SYSTEMS OF PIG PRODUCTION IN CANTERBURY: AN ECONOMIC APPRAISAL

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SUMMARY

The trends in pig production in the Canterbury province are presented and show a long period of decline followed by a rise in recent years.

The opportunities for Canterbury farmers in supplying the local market are pointed out, and the extent to which the supplementation of skim milk by meals is profitable is discussed in the economic context prevailing.

An econograph is presented and its use in the formulation of pig production policy for Canterbury farms is discussed.

It is concluded that there is immediate scope for intensified production of pigs from most Canterbury dairy farms through more intensive supplementary feeding with grain meals up to the level of 1 lb meal to each gallon of skim milk available. More intensive meal feeding beyond this point would be economically feasible only if certain improvements in efficiency, which are outlined, are achieved.

INTRODUCTION

THE EXTENSIVE reliance of the New Zealand pig industry on by-products of the dairy industry for its existence is well known. Canterbury has limited dairying potential (and town supply is relatively more important than in the more intensive dairying areas) but is the chief centre of arable farming, having 1,939 holdings classified as arable cropping out of a total of 2,786 so classified in New Zealand. Seconds of grain, surplus potatoes, and other by-products of arable farming are available for feeding to livestock and, although they are not all used for pig feed, the number of pigs per 100 dairy cows in milk has generally been higher than that of prominent pig-producing areas in the North Island and of the Dominion as a whole.

The trebling of the wheat acreage between 1956–7 and 1962–3 has had some effect on the increase of pig numbers and in narrowing the ratio of these to dairy cows in recent years. This situation is shown in Table 1.

The Christchurch metropolitan market provides an outlet for Canterbury produced pigs and also many from

TABLE 1: PIGS PER 100 DAIRY COWS IN MILK (1910 ONWARDS)

Year	*Nth. Auck.*	*Auck.*	*Taranaki*	*Wgtn.*	*Canterbury*	*Dominion*
1910	54		38	49	131	55
1920	29	26	27	29	61	30
1930	32	38	25	35	59	42
1940	42	43	34	40	56	41
1950	31	32	23	29	37	30
1960	41	30	28	39	54	35

Nelson, Kaikoura, the West Coast, and more than 2,300 tons (equivalent to 40,000 carcasses) annually from the North Island. Production from the various parts of the region comprising this northern half of the South Island clearly has a bearing on the potential demand from the Canterbury area.

The distribution of the pig population in the region is shown in Fig. 1.

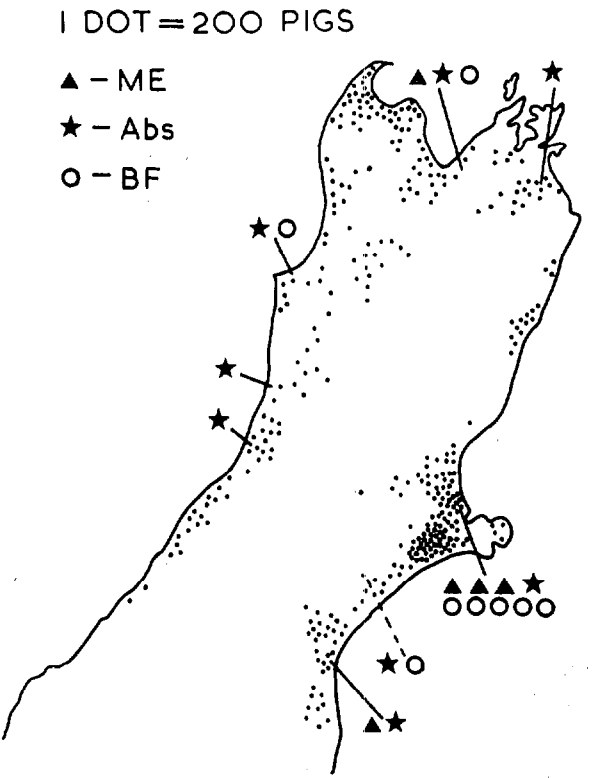

Fig. 1: Distribution map of pig population in Canterbury, Kaikoura, Marlborough, Nelson and Westland regions.
ME = Meat Export Works; Abs = Abattoirs; BF = Bacon Factories

TABLE 2: PIGS ON VARIOUS CLASSES OF HOLDING 31 JAN., 1960 (%)

	Total Pigs	Dairy or Predominantly Dairy	General mixed & Specialized Pig Farms	Other
Canterbury	29,943	55	29	16
Nelson	23,000	88	11	1
Westland	8,467	89	8	3
Marlborough	7,691	72	17	11

TABLE 3: PIG FEED SUPPLIES AND PRODUCTION 1961/62

District	'000 Food Units				Pigmeat production (tons)	
	Dairy by-products	Garbage, etc.	Concs.	Total	6 : 1*	Actual
Nelson	14,784	750	1,500	17,000	1,260	1,260
Marlborough	5,063	400	500	6,000	450	425
West Coast	8,896	100	500	9,500	700	500
Canterbury	15,608	3,000	3,500	22,100	1,625	1,625

* Calculated on the basis of an overall food conversion ratio of 6 F.U. per lb pigmeat produced.

In spite of the existence of potential pig feed supplies in the Canterbury area the strong association of pigs with dairying is evident throughout the whole region. There is, however, some variation as shown by Table 2.

An analysis of the quantity of food available from each of the main sources is presented in Table 3. This reflects the situation shown in Table 1, in that, while Canterbury has only 35% of the total supplies of dairy by-products available for pig feeding in the area, it produces 42% of the total pigs. Sufficient dairy by-products are available to provide 71% of the total pig feed supply in Canterbury compared with 93% on the West Coast. The economic reasons behind this situation will be obvious. Of interest is whether the optimum economic proportion of concentrate supplements to dairy by-products and other cheap by-product feeds is being achieved.

PIGMEAT SUPPLY AND DEMAND

ESTIMATES OF PRODUCTION WITHIN REGION

No statistics exist which give actual production for each of the districts within the region. Estimates have been made based on pig population figures from the 1960 Agricultural and Pastoral Statistics. These have been checked against the total slaughterings in all meat export works and abattoirs and this, in turn, related to the New Zealand average *per capita* consumption of pigmeats spread over the total

TABLE 4: PRODUCTION AND SLAUGHTERING OF PIGS 1959/60

District	Estimated Production	Slaughtered In district	(%)	Slaughtered Canterbury works	(%)
Nelson	28,300	16,585	59	11,715	41
West Coast	10,500	3,231	31	7,269	69
Marlborough	9,450	3,433	36	6,017	64
Canterbury	36,575			36,575	100
Total	84,825			61,575	73

TABLE 5: PRODUCTION AND CONSUMPTION IN SATELLITE AREAS

District	Tons Population 1960	Pigmeat (Carcass Weight Equivalent) Produced	To Canterbury works	Required for Local Consumption	Re-imported
Nelson	46,500	1,260	600	600	*
Marlborough	28,500	425	270	405	250
West Coast	41,000	500	330	585	415

* Some pigs killed in district are sent out for curing: Bacon returned.

population of the region. No allowance has been made for pigs killed on farms for home consumption.

Table 4 gives estimates of the pigs produced in the different parts of the region and the numbers slaughtered in each district. It is worth noting that, while 73% of the pigs produced in the region are killed in Canterbury works, only 42% are produced in Canterbury.

PIGMEAT CONSUMPTION IN REGION

Of the other South Island areas (satellite areas) sending supplies into the Christchurch market, only Nelson is really a net supplier. The West Coast is dependent on outside supplies to a small extent and, as only recently has a bacon factory been established in Westport, the bulk of bacon supplies comes from Christchurch. Small quantities come from Nelson and a few small shipments have come from the North Island. Marlborough is producing all its own pigmeat requirements, but since no curing factory exists in the district practically the equivalent in bacon to the quantity of pigmeat sent out to the Canterbury works is returned. This situation is shown in Table 5.

Canterbury, even with the assistance of the 600 tons from Nelson, has for many years not been able to supply the local metropolitan market and in recent years from 2,300 to 2,500 tons of North Island pigmeats have been brought into this area to satisfy the demand.

The deficiency is mainly in bacon sides as opposed to hams and this creates a problem of finding a market for the latter if self-sufficiency in bacon supplies is to be achieved.

FUTURE REQUIREMENTS OF PIGMEATS IN REGION

In forecasting future demands on this market, one must not only take into account likely future population trends but should have regard also to probable changes in the dairy industry of New Zealand as a whole. It appears likely that progressively more of the solids-not-fat of milk will be processed for human consumption or for casein. If this happens, the North Island, with its more rapid population growth, will find it difficult to send pigmeats to the South Island in competition with pigmeats produced locally, the more so because of the cheaper concentrate and farm grown foodstuffs which exist or can readily be produced in the South Island.

Population estimates for the region up to 1980, published by the Housing Division, Ministry of Works, permit rough estimates of the requirement of pigmeat to be calculated. These assume consumption of 32 lb per head, and self-sufficiency before 1970. They are given in Table 6.

This indicates the production targets for the respective areas of the region and constitutes the market for pigmeat which the Canterbury farmer will have to supply in the immediate future. If it appears that he has been given a disproportionately large share of the market this is because it seems he is in the best position to supply it economically. Economic marginality of dairy holdings on the West Coast and Nelson may stimulate extra pig production. This may upset calculations based on the assumption that production will tend to be centred in areas where pigs can be turned out at maximum net profit. These estimates are put forward with this reservation, as a basis on which to study a problem which is already upon us, and to guide farmers in the province in their approach to the problem.

TABLE 6: REGIONAL POPULATION TRENDS AND PIGMEAT REQUIRED

	1959	*1965*	*1970*	*1980*
Population ('000s)	448	486	528	638
Pigmeat required (tons, carcass weight equivalent)	6,400	6,940	7,500	9,110
Canterbury	1,690	2,640	4,400	5,260
Nelson	1,220	1,500	1,600	1,750
West Coast	483	850	1,000	1,500
Marlborough	433	450	500	600
North Island	2,574	1,500	—	—

Increasing Canterbury Pigmeat Production

On the basis of Table 6 the Canterbury farmer will require to increase his pig production by an average of 10% of its initial level each year up to 1980. For the average dairy farmer with five sows this would mean increasing his breeding herd by one sow each alternate year. Irrespective of whether this is a practical proposition, it is certainly logical to look for increased production on dairy farms first because:

(1) The bulk (probably 70%) of current Canterbury pig production comes from them; 550 Canterbury dairy farmers supplying butter factories averaged less than £4 gross per cow from pigs in 1958–9 (Twomey, 1961), so that there is ample room for improvement;
(2) Where a suitable piggery already exists, less capital will be required than to establish a new enterprise; and
(3) The existence of dairy by-products gives farmers an economic advantage, and where the by-product is skim milk it forms the ideal complement to grain as a pig feed.

PRODUCTION ECONOMICS AND METHODS

Production Costs

With pig production based on by-products, the New Zealand farmer is generally not cost conscious so far as feed is concerned, and discussion of food conversion efficiency does not interest him greatly. With increasing supplementation by grains food costs rapidly become of crucial importance, and a value begins to be placed on the skim milk.

Some idea of the advantage the Canterbury dairy farmer has in supplying the South Island market over both his opposite number in the North Island and the local grain feeder is shown by the following analysis of costs per £100 gross output at prices ruling in recent years. Table 7 shows percentage break-up of costs when skim milk is valued at 1d. per gallon. If the dairy farmer does not wish to cost his skim milk (and it can be included only once in the costs of the whole farm enterprise) this amount can be transferred to the other side of the ledger, increasing the margin by a like amount. In this analysis the pigs have been charged with all labour used in their production, including the farmer's own labour, at 6s. 0d. per hour. In the case of the North Island dairy farms, meals were

TABLE 7: ANALYSIS OF COSTS PER £100 GROSS PROFIT

Costs	*North Island Dairy Farms*	*Canterbury Farms Meal in Total Ration* 20%	50%	100%	
Food					
Skim Milk	£25	£25	£13	Bought Meals 2.5d./F.U.	Home Grown Grain + Protein 2.0d./F.U.
Meal	18	13	30	£63	£49
Roots and grass	2	2	2	2	6
Labour	20	19	18	20	20
Other					
Marketing, Veterinary Incidentals	7	5	6	5	5
R. & M.	3	3	3	3	3
Overheads	8	8	7	5	5
Margin	17	25	21	2	12
Gross output	£100	100	100	100	100

charged at actual cost, averaging more than 4d. per lb, and for Canterbury farms at 2.5d. per lb. A hypothetical case (final column) of a grain-grower using home-grown grain plus purchased protein supplements, and allowing only production costs for the grain, is included for comparative purposes. The difference in margin obtained by the Canterbury dairy farmer and his North Island counterpart is chiefly due to lower meal costs, and is equivalent to more than 1d. per lb of pigmeat, when meals are used at the level of 20% of total feed. Proximity to the Christchurch market further improves his competitive position by about 1d. per lb carcass weight equivalent, which is the cost of transporting North Island pigmeat to that market.

Note that the margin per unit of output tends to fall with increased use of meal above the current 20% level, but whether this will operate in the individual case depends on the possibility of effecting economies in labour and overheads through the greater turnover. Even so, the lower margin on the larger turnover obtained will, on average, mean a better net return to the farmer than under the lower meal feeding level.

The output per 100 gallons skim milk on a 50 : 50 milk : meal regime should be approximately 60% above that on the 20% level — *e.g.*,

80 units milk + 20 units meal = 100
80 units milk + 80 units meal = 160

Thus, the farm currently grossing £400 from pigs could, by increasing meal feeding, and provided accommodation

and labour were adequate, expect to gross £640. Even if no economies of labour and overheads through increased turnover were obtained, the farmer's net taxable income would increase by about £130.

By reference to Table 3, it will be seen that the total dairy by-products available for pig feeding in the Canterbury Province amount to more than 15 million food units. Assuming that this does not change materially, but that a 50 : 50 milk : meal system were adopted, the 60% increase as estimated above (9 million F.U.) would give a total available feed supply, including garbage, of 31.1 million F.U. in Canterbury. This would be sufficient for the production of 2,320 tons of pigmeat. This is still short of the target set in Table 6, and if this is to be achieved the level of supplementary feeding may have to be even higher, management and/or level of efficiency of feed conversion improved, or the extra production come from other types of farms — including specialized pig farms.

The supplementation of skim milk with grain on an equal food unit basis is clearly an economic proposition in Canterbury, and should be the aim wherever the resources of labour and capital necessary to look after the increased production are available.

Milk as a Supplement to Meal

When the 50 : 50 ratio of meal to milk is exceeded, better balanced feeding is achieved. Healthier and more contented pigs may result in improved feed conversion until, fed as sparingly as is done in Denmark, skim milk might achieve a feeding value of 6 lb ≡ 1 Food Unit.

Consider the likely result if meal feeding were increased to this extent in order to extract full value from the skim milk. Skim milk fed in conjunction with four times its equivalent in grain or other concentrate feed would quadruple pig output compared with the 20% meal feeding regime.

The farm with an initial output of £400 worth of pigmeat would now earn £1,600. The extra costs involved in producing the extra £1,200 worth of pigmeat would comprise approximately:

Food Cost: 43 tons meal (86,000 F.U. @ 2.2d.)	£790
Labour: ½ labour unit @ £600	300
Others (cartage, commission, veterinary expenses, repairs and maintenance, overheads, etc.	£160
	£1,250

There is obviously no true profit in this method of pig production, and it would not be contemplated unless labour was initially seriously under-employed and no better employment alternatives were offering.

The further alternative of growing the grain required on the farm might be considered, reducing the herd by 14 cows to allow 28 ac of barley to be grown. If the loss of income from butterfat is added to the costs of production of barley, the margin which would result from this system would not be attractive at present prices of butterfat and pigmeat.

GRAIN FEEDING OF PIGS

Production of pigs on grain must be profitable as a self-contained enterprise, and it must be capable, under good management, of giving as good a return on capital invested as alternative forms of farming.

In spite of good prices in recent years, few pigs are today produced in Canterbury on a basically grain feeding system. Thus it is reasonable to conclude that the system of farming is not sufficiently profitable to attract capital. Only one part-time enterprise is known to the writer, in which bought grain and meals form the main basis of production. The farmer concerned has other part-time employment, and grows cash crops on 25 of 28 ac of leased ground. The sows graze 3 ac of pasture and clean up the cash crop residues. An average of 10 hours per week is spent on the pigs and the farmer is satisfied that he can make the enterprise economic. He has a special market, based on high quality and even supply to local butchers which has enabled him to average 24d. per lb for the porkers which have formed the bulk of his output.

Data from this pioneering venture together with figures from dairy farm piggeries have been used to provide a practical guide to farmers on the economics of pig feeding under varying conditions of efficiency of feed conversion, food costs and pigmeat prices.

UNIT FOOD COSTS

The cheapest foods available for pig feeding are the by-products which are generally regarded as "costless" — followed by home-grown crops which can be fed *in situ*, then home-grown crops which can be stored, and finally, bought grains and processed meals.

Depending on the proportions of the various foods fed to pigs, and the cost of each, an overall figure for cost per food unit can be calculated. Table 8 sets out a range of food unit costs for varying meal prices and different proportions of meal. These unit costs range from 0.6d. when

TABLE 8: TOTAL FEED PRICE — MILK NOT COSTED

Meal Price		*Pence per food unit*		
£/2,000 F.U.	*pence/F.U.*	*25%*	*50%*	*75%*
40	4.8	1.2	2.4	3.6
36	4.32	1.08	2.16	3.24
32	3.84	0.96	1.92	2.88
28	3.36	0.84	1.68	2.52
24	2.88	0.72	1.44	2.16
20	2.4	0.6	1.2	1.8

TABLE 9: TOTAL FOOD PRICE WHEN MEAL COMPRISES 25, 50, 75 PER CENT OF RATION AND SKIM MILK VALUED AT 1D. PER GALLON

Meal Price		*Pence per food unit*		
£/2,000 F.U.	*pence/F.U.*	*25%*	*50%*	*75%*
40	4.8	1.95	2.90	3.85
36	4.32	1.83	2.66	3.49
32	3.84	1.71	2.42	3.13
28	3.36	1.59	2.18	2.77
24	2.88	1.47	1.94	2.41
20	2.4	1.35	1.70	2.05

meal at £20 per ton (2.4d. per F.U.) is fed on the lower scale of supplementation to 3.6d. when meal of the same quality costs £40 per ton (4.8d. per F.U.) and is fed at the 75% level of the total feed supply.

Since some farmers will be in a position to sell their skim milk, they may wish to apply the value they could get for it on the farm to the feed cost formula. There will be a tendency for a definite market value to be attached to skim milk as it becomes a diminishing proportion of the food supply. For this reason Table 9 gives a range of unit food costs when skim milk or other by-products are valued at 1d. per food unit.

FOOD COST PER LB PIGMEAT

The total food cost per lb of pigmeat produced will, obviously, be the product of unit food cost and the number of food units required to produce 1 lb of pigmeat. A margin must remain between this cost and the price obtained for pigmeat sufficient to cover the labour and other production costs involved and allow for a reasonable return for managerial skill and profit if capital is to be attracted.

Discussing the economics of using meal supplements with skim milk, Smith (1957) showed the limits of live-weight to which meals could be fed profitably at various

relationships of meal cost and pigmeat price. While the conclusions reached could be applied with validity to the production conditions which applied in the experiments which formed as basis of the work, considerable differences in estimates of profitability on farms would be introduced owing to:

(1) Different unit food costs, due to level of meal feeding efficiency (waste, etc., connected with meal feeding) and different costs of component feeds.
(2) Total rationing system used and rate of gain obtained.
(3) Inherent efficiency of the pigs used.
(4) Housing conditions.

The last three can be combined into one overall feed conversion efficiency factor (which can also serve to indicate the weight limits to which supplementary feeding can be taken at various combinations of level of supplementing and unit price) and the product of this and the unit food cost, *i.e.*, the food cost per lb deadweight gain, is the essential factor in determining profitability or otherwise in any particular case.

Margins Over Food Cost

An econograph (Fig. 2) has been prepared which gives the margin over food cost for a number of representative

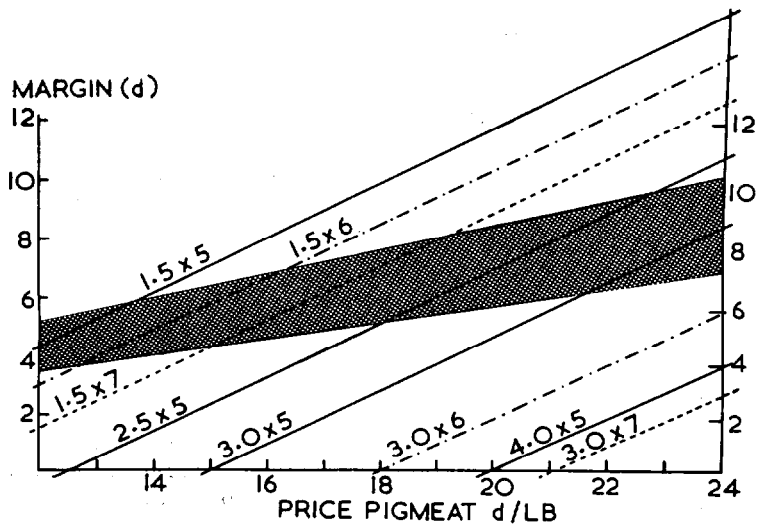

Fig. 2: Econograph showing margin over feed costs at various prices of pigmeat where food unit cost and food conversion efficiency ratio are known.

products of the factors concerned over a range of pigmeat price from 1s. 0d. to 2s. 0d. per lb.

The shaded area covers the range of margins required at any point under conditions where total food cost per lb pigmeat amounts to 55% (top) to 70% (bottom) of the gross product value.

The upper margin of this range will correspond to Canterbury grain feeding where costs other than direct food costs tend to be high. The lower margin is based on United Kingdom standards (Ministry of Agriculture, 1954) and represents a degree of organization which reduces costs per unit of output virtually to the limit.

The method of reading the econograph will be readily followed if an example is considered. The line marked 2.5×5 indicates margins over food costs, at various levels of pigmeat price indicated along the base line, when the overall conversion efficiency of food costing 2.5d. per F.U. is 5 : 1. It will be noted that, at anything less than 23d. per lb, this combination of food cost and conversion efficiency is likely to prove of doubtful profitability. A reduction in food unit cost of 2.0d. would improve margins by $(5 \times \frac{1}{2}\text{d.}) = 2\frac{1}{2}$d. per lb pigmeat and even if feed conversion efficiency dropped to 6 : 1 would show ½d. per lb more margin throughout and should enable reasonable returns to be made at 22d. per lb pigmeat.

An improvement of x F.U. in food conversion efficiency (F.C.E.) corresponds to an improvement in margin of x(Food Cost)d. per lb at constant food cost. At a constant level of F.C.E. a reduction of price of xd. per F.U. results in improving the margin over food cost by x(F.C.E.)d./lb.

Reductions in unit food cost are shown to have a much greater effect on margins than practicable improvements of food conversion efficiency but both are obviously important to profits.

Management Considerations

To be in a position to use the graph it is, of course, necessary for the farmer to have more information on his costs and food conversion efficiency than is usual in New Zealand today. It is therefore hoped that more farmers in Canterbury who are producing pigs under various systems will co-operate with the Department of Agriculture's Farm Management Advisory Service in keeping records not only on a financial but also on a physical basis.

It is clear, however, that there are two principal applications of the information obtainable from the type of graph illustrated:

(1) Overall planning of the pig production on the farm based on such known or closely estimated factors as food cost. In the initial phase it may be necessary to combine this with average values for feed conversion efficiency.

(2) Arriving at a decision as to the most profitable stage to market an individual line of pigs, taking into account the feed conversion efficiency of the particular pigs, the cost per unit of feed, and from these two, together with breeding stock overhead, calculating the *cost* per unit of carcass gain, and comparing this with the market price for pigmeat operating over different carcass weight ranges.

Conclusions which may be drawn from consideration of the graph are:

(a) Systems of production in which the average cost per food unit of the whole feed supply is more than 2d. would not be economically attractive under present market conditions.

(b) Only with pigmeat price at 2s. 0d. per lb or better could meal feeding based on 2.5d. per F.U. be undertaken by operators of average efficiency.

(c) A guide to the profitability of using meal, either as a complete feed or as supplement to cheap basic feeds, can be obtained.

To illustrate (c) consider the case of the farmer who has a line of pigs at 140 lb liveweight (just under 100 lb carcass weight). Their value on a schedule of 1s. 8d. per lb is £8 5s. 0d. If they can be fattened to 111 lb carcass weight they will be worth an extra 1d. per lb or £9 15s. 0d. — 30s. 0d. a head more, for a fortnight's extra feeding. Even if the 50 to 55 lb meal per pig required was costed at 2.5d. per lb the additional cost would only be 11s. 0d. or 12s. 0d., leaving ample margin over food costs.

On the other hand, if the baconer schedule is 1s. 6d. per lb the total food cost should not exceed 10d. — leaving 8d. margin to cover other costs and investment return. As it will take 6.5 F.U. to produce 1 lb carcass gain between 125 and 135 lb carcass weight, the cost per food unit should not exceed 10/6.5d. or 1.5d. This would limit profitable feeding of meal, costing 2.5d. per lb, to 2 lb per pig per

day in a total ration of 5.5 F.U. — if a return of 1d. per gallon of skim milk or unit of other feed is required, *i.e.*,

2 units @ 2.5d. = 5.0d.
3.5 units @ 1.0d. = 3.5d.

8.5d.

Average unit cost = 1.5d.

Once the skim milk supply falls below the level necessary to maintain this proportion of the ration there would be no economic return for taking the pigs to heavier weights.

CONCLUSION

Canterbury dairy farmers with supplies of grain available at a cost of approximately 2.5d. per lb are favourably placed to expand their pig production to cater for the local market. Re-entry into the export field seems unlikely unless a severe recession hits dairying or fat lamb production.

At present levels of efficiency and price it is quite sound to organize production on the basis of a food supply including 1 lb meal for each gallon of skim milk available, provided the meal is used without waste and in its most productive role, *i.e.*, chiefly for creep feeding suckers, weaners, and to suckling sows.

By improvements in efficiency there is no reason why the degree of supplementation of the skim milk food supply should not be further increased.

Briefly stated, the improvements in efficiency required are as follows:

(1) Reduction of weaner costs through better sow management and feeding, resulting in more pigs reared per sow annually.
(2) Reduction of food costs through more efficient production, handling and storage of grain, and production of special purpose pastures and crops.
(3) Breeding better pigs capable of being fed to a scale which would give improved feed conversion and still produce a high quality carcass.
(4) Improved feeding management, using the balance and scale of feeding which will ensure optimum feed conversion.
(5) Provision of optimum environment so far as housing and husbandry, including control of disease, can ensure this.

These improvements have already started and pig production is on its way to filling its rightful place in Canterbury farming.

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Officers of firms trading in pigmeats and of the Meat and Wool Boards' Economic Service have provided much background information.

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DISCUSSION

Q: *Would it be advantageous to increase the proportion of roots (particularly sugar-beet) fed to grain-fed pigs housed indoors?*

A. LONGWILL: We have no wide local experience on this point. It would appear, on general principles, to fit in well with a cropping rotation on the arable farm producing pigs. Whether, in fact, it will be done in Canterbury will depend largely on labour requirement and availability.

Q: *What is the incidence of footrot in grain-fed pigs compared with those fed solely on skim milk?*

MR LONGWILL: No details of the incidence of footrot on farms feeding grain extensively have been recorded. On general impressions, however, there is not nearly so much trouble as on North Island dairy farms, particularly where skim milk is fed in excessive amounts and unbalanced by the addition of any grain.

Q: *What is the likely direction of dairying in Canterbury? The hypothesis put forward here is that the extra pigs will come mainly from dairy farms because they have the by-products already on the farms, but may not a higher proportion of the milk produced go for liquid consumption in the urban areas, and a higher proportion of by-products be dried in the future?*

MR LONGWILL: There will undoubtedly be an increase in town supply. An increase of milk drying is not likely because of the lack of large-scale manufacturing units. It is expected that increases in efficiency of management of dairy stock and the extension of irrigation will enable the present level of manufacture to be maintained and hence the by-products available for pig production. However, whether the extra pigs required are produced mainly from dairy farms as suggested or from specialized grain feeders may well be determined by price movements. Because of competition with other meats, I do not envisage price of pigmeats being sustained for long enough periods to bring in many grain feeders over the period considered here.