, and the Labour and Management Income were equal to that given above for wool production (viz. £3,020) the net return from fat lamb sales would need to be £3,120 (i.e. £1,200 + 3,020 — 1,100) for the systems to be of equal profitability. This figure of £3,120 would be reached, whilst buying in ewes at 70s. each, if there were just over 102 per cent lambs marketed in conjunction with an average price of 70s. per lamb (see Figure 1). If the average price fetched by the lambs were only 60s. it would be necessary to have a marketing percentage of nearly 120 per cent to achieve parity and 65s. per lamb would require around 110 per cent marketing.

It may well be thought that the management skill which can produce 24 lb. of wool per acre is roughly commensurate with that which could obtain those fat lamb results just suggested as resulting in about the same degree of profitability between the two systems.

Under the circumstances just outlined the wool producer had to sell off a large number of young surplus stock annually. What happens when under such conditions of relatively high lambing percentages, only about half the ewes are needed to rear replacements and the rest can be mated so as to produce cross-bred fat lambs? Any effect on flock profitability can only arise from the difference in prices resulting from the sale of the surplus young stock as fat lambs instead of wethers.

It is still assumed that on the 600 acres, 400 wethers will be run alongside the 800 ewes; that losses are still at the rate of 5 per cent per annum and that sheep are drafted after 5 wool clips.

Of the 300 sheep required annually for replacements, there will be 200 ewes and 100 wethers as before. In ensuring that 200 ewes are obtained, 200 wethers will also be produced and therefore there will still be a surplus of 100 young Merino wethers. To obtain 400 Merino lambs, it will be necessary (given 90 per cent lambs reared) to put a Merino ram on to the best 444 of the ewes. This means that there will be 356 ewes available for breeding fat lambs and presumably these ewes would be joined to a Border Leicester ram.

The sheep RECEIPTS structure will then be as follows:—

		£
Wool (unchanged)		3,480
Stock:—		
	Merinos	
100 surplus young wethers at 60s.	300	
240 c.f.a. at 32s. 6d.	390	
340		690

	Cross-breds	£
320	(356 ewes at 90 per cent) fat lambs at say 70s. . .	1,120
660		£5,290

Extra receipts from the sheep amount therefore to £160; in other words, the extra 10s. per animal realized by the surplus progeny bred and sold as fat lambs rather than as young wool-cutters.

The breeding of the cross-bred lambs will mean that rams of a suitable mutton breed will have to be bought. Five or six rams would be required; apart from their feeding and drenching, etc., their cost would only amount to some £25-£30 annually.[28] One can say then, if all the assumptions are correct, that this system will yield around £130 more income than breeding all Merino stock.

It does seem that under the conditions postulated there is little to choose, in the short-term, between the three systems of production outlined.

It must be stressed that to make the budgetary comparison between fat lamb rearing and wool production it was necessary to make certain assumptions. These, although realistic in known terms, could vary (any or all of them) on other properties under differing circumstances. Therefore the assumptions must always be adjusted to meet the individual conditions against which a particular grazier makes his decisions. It is hoped that the presentation of the material will make any such budgetary alterations easy.

For instance, a prospective fat lamb producer might even feel that although 24 lb. per acre and 90 per cent lambing with Merinos was within his reach, he could achieve (out of cross-bred ewes costing 70s.) 120 per cent of lambs marketed at an average price of 75s. and (by so receiving a net return from his fat lamb sales of more than £4,000) better the break-equal Labour and Management Income figures quoted by some £1,000. On the other hand he may be able to increase Merino stocking rates beyond those suggested and cut, say, 30 lb. per acre. On 600 acres and with wool selling at 58d. lb., this would make a difference in receipts of nearly £900—compared to the 24 lb. per acre used previously. Even a false estimate of the differential in the weight of the ewes' wool clips by 1 lb. a head would affect comparative profiitability estimates by some £200 to £250 and, if the price differential between cross-bred and Merino wool is 2d. lb. more/less than conjectured, it adds up to about a £100 difference either way. Graziers must go through the routine of the calculations for themselves using their own known data.

[28] Fat lamb production is only a possibility when there is plenty of lush, green feed available and therefore the systems discussed have been related to hypothetical highly-improved properties where a fair degree of sub-division could be expected. Therefore, the keeping of another breed of ram on a place does not raise any severe management problems.

3. RESULTS OVER FIVE SEASONS FROM THREE SMALL PROPERTIES

The survey previously conducted by the writer showed that properties of less than 1,000 sheep were often in difficulties because current wool prices did not produce high enough profits per sheep to generate satisfactory Farm Incomes. The winter feed problem is accentuated on small properties because stock numbers must be kept as high as possible and yet, on the other hand, buying in winter feed can badly hit profit per sheep.

Accordingly it was with some interest that the writer came across three small properties (the largest being only 420 acres) whose occupiers are adamant that for their circumstances fat lamb production is the thing. The one man said that he would prefer to be a wool-grower but under his present circumstances he considered his system the only one economically feasible. Records were obtained from these three properties to cover fourteen property-seasons.

The physical details of the properties are given below:—

(i) 400 acres—

Grass:—		
Natural	120*	
Improved	130	
		250
Crops (inc. some fodder cropping)		70
Woodland (with some grazing)		80

*River flats almost equivalent in pasture value to improved land.

700 Merino x Border Leicester ewes are run on this property at a rate of two ewes per acre of sheep land. The owner has conservation machinery and some of the 70 acres under crop is used to produce hay; he also does some contract work for other people.

(ii) 370 acres—

Grass—Improved	250
Crops	20
Woodland (with good grazing)	100
	370

600 Merino ewes are run on this place; some are crossed to the Border Leicester (with all the progeny going as fats) and others are joined to Merino rams to maintain the flock. The Merino replacements are bred off sheep which have had four lamb crops; "they rear good Merino replacements but have not enough milk for fat lamb mothers". Twenty to thirty cattle are also "topped-off" to utilize the summer flush of grass.

(iii) 420 acres—

Grass:—		
Natural	100	
Improved	220	
		320
Crops		100
		420

This property carries 600 Merino × Border Leicester ewes.

The ratios of sales, for the above three properties, are—

	Fat Lambs	Wool	Other Receipts
(i)	1	1	½
(ii)	1	1	1
(iii)	1	2	1½

Thus all three producers have a fairly evenly divided spread to their income; this is an important stabilizing factor and of particular value to a small producer who may not have the capital reserves of larger producers.

The financial results of the three properties are remarkably similar. After allowing £1,000 for the occupier's labour, the one property (with an average Farm Income of £2,160 and an invested capital of £25,000) shows a 4.6 per cent return on capital; another (with an average Farm Income of £1,780 and an invested capital of £18,500) shows a return on capital of 4.2 per cent and the third property (with an average Farm Income of £1,642 and an invested capital of £16,000) has a return on capital of 4 per cent.

Looking at the data another way, if the invested capital is made to carry a charge of 5 per cent as its opportunity cost on each of the three properties, the Labour and Management Incomes are £910, £855 and £842 respectively.

These figures are very good for properties of this size as overhead costs are relatively high per acre; in absolute terms, building and machinery costs would not be much greater for 1,000 acre properties.

4. CONCLUSIONS

If, as the results of the budgets suggest, there is little to choose in terms of profitability between fat lamb rearing and wool production under the conditions discussed, subjective factors and peripheral considerations possibly become of importance. The incidence of sheath rot with wethers on improved properties, for instance, was mentioned as having been a factor here previously.

Long term trends are important too for both the fat lamb and wool markets are slightly precarious because of the threat of over supplies.

Wool production with Merinos gives a ratio for the value of wool to animal sales (cattle ignored) of £3,480: 1,650, i.e., 17:8; additionally most of the returns (i.e., including the bulk of the stock sales) are geared to wool prices. The fat lamb system with the profit parity previously discussed gives a ratio of wool to animal sales of £2,250:3,120, i.e., 6:8, and the prices of fat lambs are only connected to wool prices through their skin values.[29]

It may be considered that this difference in ratios favours fat lamb production in terms of income stabilization in a time of economic uncertainty arising from doubtful wool prices. It must be borne in mind, however, that big increases in production could mean that fat lambs would become

[29]Merino wool production combined with cross-bred fat lamb production gives a ratio of wool to animal sales of £3,480:1,810, i.e., 15:8.

over-supplied and that an over-supply on this market might have a more drastic effect on prices than is the case with wool. If falling wool prices drive graziers into fat lamb production and so by increasing lamb production cause a general price fall for lambs, it may even be a case, for those graziers who have made the switch, of "jumping out of the frying-pan and into the fire". Although it would appear, from the results postulated, that a successful producer has nothing a fear from being in either situation.

If lamb prices fell to an average level of 60s. net, marketing percentages would have to reach 120 per cent (with ewes costing 70s.) for the parity sum of £3,120 to be reached; if also increased demand pushed up the price of cross-bred ewes to, say, 80s., marketing percentages would need to be around 124 per cent. Thus if increased production of fat lambs causes falling prices through over supply, only the most outstandingly efficient producers would be able to maintain profit parity with wool production and, indeed, such super efficient management could probably better the wool-cutting standards used in compiling the comparative budgets. The situation could therefore arise where a swamping of the fat lamb market could lead efficient managers to go back into wool. All will depend on the extent to which the present expanding fat lamb production continues and on the future demand for lamb. The equilibrium buffer between the two markets could be those producers who, though mainly wool-cutters, rear cross-bred fat lambs out of Merino ewes surplus to the flock maintenance requirements. The effectiveness of this buffer will depend on the proportion between the total number of fat lambs reared in this way and those reared by fat lamb specialists out of cross-breds and whether the buffer works, as a result of the producers concerned going "in" or "out" of fat lambs, will depend on the income difference between their selling surplus stock off as Merino wool-cutters or as fat lambs. Such sales, however, could only be "fringe" revenue to a man deriving nearly all income from wool and therefore the buffer may not be very "elastic". As a "hedge" against possibly falling lamb prices, a new producer might even decide to produce fat lambs out of Merinos by a Border Leicester sire even though such lambs might not fetch such a good price as lambs out of cross-bred mothers.

These considerations and qualifications needed noting but they do not affect the broad conclusion previously reached, viz., a successful producer can earn for himself, his management and his capital approximately the same returns from being either an efficient lamb rearer or wool cutter under present conditions.

Fat lamb production having been described (from budgets based on known and realisable performances) as being able, in general terms, to achieve profit parity with wool production, means that this paper has perhaps met the "basic farm management issue (*a*)" stated on page 8. It has not even begun to answer the questions raised by "issue (*b*)" which is concerned with the *most* profitable organization of a fat lamb system of production. The reasons for this are the lack of necessary data relating to sheep performances in the paddock and the absence of economic data on price differentials in the market for the carcases of the various breeds and interbreeds of lambs produced (the skin values are fairly reliable and obtainable).

The possibilities consist of breeding cross-bred lambs out of Merino ewes with a Border Leicester ram; of using Corriedale ewes to produce either pure-bred or cross-bred (from probably a Dorset Horn ram) lambs or of using cross-bred (Merino x Border Leicester) ewes and siring the lambs by Dorset Horn, Border Leicester, Cheviot or Southdown rams.

The stocking rate densities at which the various ewes itemized can be run on improved pastures of high carrying capacities is very important; not only does the stocking rate determine the per acre wool clip of the ewes, it decides also, in conjunction with rearing percentages, the number of lambs produced per acre. The writer knows of no critical evidence on such comparative stocking rates nor on the wool production of ewes under conditions where they are stocked so as to produce the maximum amount of lambs per acre.

It is possible, for instance, that the lower fertility of Merino, compared to cross-bred ewes, can be offset by the fact that they can probably be more densely stocked and thereby produce more wool, and of a better quality, and at the same time still rear the same number of lambs off a given area, e.g., 50 Merino ewes on, say, 25 acres, with 90 per cent[30] lambing produce as many lambs (i.e., 45) as 40 cross-bred ewes with 112.5 per cent lambing. Additionally, the Merino x Border Leicester cross lambs can be carried without becoming overfat to heavy weights and so realise high skin values.

The milking capacities, as well as the prolificacy, of the various ewes are important with regard to the percentage of lambs marketed and to the age at which the lambs are sent away. Figures are available from individual flocks but, as these are run and managed under different conditions, such data are not acceptable statistically for comparative purposes. It is possible that the shape of the lactation curve as well as total milk production may affect the ability of the ewe to rear rapidly maturing lambs and the capacity of ewes of the breeds concerned to rear, as well as bear, twins is of obvious economic significance.

Records are not kept at Brisbane market of the prices realised by the various breed types of lambs and the nature of the market makes it impossible to sort out, from that source, the effect of breeding on carcase values—although returns from individual properties provide a fair guide on this score. If, however, tightening margins were to make the attainment of maximum economic efficiency highly desirable more critical evidence on cross-breeding methods and results would be needed.

Considerations as to what is the best economic weight at which to market lambs and as to the economic importance of rapid maturity are also bedevilled by the uncertainties of the Brisbane market—although weight effects would be more easily identified than breed influences.

Market analysis could unravel some of the confusion mentioned; for comparisons of "in paddock" production data, controlled experiments are needed. An investigation of this nature could be particularly valuable if allied to carcase evaluation of the various cross-breeds of lambs produced; for even in a market such as Brisbane, quality, in the long run, must earn some sort of reward.

[30] 90 per cent lambing with Merinos is, as noted previously, difficult to achieve but by no means impossible.

Sydney: V. C. N. Blight, Government Printer—1962