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Articles in the field of agricultural economics, suitable for publication in the journal, will be welcomed.

Articles should have a maximum length of 10 folio pages (including tables, graphs, etc.), typed in double spacing. Contributions, in the language preferred by the writer, should be submitted in triplicate to the Editor, c.o. Department of Agricultural Economics and Marketing, Pretoria, and should reach him at least one month prior to date of publication.

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Contents

Some important trends in Beef Production in South Africa

by

S.P. VAN WYK,
Assistant Chief, Division of Agricultural Economic Research

The cattle population of South Africa has changed little since the end of the Second World War. In 1945/46 there were 12.6 million head of cattle. According to the 1962/63 Census, there were still 12.6 million head of cattle owned by White and non-White farmers. During the early fifties this number dropped by more than a million as draught-oxen were replaced by mechanical traction. The protracted droughts during recent years, and the increase in the number of cattle slaughtered, will undoubtedly reduce the number of cattle still further. No data are available, but it is estimated that by the end of 1966 the cattle population will very probably number less than 12 million.

Leaders in agriculture have on several occasions expressed their concern about the present numerical strength of the cattle strength of the cattle population. They point out that the number of cattle has shown no increase after two decades. The demand for beef continues to rise, however, as the population and its buying power increase. Why is vigorous growth lacking in the cattle industry? Will the country have an adequate supply of beef to meet the needs of its growing population? These questions have elicited many pessimistic views and much criticism of the cattle industry. The answer, however, must be found in the basic facts of beef production from our local herds. In this article, some important trends within the beef industry are analysed and shown in their true perspective.

CHANGES IN CATTLE POPULATION AND THE COMPOSITION OF THE CATTLE INDUSTRY

An analysis of the cattle industry indicates that it entered an entirely new phase in the history of its development during the post-war period. Traditionally, the production of dairy products, beef and draught-oxen were the most important "tasks" of the cattle industry. With the rapid mechanisation of tractive power during the late forties, draught-oxen rapidly disappeared; and by 1949/50 the process was well advanced.

Between 1945/46 and 1949/50 the cattle population decreased from 12.6 to 11.5 million - a drop of over a million in four years. In 1949/50 a low point was reached, which must undoubtedly be attributed to the elimination of draught-oxen. The number of tractors, for instance, rose from 20,292 in 1945/46 to 48,423 in 1949/50. The sale of the draught-oxen naturally provided a great part of the capital for the purchase of tractors.

It therefore follows logically that the South African cattle industry entered a new phase of its development after the considerable reduction in the cattle population during the late forties. It is for this reason that the year 1949/50 must be taken as a basis for an analysis of the trends in the numerical strength and composition of our cattle population.

From 1949/50 up to and including 1961/62 (the most recent available census reflecting the composition of the cattle population) great changes have occurred in the cattle herds. The number of cattle has increased from 11,513,000 in 1949/50 to 12,550,000 in 1961/62 - an increase of 9 per cent. The percentage of cows kept mainly for meat production on White farms increased from 35.4 per cent to 44.5

TABLE 1 - Composition of cattle population on White farms, number of cattle owned by Whites and non-Whites, and total cattle population, 1949/50 to 1960/61

	1949/50		1954/55		1958/59		1961/62	
	Number	%	Number	%	Number	%	Number	%
	1,000		1,000		1,000		1,000	
Cows	2,237	33.5	2,527	36.5	3,534	49.0	3,472	46.1
Heifers over 2 years	770	11.3	814	11.7				
Heifers 1-2 years	636	9.4	711	10.3	868	12.0	1,146	15.2
Total female animals	3,679	54.2	4,052	58.5	4,402	61.0	4,619	61.3
Calves	910	13.4	1,019	14.7	1,130	15.7	1,343	17.8
Bulls	153	2.2	136	2.0	185	2.6	135	1.8
Oxen	2,050	30.2	1,722	24.8	1,496	20.7	1,438	19.1
Total number owned by Whites	6,792	100.0	6,929	100.0	7,213	100.0	7,535	100.0
Cattle owned by Bantu	4,721	-	4,751	-	5,114	-	5,015	-
Total all cattle	11,513	-	11,670	-	12,327	-	12,550	-
Percentage cattle owned by Whites	-	59.0	-	59.4	-	58.5	-	60.0

per cent during this period. Beef cattle therefore increased in importance in spite of the fact that the breeding of draught-oxen had become less important.

Table 1 reflects the changes within the cattle industry on White farms from 1949/50 to 1961/62.

(a) The composition of the cattle population has changed considerably. The percentage of female animals in the herds has risen from 54.2 to 61.3 per cent. A striking feature is the rise in the percentage of heifers 1-2 years old, from 9.4 to 15.2 per cent. The percentage of calves rose from 13.8 to 17.8 per cent. As against this, the percentage of oxen dropped from 30.2 to 19.1 per cent.

(b) The number of cows and heifers over two years old rose by 14.1 per cent over the period of twelve years, that is, by 1.2 per cent per annum.

(c) The number of heifers aged between 1 and 2 years rose by 80.2 per cent during the same period, that is, an increase of 6.7 per cent per annum. This is a very considerable increase and, of course, a highly promising development, since the production potential of the herds is affected very significantly by an increase in the percentage of female animals.

(d) The number of female animals rose by 25.6 per cent between 1949/50 and 1961/62, that is, an increase of 2.1 per cent per annum.

(e) The number of calves increased by 47.6 per cent, or almost 4 per cent per annum. This increase is also a very encouraging phenomenon, as it is indicative of a higher calving percentage and consequently higher production.

(f) The number of calves per 100 cows and heifers over two years old rose from 29.9 to 38.7 over the 12-year period. This represents an increase of 29.4 per cent, or 2.4 per cent per annum. The number of calves per 100 female animals older than one year

increased by 18 per cent, or 1.5 per cent per annum. This promising increase in the births per 100 female animals not only exceeds expectations, but also gives an indication of the progress made in regard to beef production. Moreover, this higher rate of calving occurred during a period when the number of dairy cattle (which usually have a higher calving percentage) decreased and the number of beef cattle increased fairly rapidly.

(g) The drop in the number of oxen on farms owned by Whites during the period under review was 29.8 per cent, or 2.5 per cent per annum. The unproductive animals (in terms of beef production) have, therefore, been replaced by female animals and calves to such an extent that an increase of 9.1 per cent in the total number of cattle was obtained during the period of twelve years, even after the total number of oxen had decreased by approximately 30 per cent.

These changes in the composition of the cattle population are an indication of the vigour of the industry and contradict the pessimism of those who attempt to use the number of cattle as a measure of efficiency. These trends in the cattle industry are illustrated in graph 1. Although the number of cattle increased by only 9 per cent during the period 1949/50 to 1961/62, the number of female cattle rose by 26 per cent; the number of heifers 1-2 years old by 180 per cent; the number of calves by 48 per cent; and the number of calves per 100 female animals older than two years, by 29 per cent. As against this, the number of oxen decreased by 30 per cent.

TRENDS IN THE PRODUCTION AND CONSUMPTION OF BEEF

The question now arises what affects these changes in the number of cattle, the composition of the herds and calving percentages have had on the production and consumption of beef. Tables 2 and 3 give details of some important trends affecting the cattle industry. During the post-war period the population of South Africa increased appreciably faster than the total number of cattle. In 1948/49 it so happened that there were approximately as many people as cattle; but by 1963 the number of people exceeded that of cattle by nearly 38 per cent.

The total beef production of the Republic, taking the years 1947/48 to 1949/50 as basis, had increased by 28 per cent by 1964/65. During this period the total number of cattle increased by only about 9 per cent. A great part of the increased meat production must therefore be attributed to greater efficiency. The higher efficiency can be measured by two criteria, namely rate of turnover and slaughtered-weight production per head of cattle.

The rate of turnover for cattle, that is, the percentage of cattle and calves slaughtered annually, rose from 11.6 per cent in the basic years (1947/48 to 1949/50) to 14.9 per cent in 1963/64 and to 16.7 per cent in 1964/65. This represents an increase of 44 per cent in the rate of turnover for the two years respectively. The rate of turnover rose from 14.9 to 16.7 per cent between 1963/64 and 1964/65. This considerable increase in one year may be attribtued largely to the prevailing drought conditions and the high prices obtained for beef.

The slaughtered-weight production per head of cattle increased from 74.8 pounds in the period 1948/49 to 1950/51 to 86.9 pounds in 1963/64 - an increase of 16 per cent.

The per capita consumption of beef and veal declined from 79.0 pounds during the period 1947/48 to 1949/50 to 67.7 pounds in 1964/65 - a drop of 15 per cent. The price of beef rose by 170 per cent during this period, while the price of summer cereals rose by 37 per cent, and the retail price index by 64 per cent. The higher prices obtained for beef, and the higher production thereof, led to an increase of 221 per cent in the gross value of beef production.

Graph 1 – Trends in the cattle population of South Africa, 1949/50 to 1961/62

Item	49/50	54/55	58/59	61/62
1. Female animals	100	110	120	126
2. Heifers 1–2 years	100	112	136	180
3. Calves	100	112	124	148
4. Oxen	100	84	73	70
5. Calves per 100 female cattle over 2 years	100	102	107	129
6. All cattle	100	102	107	109

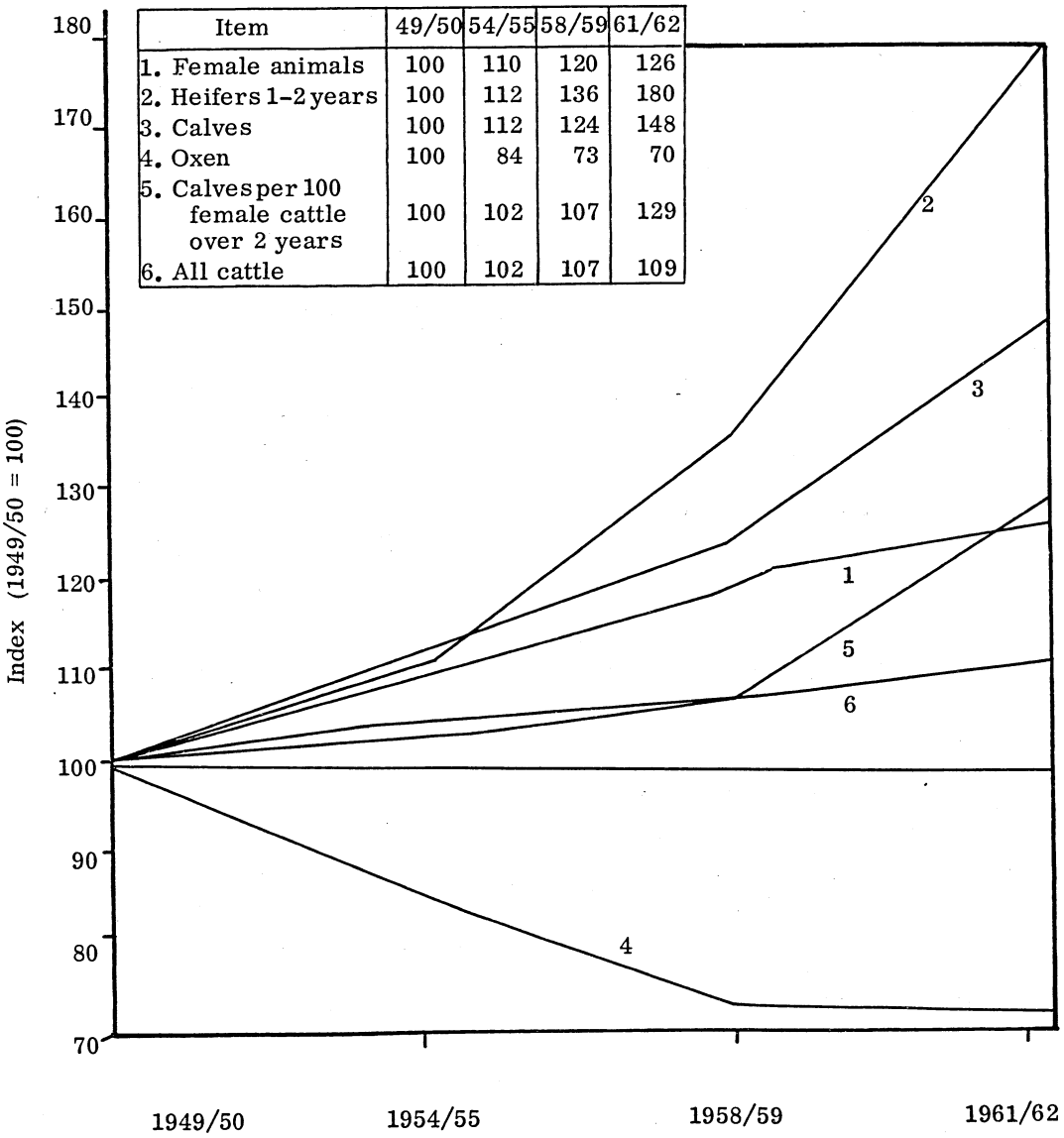

TABLE 2 - Some important aspects of beef production in South Africa, 1947/48 to 1964/65

Year	Number of cattle	Population	Total beef and veal production	Rate of turnover*	Slaughtered weight production per head of cattle 1)	Consumption of beef and veal per capita	Gross value of beef production
	1,000		million lb	%	lb	lb	R1,000
1947/48		11,826	932.0)		-	77.3	34,941
1948/49	12,242	12,084	1,059.1)	11.6	70.0	78.0	37,851
1949/50	11,513	12,335	1,021.7)		79.4	81.8	42,205
1950/51	11,565	12,587	967.3	12.1	75.0	76.1	47,190
1951/52	11,768	12,878	959.5	11.7	72.4	72.2	55,734
1952/53	11,655	13,208	971.2	12.0	74.0	73.5	59,233
1953/54	11,604	13,547	999.6	12.9	77.7	74.1	61,312
1954/55	11,689	13,892	928.8	11.8	70.1	66.4	56,553
1955/56	11,800	14,244	971.7	12.3	72.6	67.0	62,418
1956/57	12,042	14,609	1,064.4	12.8	76.8	73.1	73,980
1957/58	12,062	14,973	1,059.3	12.9	75.8	70.6	76,804
1958/59	12,327	15,353	1,109.1	12.5	73.8	71.4	76,553
1959/60	12,295	15,742	1,092.6	13.4	76.7	69.0	80,081
1960/61	12,527	16,118	1,132.0	13.7	78.7	69.6	82,293
1961/62	12,550	16,481	1,138.7	14.5	82.7	68.4	87,247**
1962/63	12,558	16,861	1,146.1	14.8	81.9	68.3	90,635**
1963/64	-	17,266	1,267.0	14.9	86.9	72.9	94,762**
1964/65	-	-	1,207.9	16.7	-	67.7	122,888**

* Rate of turnover is the percentage of cattle slaughtered annually.

** Subject to change.

1) Slaughtered-weight production per head of cattle is calculated by dividing the total beef and veal production of the Republic by the total number of cattle.

During the post-war period the production of beef and veal therefore increased considerably as a result of a small increase in the total number of cattle, an accelerated rate of turnover and the production of more beef per animal (higher slaughtered-weight production per animal). More beef was imported from adjoining territories, however, and the percentage of beef produced in the Republic remained virtually constant. From 1947/48 the buying power of the population increased considerably. The final result of this, of course, was a sharp increase in the demand for meat and the supply of beef did not keep up with the demand. A sharp increase in beef prices was inevitable. Beef production is a long-term project, and the supply is comparatively inelastic. It is possible that beef prices will rise still further during the next few years, particularly after the drought which has stricken the cattle grazing regions in particular during recent years.

The cattle industry, particularly as regards beef production, has received a strong price stimulus during recent years - far greater than that of summer cereals, for instance. Cattle farmers responded more strongly to this stimulus than most people had expected. They also responded very wisely - instead of increasing the number of cattle on the already over-grazed veld, they changed the

thereby increasing their production potential. Actual production was also increased considerably by marketing at a younger age, raising calving percentages, and keeping more female animals in the place of unproductive draught-oxen or other oxen destined for marketing only at a comparatively advanced age.

EXPECTED TRENDS IN BEEF PRODUCTION

The population of South Africa is growing more rapidly than its beef production. The buying power of this larger population is constantly increasing and the demand for beef promises to grow consistently. The production of beef will necessarily have to undergo major adjustments in order to meet the increased demand. Beef production is a long-term project and will necessarily react comparatively slowly. For this reason the price of beef may be expected to show a steadily rising trend. The catastrophic drought, with its inevitable thinning out of herds and the retarding effects on production will affect supplies and cause a further upward trend in prices.

These likely price increases necessitate further urgent adjustments in the production practices of cattle farmers. The possibilities of horizontal expansion on the pastures of the Republic are very limited. It will be necessary to produce more beef by following more intensive production systems and by producing more beef from the same cattle by making use of improved production practices and

TABLE 3 - Trends in the cattle industry of South Africa, 1947/48 to 1961/62

Year	Population 1)	Number of cattle 2)	Total beef[1)] production	Rate of turnover 1)	Slaughtered weight production per head of cattle[3)]	Consumption of beef per capita[1)]	Beef prices 1)	Prices of summer cereals 1)	Retail price index 1)	Gross value of beef production[1)]
1947/48	98	-	93	-	-	98	98	97.0	95	91
1948/49	100	106	100	-	94	98	99	99.1	101	99
1949/50	102	100	107	-	106	103	103	103.9	104	110
1950/51	104	100	101	104	100	96	116	117.2	110	123
1951/52	107	102	99	103	97	91	144	131.8	118	145
1952/53	109	101	101	103	99	93	153	138.5	126	154
1953/54	112	101	105	111	104	93	152	142.1	130	160
1954/55	115	102	96	102	94	84	157	139.4	133	148
1955/56	118	102	100	106	97	84	171	137.0	136	163
1956/57	121	105	108	110	103	92	189	133.2	139	193
1957/58	124	105	107	111	101	89	201	129.4	144	200
1958/59	127	107	106	108	99	90	196	128.1	148	200
1959/60	130	107	110	116	103	87	200	133.4	149	209
1960/61	133	109	115	118	105	88	200	138.7	151	215
1961/62	137	109	121	125	111	86	198	134.1	154	228
1962/63	140	109	120	128	110	86	209	127.2	156	236
1963/64	143	-	128	128	116	92	211	130.7	158	247
1964/65	-	-	128	144	-	85	170	136.6	164	321

1) 1947/48 to 1949/50=100 2) 1949/50=100 3) 1948/49 to 1950/51=100

larger investments. Apart from better herd management, special attention will have to be given to a considerable increase in the feeding of beef cattle. This will not only involve higher costs, but will also place beef cattle in greater competition with other branches of stock farming and particularly with cash crops. At the present price level it is difficult for beef cattle to compete with other branches of stock-farming or with cash crops. Beef herds can, however, to a large extent be integrated to supplement other branches of farming, even in the form of more intensive systems of production. For this reason, beef cattle will have to be integrated carefully with the potential of the farm and with competitive branches of farming. In addition to intensification with existing herds, the intensive fattening of young cattle may be considered. It is doubtful, however, whether it will be possible to apply the large-scale fattening of beef cattle, as already practised in the United States of America, on a large scale in South Africa until such time as price ratios between meat and maize have changed considerably. Maize, or other crops cultivated in competition with maize as substitutes for it, form the basis for the fattening of cattle. In 1964/65 the producer's price per pound of maize (excluding the bag) in the United States of America was 1.478 cents (S.A.) and in the Republic of South Africa 1.5 cents (S.A.) per pound. The price of beef of comparable quality ("Good" in the United States of America, "Super" in South Africa) in 1964/65 was R30.19 and R18.82 per 100 pounds slaughtered weight respectively. The ratio between the prices of beef and maize was therefore 1:20.4 in the United States of America and 1:12.6 in South Africa.

The feeding of beef cattle is an undertaking fraught with great risk in the United States of America - even at the existing prices, which are more than 50 per cent higher than the beef prices prevailing in South Africa. For this reason it is expected that the fattening of young cattle economically on a large scale will depend on a considerable change in price relationships.

In the fattening of cattle a profit can be obtained from the "feed margin" (difference between feeding costs and value per pound of weight gained), from the "price margin" (the difference between purchase and sale price per 100 pounds) and from the higher dressing percentage of the fattened animal. As a result of the prevailing price relationships, there is little chance of making a profit from the feed margin. The price margin holds far greater promise at the present time, particularly if the farmer is sufficiently experienced to buy and sell advantageously. Older oxen offer greater opportunities for a profit on the price margin, since a greater part of the selling weight is purchased.

A trend of rising beef prices, intensification of production systems within the existing herds and consequently improved possibilities for intensive fattening are therefore foreseen. The wise cattle farmer will not devote his attention to fattening in the first place. He will plan the composition of his herd with a view to being able to take suitable advantage of the more favourable price levels, feeding, calving percentages, breeding, performance tests and accelerated turnover will receive initial priority. As prices become more favourable, he will then have the necessary store cattle of good quality available.

Price relationships may change more rapidly than is generally expected. Apart from the possible increase in beef prices, a drop in maize prices could accelerate more favourable price relationships. The latest maize price has brought about a still more unfavourable price relationship between beef and maize. The question, however, is how this price relationship will stand after a few seasons of "normal" or "good" harvests.

A furhter development to be expected is the wider use of substitutes for beef as the latter becomes more expensive. South Africans like mutton, and mutton prices have increased to a lesser extent during the post-war years than those of

beef. Poultry, produced at high levels of efficiency, is already being consumed in large quantities. The price of poultry is highly competitive with that of beef, and more favourable price ratios (either as a result of higher meat prices or lower maize prices) will favour the competitive position of poultry at least to the same extent as that of other types of meat. The increasing consumption of other substitutes such as pork, fish and other protein foods will, of course, follow as a natural result of increased beef prices.

A final important matter closely affecting the profitability of beef production, is the capitalisation of the industry. Beef production is a capital-intensive enterprise - it requires a great deal of capital and has a slow turnover. As regards interest on capital, an American writer has provided us with a succinct summary of the position: "Ranch ownership and operations is a most satisfying and worthwhile experience for many people. A 7 per cent return can be guaranteed. That is a 2 per cent return in cash and 5 per cent in fun. So a primary consideration is whether the recipient can afford or does receive a full 5 per cent in fun and satisfaction from a ranch investment."

A clearly discernible trend towards over-capitalisation in land investment is one of the most disturbing tendencies of the post-war period. In the cattle-grazing regions, the investment in land per large-stock unit(1 is anything from R120 to R170 per L.S.U. Add to this R50 to R60 for each head of cattle, and R10 per L.S.U. for the investment in vehicles, implements and facilities, and an investment of R180 to R240 per L.S.U. is obtained. Under normal conditions and at prevailing price levels, a net income of R8 to R12 per L.S.U. may be expected (net income = gross income less all costs except interest). On these investments a net farming income of barely 5 per cent may be expected - without making any allowance for the entrepeneur's remuneration.

Irrational capitalisation of land in cattle-grazing regions has already overtaken the higher return obtained by greater efficiency and the considerable increases in prices. Land values, particularly in the warmer cattle-grazing regions, are out of proportion to their potential. Quite apart from the fact that unduly high land prices and the high commitments associated with them promote malpractices such as over-grazing, they can have an adverse effect on the cattle industry and weaken its competitive position. This tendency towards over-capitalisation in the beef industry is a matter for grave concern and may seriously retard beef production.

As regards demand, the future of the cattle farmer seems promising. His product is the "king of the meats" in most countries of the world. As regards supplies, the stage has been reached where the resources for beef production are being utilized to very nearly their full capacity, with the result that further expansion must occur in greater competition with other agricultural industries. A complex of economic factors arise when more intensive beef production is contemplated. The degree and rate of intensification will be determined by the interaction of these economic factors and the physical production potential of beef as against other products. Rational planning and effective integration of the available knowledge and technological aids is therefore essential to ensure the success of beef production.

SUMMARY

The cattle industry of the Republic has undergone considerable changes during the post-war period. Basic changes in the composition of herds has increased considerably their production potential.

1) 1 L.S.U. (large-stock unit)
= 1 adult head of cattle over 2 years old
= 2 heifers or tollies 1-2 years
= 3 calves
= 6 sheep.

Accelerated turnovers and yields per cattle unit have resulted in a considerable increase in beef production. This increase, however, has been appreciably less than the increase in population. With the larger population, whose buying power is constantly increasing, a far greater demand for all kinds of meat has been created. Supplies of beef have not kept up with the increased demand, and prices have risen sharply. Per capita consumption of beef has declined by 15 per cent during the post-war period.

With a rapidly growing population and a sound economy, an increase in the demand for meat may be expected. Beef production is a long-term project, and supplies are comparatively inelastic. The price of beef may therefore show a tendency to rise steadily. As beef prices rise, stronger competition is to be expected from substitutes such as poultry, mutton, pork and fish.

Increased beef production will depend to an increasing extent on more intensive feeding. This places cattle (particularly beef cattle) in direct competition with other types of farming. At the present price ratios, beef cattle will find it hard to compete. But higher meat prices and cheaper feed could bring about a rapid change in price ratios.

There is a strong tendency towards over-capitalisation of cattle-grazing land. This tendency is a cause for grave concern, and may seriously retard the development of the cattle industry.

The future of beef production is rosy, provided that its expansion occurs within the framework of a rational combination of branches of farming and capitalisation.

DIVISION OF LABOUR

The farmer was formerly concerned with the weeds and weather. He is still concerned with these, but is now even more interested in the prices received for his products, and prices which he must pay for his purchases.

By specialization, each of us produces so much of something that each of us can have more of everything. The battery that keeps this modern machine running is the medium of exchange - money. When money is stable in value, the machine works well. When inflation occurs, it runs too fast. When deflation occurs, it stalls; sales stop; unemployment is common; and there is starvation in the midst of plenty.

- Gold and Prices. G.F. Warren and F.H. Pearson. 1935.