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# The Call To Produce More Live-stock

E. BRUCE LEVY, Director, Grasslands Division, D.S.I.R., Palmerston North.

"During the war and the years following immediately upon the war, popular opinion was that the world food shortage, born out of the devastation of war and its dislocating effect on production, was merely a passing phase. To-day, however, the world is faced with the stark reality that the ability of each country to feed its people will constitute one of the major problems of the post-war period. Food is to-day the limiting factor in the increase and progress of humanity." (1)

"Everywhere man must ponder the problem of how to produce enough food adequately to meet the needs of existing populations, and perhaps of larger populations in the future." (2)

The source of food may be roughly divided into two classes: (1) That derived direct from the soil in the form of edible crops, i.e., wheat, maize, rice, potatoes, etc.; and (2) that derived from livestock—meat, butter, cheese, etc.

The former group are the product of the harder climatic and harder ecological conditions for life generally, whereas the latter are for the most part the product of more temperate and less severe ecologically attuned conditions. True it is that the product of the first group may be converted into the product of the latter group where the latter group is protected during the winters by man-made structures so that the animals may survive. True it is also that certain of the hard habitat areas of the world provide wide range grazing for stock, and these supplement the animal products from the less desiccated habitats of the more temperate and more fertile regions. It is questionable whether there will ever be any marked increase in animal production from the prairie and steppe range country of the world, and if we take New Zealand Montane Tussock country as an example of these, it would appear that a system of more restricted grazing is necessary before these tussock areas again become ecologically stable as a vegetation resembling its original steppe form.

It would appear to me that the future increase of food of animal origin must come from the temperate climates of the world, and of the countries I have seen, New Zealand and Great Britain appeal as the two most perfectly attuned in this regard, and of these two, New Zealand stands out pre-eminently, acre for acre, as the best animal producing country in the world. I do not infer from this that, if concentrate animal feeding stuffs could be produced ad lib and in perpetuity from the climatically attuned agricultural cropping areas of the world that massive animal production could not be undertaken anywhere provided shelter for the animal could be provided. There is, however, a very great difference in the economic outlook of the in-door, concentrate fed animal, as against the system where the animal can live out-of-doors, can harvest its own requirement of food and spread its own waste manurial residues on to the land. It is in this latter regard that New Zealand can excel. I say specifically "can excel" if only we move towards more intensive farming methods and use to the full the great grassland climate we enjoy.

## The Need of More Food of Animal Origin.

There are very few countries in the world adequately provided with food of animal origin. Phillips (2) quotes Pearson and Harper (1945) as indicating that approximately 3% of the food consumed in Asia, 17%

in Europe, 25% in North America, 4% in Africa, 16% in South America, 36% in Oceania, is of animal origin. The world average is 9%.

“What a man, a community, a nation can do; think, suffer, imagine or achieve, depends upon what it eats. Bran-eaters and vegetarians are not the kings of men. Rice and potatoes are the diets of slaves. The races that live on beef have ruled the world, and the better the beef the greater the deeds they have done.” (3)

Relatively few countries have an excess of food of animal origin for export to the high population areas of the world, and as populations of the New World increase the likelihood of export from these countries will tend to diminish unless very special efforts are made to direct the people's energies in food production, rather than into professional, industrial or servicing channels.

All countries could do far more in this regard than they are doing at the present time. Great Britain sees clearly the writing on the wall and her direction of labour, finance and national backing to provide more food of animal origin from her own soil is noteworthy and highly commendable. It is a position being forced upon her by failure of other countries to provide her requirement within the economic level deemed sound in her present economy. Actually there may have to come an entire revision of a country's ideas on economic price levels as far as food is concerned. Food has always been the Cinderella of the Industries. It may in the future have to take pride of place in human endeavour if the world is to survive, or is to maintain its present standards of life, let alone build to desirable higher standards.

We might well ask ourselves are we appreciating in this God-given food producing country of ours the opportunities for and the obligation upon us to increase our food of animal origin.

Some comparisons with the efforts made by Great Britain are illuminating and show that we, as an agricultural country, are failing to make the grade when compared with the efforts of Britain.

Table I. shows how the United Kingdom's supplies of meat and dairy produce in 1949 compares with pre-war; and these figures indicate that ample markets exist for increased quantities of meat and dairy produce.

**TABLE I.—United Kingdom's Supplies of Meat and Dairy Produce, and Showing that Ample Markets Exist for Increased Quantities of These.**

000 tons

Food	Pre-war		1949		Totals		Difference
	Imptd.	Home prod.	Imptd.	Home prod.	Pre-war	1949	
Butter	480,	46,	319,	19,	526,	338,	—188,
Cheese	142,	44,	213,	33,	186,	246,	+ 60,
Dried milk	14,	21,	35,	30,	35,	64,	+ 29,
Condens. milk	88,	203,	68,	108,	291,	175,	—116,
Carcase meat	1,040,	1,063,	844,	770,	2,103,	1,614,	—489,
Bacon & ham	387,	196,	141,	186,	583,	327,	—156,

Britain's population increase over this period was 3,000,000.

It will be seen that meat supplies are still 489,000 tons, and butter supplies 188,000 tons below the pre-war level. Although the total supplies of cheese have risen from 186,000 tons to 246,000 tons it is still necessary to ration cheese; and to maintain the ordinary ration at 3oz., it is necessary to supplement soft currency supplies of cheese by purchases from dollar sources. It is, of course, true that if British production regained its pre-war level and if the Argentine staged a come-back in meat production the position would be improved, but only in the case of meat would the difference be substantial.

From the figure in Table I. it might be inferred that Britain herself has done little or nothing to improve her own agricultural production. The following tables, compiled from our own Agricultural and Pastoral Statistics, and from data relative to Great Britain, kindly supplied by Mr. D. S. Hendrie, Agricultural Advisor to High Commissioner for the United Kingdom in New Zealand, show the relative statistical position:—

**TABLE II.—Animal Statistics of New Zealand and Great Britain Compared Pre-war and 10 years Later.**

No. 000 head of stock.

	Dairy cows in milk or dry or in calf	Other Cattle	Total Cattle	Sheep	Pigs	Poultry
(Av. 1939-40) N.Z.	1,852,	2,697,	4,549,	31,480,	699,	4,000,
G.B. (1939) N.Z.	3,885,	4,988,	8,873,	26,887,	4,394,	74,357,
(Av. 1948-49) Difference	1,837, — 15,	2,883, + 186,	4,720, 171,	32,664, 1,184,	546, — 153,	2,414, — 1,586,
G.B. (1950) Difference	4,622, + 737,	5,988, 1,000,	10,610, 1,737,	20,466, — 6,421,	2,974, — 1,420,	96,087, 21,730,

Since my return from overseas the food position in Britain has worsened, particularly in relation to meat, although with the resumption of trade with the Argentine the position may now rapidly improve.

Rising populations in most world countries, the rising standard of living, together with the disconcerting and imbalanced population trend towards industries and services rather than towards the land are creating a food problem that might well be "the limiting factor in the increase and progress of humanity." New Zealand has a National and an International duty to produce food of animal origin. We just cannot ignore this as a responsibility to the peoples of the world and particularly to the peoples of Britain. The call is to produce more livestock.

#### **Grassland Development.**

I would now like to look at the position from another angle.

I have repeatedly said that the more animals we can adequately feed per acre the better do our grasslands become, and I add further, nutritive value in grassland is subject to its timely and effective pruning by livestock. Such need of pruning will to some extent depend on floristic composition and the soil fertility level. If we persist in low nutritive value grasses, or with low palatability plants, or with low soil fertility that toughens growth, then high nutritive value can be secured only by hard, close grazing in order to keep what growth there is reasonably young, reasonably palatable and reasonably nutritious.

**TABLE III.—Statistics of Agricultural Produce, produced in New Zealand and in Great Britain compared pre-war and 10 years later.**

tons.

	Meat	Milk and milk products	Fruit and vegetables	Total Crops other than Fodder
N.Z. (1938-39) .....	17,322,000 head slaughtered = 511,500 tons approximately	268,300	Orchards & M.G. 26,886 acres 260,000 tons (estimated)	391,000
G.B. (Av. 1936-37) ....	1,413,000	6,300,000 milk	2,700,000	8,745,000
N.Z. (Av. 1948-49) ....	18,827,000 head slaughtered = 556,200 tons	310,000 = 4,000,000 milk	Orchards & M.G. 30,621 acres 300,000 tons (estimated)	350,000
Difference .....	+ 1,505,000 head = + 44,700 tons	+ 41,700	+ 40,000	= 41,000
G.B. (Av. 1947-48) ....	844,000	7,614,000 milk	3,533,000	11,888,000
Difference .....	= 569,000	+ 1,314,000	+ 833,000	+ 3,143,000

**TABLE IV.—Volume and Value of Farm Produce: New Zealand and Great Britain compared.**

	Pre-war	Present Day	Aim 1952	Value	Edible foods
G.B. (home grown)	30% of requirement	40%	50%	£900,000,000	24,000,000 tons
Ratio .....	100	139	150	—	—
N.Z. Ratio .....	102 (1939-40)	117	Indefinite	£168,000,000	5,750,000 tons

**TABLE V.—Expansion Targets set by Great Britain for 1952-53 compared as Percentages with Pre-war (1936-39).**

FOOD .....	Milk	Beef, Veal	Mutton, Lamb	Pigmeats	Wheat	Barley	Potatoes	Sugar Beet
%AGE .....	126		83	92	160	279	129	131

**TABLE VI.—Figures Indicative of Opportunity for New Zealand to Increase Produce for Sale to Great Britain.**

G.B.	Calories	Proteins	Fats	Meat	Bacon Ham	Eggs	Bread	Sugar	Liquid Milk	Potatoes
Home grown	39		34	52	46	75	30	30	100	.100
Imported	61	47	66	48	54	25	70	70	Nil	Nil

**Present British Ration**

Food .....	Butter	Margarine	Cooking	Cheese	Carcase, Meat	Bacon, Ham	Sugar	Tea
Ration .....	4oz.	4oz.	2oz.	2oz.	8d per week*	4oz.	10oz.	2oz.

\* prospects for increase in the near future.

The better grown sward, the higher clover content swards and the more palatable swards may be utilised to advantage at a somewhat more mature condition, but these must be under reasonable grazing control. In other words, if we are to get full value out of our grasslands the call is to produce more livestock.

At Te Awa where we have the country under ideal grazing control and by insisting on full utilisation of all feed produced, even without any topdressing or oversowing, we have increased the carrying capacity by 1 ewe per acre. By oversowing and topdressing and still further by full utilisation through grazing control, we have increased the carrying capacity by two ewes per acre. At "Grasslands" under high soil fertility build up and maintenance, with high quality grasses and clovers, rotate grazed, and spelled to give maximum production, we have doubled the normal carrying capacity of that country. There are many individual farmers who can claim without boast to have accomplished the same improvement.

There are movements abroad to-day, encouraged to some extent by good prices; the plough-up and resow policy is gaining momentum; the use of crops for summer feed; the use of special purpose pastures for winter and summer feed, not only to increase total production but to spread that production more equably over the year and to replace wasteful conservation of feed: Scrub cutting on hill country; oversowing of hill country with clovers; topdressing of more hill country, and in this regard the aerial distribution of seed and fertilisers would appear to have come to stay, provided the supply of materials is maintained and improved.

These movements produce more feed on the lowlands and on the hills. If that feed is to be utilised and not wasted the call is to produce more livestock in the near future.

One has only to see the spectacle of the East Coast during the present season to realise the waste and the mess to the country understocking brings about. Without utilisation, the feeding quality rapidly deteriorates and young stock particularly suffer unthrift.

Sears of recent years at "Grasslands" has been studying pasture establishment, more particularly with regard to our newer special purpose pastures that are now being taken up widely by the farming community. He has shown conclusively that these pastures must be grazed upon and well utilised in the first six months at least to ensure establishment of the vital clover content of these swards, and in the summer, experience is showing that the clovers must be reasonably controlled or else the grasses suffer by smother. If these pastures are to expand in popularity and use, then again the call is to produce more livestock adequately to establish them and fully exploit them. Suckling's work on clover establishment on the hills points in the same direction: it is a slow process to establish clovers on a tufted, matted sward of inferior grasses, or in grassland that gets away rank in the spring. The fully utilised grazed sward, well cleaned up in the bottom would appear to provide the most favourable conditions for the establishment of oversown clovers.

This hill country movement of clean-up, oversowing clovers and topdressing is going to make high demands on live-stock numbers, both cattle and sheep. To-day one is hesitant to proceed with grassland improvement until we see an adequate build-up of stock numbers to consume that feed at a stage most nutritive to that live-stock.

We can get along by wasting feed, either by letting it get away out of hand in situ or by turning larger quantities of it into hay and silage, but more and more I feel our grassland progress is linked up with more eating of grassland at a more appropriate time in its qualitative cycle.

As far as the soil fertility cycle is concerned, livestock and their residues is really the key. His Excellency, S. L. Mansholt, Minister of Agriculture and Fisheries for the Netherlands, in his address to the 5th International Grassland Congress in 1949 said: (4)

"As yields or arable land improve, needs in regard to organic manure increase. Stable manure was important as it sustained the humus content of the soil. Large quantities of stable manure were available only if much livestock were kept, and much live-stock can be fed only if the grasslands are producing high yields. It stands to reason that an abundant production of farmyard manure by a large number of live-stock, to be fed on the produce of an extensive area of good quality grassland would remain of the utmost importance in their country."

Not only is farmyard manure highly essential for the upkeep of the fertility of the arable land; but also the continued growth and well-being of our grassland is dependent upon the amount of "farmyard manure" dropped by the animal in the course of its grazing, and upon its fair and even redistribution over the grazed sward. More and more "farmyard manure" can be dropped only if we have more live-stock adequately fed on the farm.

The response to any call for more livestock is a live-stock man's function. It is a function of this Society of Animal Production: it is a function of the breeder: the store stock raiser: it is a function of the dairy industry with its crop of unwanted calves; it is a function of the animal ecologist to study whether we are using the best breeds on the respective types of country: it is a function of the animal physiologist to see whether fecundity and the oestrus cycle cannot be modified to allow more frequent crops of livestock, particularly sheep.

In an argument with the Ministry of Food, London, I broached the question of heavier weight lambs to give more meat. A paragraph from their reply reads:

"Opinion, as you know, is divided as to whether by keeping lambs till they are heavier more meat is obtained, because if lambs are killed at an early date room is made for more."

The question that I put to you is: Can room be made for more and can we fill that room in the yearly cycle of animal production?

We could, of course, build up our animal population by depriving Britain of meat, and for various reasons that is actually what is happening at the present time.

"Export meat killings for the period October 1st, 1950, to March 17th, 1951, show a decrease of 63,901 tons over the corresponding period for last season, states the Meat Producers' Board."

"Killings of sheep and lambs are down by approximately 2,500,000 carcasses, quarter beef by over 100,000 quarters and pig meat by 50,000 carcasses. Meat in store is 91,247 tons compared with 135,703 tons on the same date last year."

This latter figure would indicate that stoppage of slaughter as a result of the present strike had influenced the position somewhat, but the excellent feed position and the high price of wool are probably together the main reason for the decreased killings. This but serves to show that there is already in our improved pasture feed supply, room for more stock and that position could be bettered enormously by an acceleration of the present trend to break up more old grass, to sow the more productive, more palatable and wider seasonal growth pastures for which improved strains are now available. Oversowing of clovers

and their successful establishment by topdressing and good grazing management: the adoption of a compounded fertiliser that will give better results than straight super and will make the limited super-phosphate supplies go further and will ensure more efficient exploitation of what phosphate is applied. Clearing of scrub, development of marginal land, bulldozing of tracks to give better access to hill country. All these are influencing the stock-feed supply. All trends are indicative for the call to produce more stock.

We would all like to see that increase take place without decreasing the total export of live-stock products to Britain. That means of course a fuller exploitation of the breeding potential of the country and a maximum development of intensive grassland production, both on the lowlands and on the hills to ensure all stock are adequately fed.

### **The Dangers of Overstocking.**

In any full utilisation system of grassland farming there will always be risks. More cropping and the special purpose pasture will reduce those risks on the lowlands; some systematic spelling, together with topdressing and the incorporation of more clovers into the hills, and the more efficient development and use of the shady country of the hills will ensure greater safety on the hills under a system of full grazing utilisation. Perhaps one of the worst snags of the highly developed and fully graze-utilised farms is facial eczema, but here again the special purpose pasture with its high autumn clover content and the ability to spell these without undue loss of palatability and nutritive value may reduce considerably the risk of facial eczema used in conjunction with a system of restricted intake of the well grazed sward during that period when the really close grazed pastures may be dangerous.

On the hill country an over-full and continuous grazing system, whilst keeping palatable and nutritious what grass is there, does tend to encourage the income and spread of rubbish growths, such as bid-a-bid, hard fern, manuka, tauhinu, rushes, moss and a host of flat weeds and mat weeds.

A full grazing utilisation of hill country grassland may have its dangers relative to soil conservation insofar as the run-off is expedited and the gullies may not withstand the accelerated rush of water. It is still a moot point here, however, whether the carrying capacity of the country should be prejudiced through long spelling and withdrawal from normal stocking, or whether the engineer cannot strengthen the gullies and temporarily impound waters by water-retarding dams among the hills to take or reduce the accelerated flow of water from the well grazed catchments. Obviously in all these things an eye must be kept to land deterioration, whether it is in the nature of increasing weeds, secondary growth or accelerated soil movement from the hills or weakening of the gully floor. The great principle that I really want to enunciate is a better turf, a better ground cover and a full grazing utilisation to ensure that what feed is eaten is in a palatable and nutritious condition. Obviously, too, in such a programme adequate fencing to control stock to regulate grazing is imperative.

### **What of Our Programme to Boost Production?**

From discussions I had in Britain with the Ministry of Food, and in view of long-term contracts to encourage development in New Zealand, Britain is obviously disappointed with the actualities of accomplishment compared with the potentialities for development in New Zealand, and it is my considered opinion that Britain is justified

in that criticism. In the words of Dr. Norman Wright, of the Ministry of Food, after his return to Britain from a food-production sponsoring visit to New Zealand:

"There seemed to me to be a complete lack of any real productive drive or any effort to place the increased output target fairly and squarely before all producers."

Those are hard words.

Sir Thomas MacKenzie, Minister of Agriculture and Commerce, in 1910 made this statement:

"The great source of our wealth comes from the land. We depend now and must depend for many years to come on the products of the soil. Here is the warrant for the closest relations between Agriculture and the State. It is on the success and development of the Agricultural and Pastoral industry that our prosperity is based."

Those words ring true to-day. It is the duty of the State to see that Agriculture in New Zealand lacks nothing for its full and efficient development.

#### Reference to Literature.

- (1) Neveling, C.H. (1949), *Farming in South Africa*, 24, 39.
- (2) Phillips, R. W. (1949), "Grasslands and the World Food" Report Fifth International Grassland Congress, Netherlands.
- (3) Ingalls, J. J., "A Eulogy on the Merits of Grass," *Kansas Magazine*, 1872.
- (4) Mansholt, His Excellency S. L. (1949), "Inaugural Address" Report Fifth International Grassland Congress, Netherlands.

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## Discussion

Mr SMALLFIELD: Are there any means of increasing production besides coercion or by providing a price incentive?

Mr. LEVY: In Britain agriculture as a way of life is approaching equality in reward comparable with mechanical industry and there is a price incentive and a big-business incentive to attract capital and some of the best brains to encourage production. The State is right behind British Agriculture but there is also a certain amount of direction and coercion. There are subsidies such as on the rearing of cattle and on marginal land development. Local Agricultural Committees are functioning and these committees do much to aid planning and development in close collaboration with the excellent National Agricultural Advisory Service in Britain, to carry out the target projects of the Ministry of Agriculture and the Ministry of Food. Where land is being inefficiently farmed the farmer and his land may be placed under supervision of the local Committee for a few years and if there is no response by the owner he may, on the recommendation of the Committee, be put off the land. These local Agriculture Committees, composed of leading local farmers, backed by the State in material aid or subsidies, would in my opinion do much to clean up land and to improve production in New Zealand, but in this development the industry itself must, I feel, submit to some form of direction, which through its Agricultural Committees it largely administers itself, i.e., the industry itself imposes its own disciplines.

Dr. FILMER: I feel that Mr. Levy has not given enough credit to the New Zealand farmer. In Britain there has been a great increase but the production is still low. At the Hannah Research Institute, where they grew all their own feed, the production per acre was less than 200 gallons. From Ayrshire cows this would represent 70-80lb. fat per acre, which is well below the New Zealand average. Even allowing for climatic differences it does not compare with the figure 250lb. fat per acre at Ruakura. The fact that 30% more production has been achieved at Ruakura by the addition of a small ration of concentrate indicates that there is still room for improvement in pasture as a feed for dairy cows. In sheep also, wool production falls far short of capacity on pasture.

Mr. LEVY: The area of pasture in Great Britain and New Zealand are roughly similar, but Britain has more ploughable country. Taking climate into account our really well farmed land acre for acre is more productive than the best land in Britain and this applies both to the lowlands and to the hills. In Britain pastures grow six to seven months of the year at most, and the making of enormous quantities of hay and/or silage involves serious losses of nutrients. Similarly, where self-sufficiency in the farm, as The Hannah is aimed at, much land is used for root and forage crops and for the production of grain concentrates for winter and grass-supplementary feeding. When these practices are compared with our all-grass, nearly all the year round growth, it is little wonder we can show a higher per acre production and higher per man production. Nevertheless our total production of food compared with Britain's production of food, as shown by the statistical position in my paper, is poor, and I feel we are not making as good use of the climatic fortune and growing facilities we have to produce as they are of theirs in Britain.

One of the lessons impressed upon me in Britain and in the Netherlands was the point Dr. Filmer raises regarding concentrate feeding to supplement and balance up high protein grass. It is not so much a case of growing more nutritious grass or of attempting to grow a pasture sward that is equivalent to good high protein pasture plus low protein—carbohydrate food to balance that growth. For the high milk producing animal a concentrated balanced milk producing feed less bulky than even the best all-grass ration is indicated and this course was impressed upon me by several high per cow and high per herd people in Britain.