FURTHER STUDIES ON MEAT PRODUCTION PER ACRE

D. E. WALKER*

AT THE 1953 CONFERENCE results were presented of the first stage of a series of experiments to determine meat production per acre under different stocking rates of ewes and cattle (1). Briefly, these showed that meat production per acre was virtually identical from three similar 50-acre farms stocked at the rate of eight ewes per acre with no cattle, six ewes per acre plus approximately one-third cattle beast bought in the spring and fattened off by autumn, and four ewes per acre plus approximately one-third cattle beast wintered.

The second stage of this experiment has now been completed and the above information can now be extended to cover production from a herd of Aberdeen Angus cows whose steer progeny were fattened off the farm at 2 to 2½ years and production from the fattening of 3 to 4 year old bullocks. No sheep were run with either of these two herds. To provide a link between the various stages of this experiment, the original four-ewe-plus-cattle set-up was maintained on the third farm. The overall design was the same as that used in the first stage of the experiment, as previously discussed at the 1953 conference.

The three seasons during which this trial was in operation were not nearly as good as those experienced when the first stage was in progress. This is shown by the lower output from the four-ewe farm.

Table 1 shows the production of lamb and/or beef from the various farms for each stage.

TABLE 1: MEAT PRODUCTION PER ACRE (lb.).

Stocking	Stage 1	Stage 2	Expectancy
8 Ewes per acre	254	—	240
6 Ewes per acre + spring cattle	259	—	245
4 Ewes per acre + cattle wintered	259	230	245
Breeding cows and offspring	—	217	231
Bullocks	—	255	272

**Meat Research Officer, Ruakura Animal Research Station, Dept. of Agriculture, Hamilton.*

The 29 lb. drop in production on the four-ewe farm was almost entirely due to a lower beef output. Poor hay crops, diversion of hay supplies to the ewe flock during facial eczema danger periods, and slow recovery of autumn pastures, left the feed position too low to buy in the annual addition of weaners in the autumn. The young cattle which made up half the cattle stock on the four-ewe farm were, therefore, not purchased till mid-winter and the drop was largely due to the loss in their increment.

Since the four-ewe farm was carried on through the six years, the results can be averaged to show production over the wider range of seasons. Production figures from the other farms can be adjusted accordingly to provide an indication of expected output had these farms been operating over the six year term. These adjusted figures are shown in the final column of Table 1.

As might be expected, production from the breeding cow farm was the lowest of the five systems. On this farm 30 Aberdeen Angus cows were run, and 12 weaner steers and 5 weaner replacement heifers were kept each autumn and the rest of the calf crop sold. The steer progeny were fattened off at 2 to 2½ years. By the end of March (that is in seven months) the calves, with a zero starting point, contributed a live-weight increase equivalent to that achieved by the 18-month steers in a year. Against this, however, must be charged the constant overhead of the cow maintenance. This far outbalances any advantage shown by the calves and emphasizes the inefficiency of running breeding cows on fattening country. Production from the fattening of bullocks was surprisingly good. In managing this farm, as many head as possible were wintered and additional cattles were bought in in the spring and early summer in sufficient numbers to ensure utilization of all feed available. The most efficient gains were shown by cattle brought in in poor condition in the autumn and fattened by the following spring and summer (2).

Table 2 shows the mean live-weight gains made by the steer cattle on each farm. The age shown is the age at the time the increase was calculated. The increment has been taken as from March 31, or date of purchase after that till the following March 31 in the case of the young cattle, or time of slaughter for the fattening cattle. The periods during which these increases were attained, therefore, vary. The number of days is shown in parentheses. The only complete year's record shown is for the 1½ year steers off the breeding block. All cattle intended for killing were fattened off by the end of March in each season, with slaughtering beginning about October.

TABLE 2: MEAN LIVE-WEIGHT INCREASES PER HEAD (lb.).

Steers	4 Ewes + Cattle	Cattle Breeding	Bullock Fattening
½ year		370 (203)	
1½ years	360 (278)	370 (365)	
2½ years	310 (273)	340 (250)	
4½ years:			
Winter			440 (233)
Spring			380 (145)
Summer			80 (66)

The live-weight gain per day of the young steers bought on to the four-ewe farm in mid-winter was 1.3 lb. The daily gain of the comparable beasts on the cattle breeding farm for the complete year was 1.0 lb. The older steers on the four-ewe farm were slower to fatten than their mates on the cattle breeding farm since during their last few months they had to share available feed with ewes and lambs. As on most fat lamb farms, the general policy was to distribute the cattle over the area with the main objective of keeping the pastures in order for the lambs. Hence the cattle on this block took nearly a month longer to fatten, and put on only 1.1 lb. per day as compared with a 1.4 lb. increase shown by the steers on the breeding farm which had preferential treatment over other stock on the area.

The average carcass weights were 660 lb. off the sheep area and 670 lb. off the cow area. The gains of young cattle, which are still benefiting from a natural growth impetus, are far more economically attained than those of more mature animals. It will be noted that there was little inexplicable difference between the daily increases shown by the yearling and two-year-old steers.

The daily gains of the bullocks were higher, being 1.9 lb. for the cattle wintered, 2.6 lb. for those bought in in early spring, and 1.2 lb. for the short-term summer cattle. Although these gains look more impressive, they were less economically achieved. The weight increase was largely in the form of fat which is expensive in terms of calorific requirements. Also, although the production figures were good on the bullock fattening farm, the type of meat produced was not very acceptable for the export trade. With the price differential in favour of lamb, cattle fattening is not a paying proposition in New Zealand and this is particularly so with heavy bullocks which are no longer required by our overseas market. This form of farming is, therefore, rarely practised in New Zealand.

TABLE 3: NET STOCK PROFITS PER ACRE (£).

Stocking	Stage 1	Stage 2
8 Ewes per acre	20	—
6 Ewes per acre + spring cattle	18	—
4 Ewes per acre + cattle wintered	16	18
Breeding cows and offspring	—	9
Bullocks	—	7

Table 3 makes the reason clear. The figures are not strictly comparable between the two stages in that while lamb and wool prices rose approximately 25 per cent., beef rose only about 10 per cent. However, they provide sufficient evidence to explain the bias in New Zealand in favour of fat lamb rather than beef production.

Although some profit may be made out of wintering and fattening cattle, there is little if any margin in cattle purchased in the spring for fattening in the current season. The supply of store cattle is insufficient to meet the demands from improving fattening farms. As improvement of hill country is speeded up, greater numbers of young cattle should become available to satisfy lowland demands. There could be a future in New Zealand for the specialized fattening of young beef if market trends and prices change to provide the necessary financial encouragement.

This experiment is now being continued to cover production from the fattening of young steers and heifers run without sheep so that eventually it is hoped to be able to provide a fairly accurate estimate of meat production from the seven different types of stocking. Although in prosperous times farmers will always be inclined to farm according to their own personal preferences, when national or personal emergencies stimulate a drive for production, basic information of this type should be available for application.

References

(1) WALKER, D. E. (1953): *Proc. N.Z. Soc. Anim. Prod.*
(2) WALKER, D. E. (1955): *Proc. Farmers' Conf., Ruakura Anim. Res. Stn.*

DISCUSSION

Q: : *Could you explain the low return from the bullocks? If they produced 272 lb. of meat per acre why did this sell for only £7.*

A: : Table 3 shows the net stock profits per acre. £7 was the difference between the cost of the bullocks and the net value of the carcasses on a per acre basis.

Q: : *Why were the changes in weight of the ewes and cows excluded from the total meat per acre produced?*

A: : The cows were approximately the same weight each autumn when the increases were calculated. The changes in ewe weight were ignored as their inclusion would have confused the main issue. In the first stage of the experiment, the four-per-acre ewes put on far more total weight than the eight-per-acre ewes but as this consisted largely of fat they were not acceptable to the trade and the returns from them would have been lower had they been sold on the hooks. Since the policy was to run five-year ewes, all flocks were replaced each year and the majority of the previous season's ewes were sold as six-year breeding ewes.

Q: : *In calculating the economics of the different systems, did you use current values or values averaged over a period? If the data are to be used as a guide would it not be better to adopt standard values?*

A: : Current values were used. Standard values could easily be applied.

Q: : *Surely, the important feature of this work is the basic information it provides on the output of meat per acre. Given this information, it is the job of farmers and advisers to take note of the physical relationships involved when working out the economics of the different systems.*

A: : I agree with Mr. Nalson. The net profits on stock transactions have been shown as a guide but it has been left to the farmer or adviser to apply working costs, etc. The average ruling prices were quoted in the report on the first stage and perhaps I should have indicated these for the second stage more clearly. The average opening price for lamb for Down 2's was 23d./lb. For ewe wool we averaged 46d./lb. and for beef 12d./lb. Given these figures as a basis, adjustments can easily be made.

Q: : *Are records being kept of the effect on pasture composition of these different systems of stocking?*

A: : A report on the pastures was made towards the end of Stage I by officers of the Grasslands Division. At the end of Stage II, the breeding cow herd was replaced by heifers and the bullocks by young steers, and I did not think these changes were drastic enough to affect the pastures very much before our own pasture expert arrived to take over that angle. I understand he is expected to take up his appointment soon.