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THE SHORTAGE OF PROTEIN CONCENTRATES IN NEW SOUTH WALES.

by

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1. INTRODUCTION.

Over recent years Australian livestock producers have been worried by recurring shortages of protein concentrates. Hardest hit have been the poultry and pig industries, in which protein concentrates are widely fed as part of the animals' regular diet. The dairying industry has also been affected.

From the viewpoint of farm efficiency protein concentrates are important because the feeding of concentrates is necessary for efficient production under existing price relationships. From a national standpoint, these feedstuff shortages have been of serious import because the industries affected were those from which increased production has been urgently required, both to mitigate periodic shortages on the home markets and to meet the demands of the United Kingdom.

At the beginning of 1951 it was apparent that the supply position of protein concentrates was deteriorating. The Division of Marketing and Agricultural Economics thereupon began an investigation of the overall demand-supply situation. The present article represents the outcome of this investigation. The study is focussed largely on New South Wales. However, the shortage of concentrates is Commonwealth-wide, and many of the remarks which follow are as pertinent to the position in other States as to New South Wales.

2. DEMAND FOR PROTEIN CONCENTRATES.

No attempt has been made to formulate a quantitative estimate of the unsatisfied demand for protein concentrates at present prices. However, reports from producers and traders state that demand for these concentrates has increased considerably over the past decade, particularly in recent years. World prices for both protein concentrates and the commodities they help to produce (dairy produce, meat, eggs) have risen considerably over the past decade. However, the corresponding Australian farm prices have only partially reflected this world trend. This is the result of a variety of factors such as home-consumption prices, export and import controls, long-term contracts and direct and indirect local price control¹. Furthermore, whilst the Australian prices of both concentrates and concentrate products have failed to keep pace with world prices, concentrate prices have shown the greater inflexibility.

A study of the price movements of livestock products and the chief protein concentrates would probably reveal that the ratios of the former to the latter have increased in Australia over the past decade.

New South Wales farmers are paying much less than world parity for their concentrates. This is related to the fact that they are obtaining less than world parity for some of their products. High world prices for concentrates are also a result of the policy of the United Kingdom and certain other European countries in buying feeds irrespective of cost in order to maintain the output of their livestock industries. The United Kingdom, at least, has sold such feeds at subsidised prices and has paid local livestock producers in excess of world parity prices for their products. Imported peanut meal and linseed meal would cost Australian farmers more than three times the prices of the local product, whilst imported meat meal would cost more than twice the domestic price.

The increased demand for protein concentrates in New South Wales over the past decade is not primarily due to increasing numbers of livestock and poultry. Statistics on the relative amounts of concentrates fed to pigs, poultry and dairy cattle are not available. It is probable that the poultry industry absorbs more than half of New South Wales production of protein concentrates. Poultry numbers, as reported to the

¹ Meat meal is the only protein concentrate which is directly controlled. However, the prices of various prepared stock foods which utilize the other meals as ingredients are under price control. A separate price is fixed by the Prices Commissioner for each prepared food. It is probable that the existence of this control influences the price policy of meal producers not under direct control.

The prices of all meals are controlled in the sense that they are divorced from export parity. It is most unlikely that the Department of Commerce and Agriculture would grant an export permit to any producer who wished to take advantage of the high overseas prices.

Statistician, increased considerably between 1940 and 1945, but have since declined. However, this decline has probably been more than offset by the expansion of the cockerel-raising industry².

Pig numbers rose from 357,000 in 1938 to 561,000 in 1944 but fell to 333,000 in 1950. However, these figures disguise important changes in the distribution of pig population over that period. In 1938, 82 per cent. of the pigs in this State were in coastal dairying districts. This percentage fell to 60 in 1945 but rose again to 67 in 1950. These movements are significant from the viewpoint of demand for protein concentrates, because pigs outside coastal districts are fed on grain, which must be supplemented with protein to a greater degree than rations fed in dairying areas, where milk protein is available.

Cattle in registered dairies fell from 1,272,000 in 1943 to 1,168,000 in 1950. However, in the case of pig-raising and dairying, Departmental extension work has doubtlessly had considerable effect over the last decade in popularising the use of protein concentrates. Furthermore, demand for concentrates in these industries may have been increased as a result of the fall in supplies of milk protein available for stock feed³. The practice of raising calves by feeding concentrates rather than milk may also have increased demand for these feeding-stuffs. Statistics are not available to indicate the extent of this practice. However, it is believed that it has been spreading in the milk zone over recent years.

A rise in the price of meat meal, linseed meal and fish meal, besides resulting in a probable increase in the supply of these products, would also reduce demand for them, and, in that sense, reduce the shortage. There is little doubt that the amounts of protein concentrates demanded by dairy farmers at given prices falls well below the amount which would be demanded if all dairy farmers fed concentrates up to the point of maximum profits. Notwithstanding this fact, it would appear that concentrates are undervalued in Australia relative to livestock products. However, higher farm prices for protein concentrates might have the effect of reducing concentrate feeding even more than the rise in price would justify.

Demand for protein concentrates may vary to some extent with the availability of legumes as stock feed. Legumes form a supplement to protein concentrates and a partial substitute. However, such legumes are far from being a universal substitute.

The fact that average supplies of protein concentrates in New South Wales in the war years were at approximately the same level as in 1950-51, whilst there was not a shortage in those years comparable to that now being experienced, suggests that demand has increased considerably since then.

² These cockerels are hatched and killed within six months, so that an increase in the number of cockerels raised is not fully reflected in the annual livestock inventory.

³ Increased utilisation of whole milk in fresh form and in condensed and dried products over the past decade has reduced the amount of skim milk and butter milk available for stock.

3. SUPPLIES OF PROTEIN CONCENTRATES.

All of the protein concentrates used in Australia are by-products of various industries. Therefore, supplies of protein concentrates are dependent on supply and demand conditions for the major products of these industries.

Table I shows production of the most important protein concentrates in New South Wales and Australia, together with the corresponding figures for bran and pollard, which are used with grain and protein

TABLE I.
Production of Stock Feeds—New South Wales and Australia.
1937 to 1951.
NEW SOUTH WALES.

Year ended 30th June.	Chief Protein Concentrates.				Peanut Meal.	Cotton- seed Meal.	Bran and Pollard.
	Meat Meal, etc.	Coconut Meal.	Linseed Meal.	Total.			
	'000 tons.	'000 tons.	'000 tons.	'000 tons.	'000 tons.	'000 tons.	'000 Short tons.
Average 1937 to 1939 ...	<i>e</i>	8.4 <i>a</i>	16.5	<i>e</i>	<i>e</i>	...	208.9
Average 1940 to 1945 ...	9.6 <i>d</i>	8.2	16.9	34.6	4.3 <i>g</i>	...	207.9
1946 ...	15.6	4.9	23.3	43.8	3.5	...	184.5
1947 ...	16.9	4.1	8.9	29.8	<i>e</i>	...	222.6
1948 ...	18.1	6.9	4.7	29.8	0.8	...	217.2
1949 ...	19.8	11.4	7.8	39.0	<i>e</i>	...	269.3
1950 ...	19.9	9.8	13.6	43.3	<i>e</i>	...	231.5
1951 <i>i</i> ...	18.7	7.5	6.7 <i>h</i>	32.9	<i>e</i>	...	238.0

AUSTRALIA.							
Average 1937 to 1939 ...	2.5 <i>c</i>	8.4 <i>a</i>	20.4 <i>c</i>	31.3	1.7 <i>b</i>	2.2	539.4
Average 1940 to 1945 ...	15.4 <i>d</i>	8.2	22.6	46.2	3.4 <i>d</i>	1.9	516.8
1946 ...	25.5	4.9	29.8	60.2	4.2	0.3	493.9
1947 ...	30.3	4.1	12.5	46.9	1.1	0.1	603.9
1948 ...	29.8	6.9	6.4	43.1	1.5	0.1	634.4
1949 ...	32.5	11.4	11.6	55.5	1.6	0.2	673.6
1950 ...	<i>e</i>	9.8	15.2 <i>f</i>	<i>e</i>	<i>e</i>	0.1	575.6
1951 <i>i</i> ...	<i>e</i>	7.5	<i>e</i>	<i>e</i>	<i>e</i>	0.2	600.0

a Average of years 1938 and 1939 only.

b 1938 only.

c 1939 only.

d 1942 to 1945 only.

e Not available.

f Estimate only.

g 1945 only.

h Estimated quantity of linseed meal likely to be available to crushers from 1950-51 local production and imports of linseed. No allowance is made for stocks.

i Forecast.

Source: Commonwealth Bureau of Census and Statistics. Queensland Cotton Marketing Board.

meals in concentrate mixtures. The investigation has been hindered by the unsatisfactory nature of the statistics available on the vegetable oil industry. Where apparent contradictions still appear in statistics used in this article, it should be understood that attempts to reconcile conflicting figures have been made, but without success.

It will be seen from Table I that New South Wales production of the three most important protein concentrates increased considerably from 1946-47, when production was very low, to 1949-50. In 1949-50 production was higher than at any time during the previous decade, with the exception of 1945-46. Production in the latter year was abnormally high because of very large imports of linseed to meet postponed wartime demands for linseed oil.

A considerable decline has occurred since 1949-50 in the production of all three of the important concentrates. New South Wales production of these concentrates in 1950-51 is likely to be about 25 per cent. below the 1949-50 level, and production in 1949-50 was probably below the amount which could have been sold at the prices then existing. Furthermore, these concentrates are being produced at a lower rate now than at the beginning of 1950-51, and there are no signs that production will increase, at least in the immediate future. The production of bran and pollard, both in New South Wales and the Commonwealth as a whole, is at a high level relative to previous years.

Comment on Table I is incomplete without some reference to the fact that the protein content of the concentrates varies considerably. The abattoirs' by-products—meat meal, meat and bone meal, blood meal and liver meal, average over 50 per cent. crude protein. Coconut meal contains 20 per cent. crude protein and linseed meal 30 per cent. The total quantity of crude protein available for stock in these meals increased from a wartime average of 11,500 tons per annum to 16,000 tons in 1949-50, but is likely to fall to about 12,400 tons in 1950-51.

There is no significant trade between Australia and other countries in protein concentrates. Interstate trade is also fairly small, according to those producers interviewed. No statistics are available to verify this fact. However, freight rates on protein concentrates are high, relative to their value, and this would be a factor limiting interstate movements. It is possible, therefore, to discuss the New South Wales supply position purely in terms of New South Wales production figures.

Little is known about the supply position in other States. However, all of Australia's coconut meal and most of Australia's linseed meal is produced in New South Wales, so that the other States must depend largely on abattoir by-products. According to the Queensland Meat Industry Board, there is an acute shortage of protein concentrates in

that State. Furthermore, Western Australia has been dependent in the past on supplies from the eastern States, and a shortage may exist there, although whale meal supplies may be rectifying the position.

4. ABATTOIR BY-PRODUCTS.

Over recent years approximately one-half of the production of protein concentrates in New South Wales has taken the form of abattoir by-products. In order of importance, they consist of meat and bone meal (40 to 50 per cent. protein), meat meal (50 to 60 per cent. protein), blood meal (70 to 80 per cent. protein), and liver meal (60 to 70 per cent. protein).

In 1948-49, 60 per cent. of New South Wales production of these products consisted of meat and bone meal, and 30 per cent. was meat meal. Total production of these products has almost trebled over the past nine years. Of twenty known producers of these products in New South Wales, fifteen are abattoirs, and five are firms producing meat meal from meat refuse collected from butchers' shops.

All known producers have been contacted and on the basis of the information so far received, it is estimated that production of meat meal, etc., in New South Wales in 1950-51 will probably be in the vicinity of 1,200 tons (6 per cent.) less than in the previous year. All but one of the firms contacted indicated that the main cause of this decline in meal production is decreased livestock slaughterings.

The following reasons for decreased slaughterings in the post-war years were advanced:

- (1) High meat prices have caused farmers to retain stock to extend herds and flocks.
- (2) Wool prices have risen much higher than meat prices and this has induced wool-growers to retain sheep for their wool.
- (3) The rising wool market has induced wool-growers to transfer from cross-bred to merino sheep; as a result, there has been a reduction in the supply of fat lambs.
- (4) There has been a recovery in the total sheep population since the drought of 1945-46. This process of re-stocking, assisted as it has been by good seasonal conditions, has tended to reduce the number of sheep marketed.

One producer on the North Coast stated that his production was declining because a shortage of refrigerated railway trucks and power has limited his slaughterings. It is not thought that these factors are seriously limiting meal production in other country areas. However, several city producers who obtain meat refuse from butchers' shops complain that power shortages prevent the continuous running of their millers and cookers.

Abattoir production of meal is dependent, not primarily on total slaughterings, but on slaughterings in those abattoirs which process their offal. In the larger killing houses this offal is processed into meal, whilst the smaller killing houses convert their offal to organic fertilizer.

(a) New South Wales Slaughterings.

Table II gives details of slaughterings of those livestock which are the main source of meals in this State.

TABLE II.
Livestock Slaughterings in New South Wales, 1937 to 1950.

Year.	Sheep and Lambs.	Cattle.	Calves.	Pigs.
	'000	'000	'000	'000
Average 1936-37 to—				
1938-39 ^a ...	6,529	714	467	568
1939-40 ^a ...	6,887	681	441	542
1940-41 ^a ...	8,168	557	402	597
1941-42 ^a ...	8,129	619	422	738
1942 ...	9,296	640	379	669
1943 ...	9,476	646	348	503
1944 ...	9,410	608	396	444
1945 ...	8,018	566	389	495
1946 ...	7,235	681	435	468
1947 ...	6,361	690	376	411
1948 ...	5,910	718	386	459
1949 ...	6,932	769	385	500
1950 ^b ...	5,863	771	339	454

^a Year ended 31st March.

^b Subject to Revision.

Source : Bureau of Census and Statistics.

Slaughterings of cattle and calves in the first four months of 1951 were approximately 8 per cent. higher than in the same period of 1950. However, the corresponding figures for sheep and lambs showed a decline of 7 per cent. compared with last year.

The very large increase in meal production since 1943 has occurred during a period in which annual slaughterings of sheep and lambs have decreased by 3,600,000 (38 per cent). Slaughterings of calves and pigs have also fallen. Despite the fact that slaughterings of cattle have risen by 125,000 per annum, the offal available from all slaughterings has decreased considerably. A rise in meal production over a period in which slaughterings decreased could occur only (1) if there were a shift of slaughterings from abattoirs not producing meal (small firms) to those producing meal (large firms); (2) if there were an increase in the production of meal from refuse collected from butchers' shops; or (3) if abattoirs producing fertilizer changed over to meal production. Evidence on these points is very difficult to obtain but it seems likely that the latter two factors have contributed to the rise in meal production since 1943.

(b) Meat Production in Abattoirs Producing Meals.

There is a closer correlation between total meat production and meal production than between total slaughterings and meal production, since heavier animals, such as cattle, yield more offal.

In Table III total production of meat in New South Wales is compared with total production of meat in those New South Wales abattoirs producing meat meal during the years 1947 to 1950.

TABLE III.

Total Meat Production in New South Wales and Total Meat Production in New South Wales Abattoirs Producing Meat Meal, 1947 to 1950.

Year.	New South Wales Meat Production. I.	Production of Meat in N.S.W. Abattoirs Producing Meal. II.	Column II as a percentage of Column I.
	'000 tons.	'000 tons.	per cent.
1947 ...	280.1	180.9	64.6
1948 ...	303.5	193.1	63.6
1949 ...	333.5	211.6	63.4
1950 ...	305.2	189.9	62.2

Source : Bureau of Census and Statistics.

No evidence is available as to whether the percentage of State slaughterings in the larger (meal-producing) abattoirs increased or decreased between 1943 and 1947. Statistics shown in Table III indicate that there has been a slight trend of slaughterings away from the meal-producing abattoirs since 1947⁴. A continuance of this trend towards a higher percentage of meat production in this state occurring in the smaller killing houses would tend to decrease meal production. The opening of two large abattoirs at Goulburn and Wagga during 1951 should increase meal production. Many of the animals which will be slaughtered in these works would be used in meal production in any case. However, the net gain in meal production has been estimated by the Department's abattoirs' officer at 220 tons per annum.

(c) Meal Production Other Than in Abattoirs.

A certain amount of meal production is not related directly to slaughterings in abattoirs. This applies to meal produced from refuse collected at butchers' shops. Over two-fifths of meat meal production was derived from this source in 1950. Figures supplied by the State Statistician indicate that the output of meal from this source has increased by more than 250 per cent. since 1945. The amount of meal produced by these firms is largely dependent on domestic meat consumption. Reliable statistics on New South Wales meat consumption are not available, but there has been a significant increase in Australian consumption of meat from 646,000 tons in 1947 to 764,000 tons in 1949.

However, supplies of meat refuse, bones, etc., have other uses besides meat meal and fertilizer. Some of the increased amount of meat refuse available from butchers' shops and small killing houses over recent years has been used to produce bone charcoal. One company refining sugar is using over 4,000 tons of bones per annum for this purpose, and demand for meat refuse for this use is increasing.

⁴ The details for one abattoirs producing meal are not available but this would not affect the conclusions to any degree.

(d) Diversion of Offal from Fertilizer to Meal.

Very few firms produce both fertilizer and meal. Most fresh non-edible offal is suitable for either purpose. Small slaughter-houses simply boil their offal in an open pot to produce fertilizer. The resulting smell is regarded as a "nuisance" by local government authorities, and slaughter-houses situated in towns and cities often have no choice as to whether to produce meal or fertilizer. The modern method of meal production consists of milling the offal and cooking it under pressure. The use of dry-rendering and expeller plants in this way is a much cleaner method of processing offal than using it for fertilizer. However, the cost of the plant is prohibitive for many small killing houses. The cost of one melter and press is approximately £4,000.

The minimum number of slaughterings necessary in an abattoirs to make the production of meal profitable is dependent on meal prices as well as plant costs. The price of meal has risen by about 70 per cent. in the past decade. One abattoirs with an annual meat output of only 1,535 tons over recent years, has been operating a meal plant. If meal prices rise in relation to production costs and fertilizer prices it might become profitable to produce meal in abattoirs producing even less than 1,535 tons of meat annually. Such abattoirs probably handle close to one-third of the State's slaughterings.

Statistics indicate that there has probably been a diversion of offal from fertilizer to meal since 1943. The use of offal in the production of non-chemical fertilizers (manures) has declined, both in absolute terms and in relation to offal used for stock foods, as is shown in

TABLE IV.

Manures and Stock Foods Produced in N.S.W. Boiling-down, Bone and Manure Works, 1940 to 1950.

Year ended 30th June.	Manures.				Meat Meal and other Stock and Poultry Foods.	Ratio of Manure Production to Stock Food Production.
	Bone Manure.	Blood Manure.	Blood and Bone Manure.	Total.		
	'000 tons.	'000 tons.	'000 tons.	'000 tons.	'000 tons.	
1940 ...	7.7	2.8	19.5	30.0	<i>a</i>	<i>a</i>
1941 ...	6.7	3.5	18.1	28.3	9.8	2.87
1942 ...	7.7	2.9	16.8	27.4	10.3	2.65
1943 ...	8.2	2.1	20.5	30.8	12.0	2.56
1944 ...	6.2	2.1	20.8	29.1	13.0	2.20
1945 ...	5.4	2.2	18.4	26.0	15.1	1.72
1946 ...	6.9	2.3	12.9	22.1	17.1	1.29
1947 ...	14.4	1.5	4.9	20.8	19.5	1.06
1948 ...	<i>a</i>	0.4	5.8	<i>a</i>	21.1	<i>a</i>
1949 ...	<i>a</i>	0.5	5.5	<i>a</i>	23.0	<i>a</i>
1950 ...	0.1 ^b	0.4	6.9	7.4 ^b	22.3	0.33 ^b

a Not available.

b This figure has been affected by the re-classification of a bone fertilizer producer as a chemical fertilizer producer.

Source : New South Wales Statistical Register.

Table IV. Much of the 10,000-ton decline in production of fertilizer from 1943 to 1947 is probably a result of the 7,500 ton increase in meal production over that period⁵.

Statistics for 1948-49 and 1949-50 published by the Division of Agricultural Production, Department of Commerce and Agriculture, indicate a considerable diversion of offal from fertilizer to meal production over those two years. In 1948-49, organic fertilizer comprised 43.2 per cent. of the total of organic fertilizer and stock foods produced as by-products of the meat industry. In 1949-50, organic fertilizer constituted 40.4 per cent. of the total.

(e) Price.

The price of meat meal and meat and bone meal, is fixed individually for each producer by the New South Wales Prices Commissioner. There is no specific prices regulation governing the product. None of the producers contacted expressed the opinion that price control has had any effect in reducing production. This might be expected since the meals are by-products. The chief effect of an increase in price would be to induce more firms to process their offal for meal. The price of the meals varies widely. Protein content is important in this respect. Factory prices quoted for meat and bone meal range from £13 to £18 per short ton. Applications for prices as high as £20 per short ton are under consideration by the Prices Commissioner.

(f) Imports.

As previously stated, there are no Australian imports of meat meal and like products. In view of the very high prices being paid overseas for protein concentrates, any purchases on the open world market would be so costly that the feeding of such concentrates to Australian livestock would not be profitable under the existing prices ruling for livestock products.

5. LINSEED MEAL.

Linseed meal is a by-product of the crushing of linseed for oil. The oil is used in the production of paint and varnish, linoleum, industrial chemicals, inks and polishes. Each ton of seed crushed for oil leaves as a by-product 1,400 lb. of meal. No significant amounts of linseed meal are imported into Australia; nor are interstate movements of linseed and linseed meal of great importance, according to manufacturers. Most of Australia's meal production occurs in New South Wales.

⁵ The figures in Table IV do not represent total New South Wales production of organic fertilizers, considerable quantities of which are produced as by-products in other industries.

The sources of New South Wales and Australian supplies of linseed oil and meal over recent years are shown in Table V.

TABLE V.

Supplies of Linseed Oil and Meal—New South Wales and Australia—1937 to 1950.

NEW SOUTH WALES.

Year ended 30th June.	Linseed Produced.	Linseed Imported.	Linseed Oil Pro- duced. ^a	Linseed Oil Im- ported. ^a (Net).	Linseed Oil Available.	Linseed Meal Produced.
	'000 tons.	'000 tons.	'000 tons.	'000 tons.	'000 tons.	'000 tons.
Average 1937 to 1939 ...	...	26.2	9.5	0.2	9.7	16.5
Average 1940 to 1945 ...	...	28.0	10.5	— 1.1	9.4	16.9
1946 ...	...	28.8	13.5	— 1.3	12.2	23.3
1947 ...	...	12.7	5.7	0.2	5.9	8.9
1948 ...	0.1	10.1	3.0	3.6	6.6	4.7
1949 ...	0.8	14.2	5.0	6.4	11.4	7.8
1950 ...	1.6	15.0	8.4	4.7	13.1	13.6
1951 ^f ...	3.0 ^b	8.4 ^c	^d	^d	^d	6.7 ^e

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Average 1937 to 1939	33.6	11.7	0.9	12.6	20.4
Average 1940 to 1945	35.5	13.7	— 1.1	12.6	22.6
1946 ...	...	37.5	17.7	— 1.3	16.4	29.8
1947 ...	...	15.9	7.8	0.2	8.0	12.5
1948 ...	0.3	13.5	3.8	5.8	9.6	6.4
1949 ...	3.0	18.3	7.2	8.6	15.8	11.6
1950 ...	6.7	19.4	9.7 ^e	5.4	12.2 ^e	15.2 ^e

^a Converted to tons on the conversion factor, 243 gallons equals one ton.

^b Estimated quantity available for crushing after allowance for seed for planting.

^c This figure represents imports in the first six months of 1950–51. Imports in the following four months were nil. According to manufacturers no seed was imported in the final two months of 1950–51.

^d Not available.

^e Estimated on the basis of seed available for crushing.

^f Forecast.

Source : Commonwealth Bureau of Census and Statistics.

This table shows that two very significant changes have occurred over recent years in the source of linseed oil supplies. First, there has been a trend towards imports of oil rather than linseed, which has greatly reduced Australian supplies of meal. Second, Australia has developed an important linseed-growing industry over the past four years.

(a) Imports of Linseed and Linseed Oil.

Table V shows that until 1947 Australia produced virtually all of its oil requirements from imported seed. Yet by 1949 more than half of Australia's oil requirements were met from imported oil, imports of seed having fallen to one-half of the average annual quantity imported during the preceding decade. This trend has developed to the point where New South Wales imported no linseed at all in the first four months of 1951. Linseed production in New South Wales, whilst expanding rapidly, has not compensated for this fall in seed imports.

The main causes of the fall in Australian imports of linseed over recent years have been: (1) a world shortage of linseed which has been revised by recent stockpiling; (2) the efforts of the world's chief linseed exporting countries to develop their own crushing industries; and (3) the very high prices being paid on the world market for linseed cake and meal.

(b) The World Shortage of Linseed.

Australia has always depended on India for the bulk of her supplies of linseed. By 1946 India was supplying Australia with 90 per cent. of her domestic requirements. An acute shortage of linseed developed in the early post-war years and in February, 1946, India indicated that there would be a curtailment of deliveries. World acreage of linseed fell from 19,130,000 in 1938 to 15,303,00 in 1946, despite a large increase in demand. World linseed exports fell to 102,000 tons in 1947 compared with 1,627,00 tons in 1938, partly as a result of reduced production and partly as a result of the trend towards increased exports of oil⁶. In 1946-47 India allotted Australia a quota of less than half her normal imports, and the Federal Government rationed all consumers of oil.

The supply position improved after 1949. In 1948 and 1949 the world acreage of linseed was higher than before the war. However, this was partly due to increased production in hard-currency areas. World exports of linseed (oil equivalent) and linseed oil were estimated at 343,000 metric tons in 1950 compared with 567,000 metric tons in 1938⁷.

The trend in prices over the past decade is illustrated by the prices paid for linseed by the Division of Import Procurement of the Commonwealth Department of Trade and Customs. The price in sterling c.i.f. Indian ports rose from £11 17s. 6d. per ton in 1939 to £37 os. od. in 1946 and £58 os. od. in 1948 (£A78 10s. od. to £A80 os. od. landed, Australian ports). The price fell slightly in 1949 but has risen sharply over the past eighteen months, partly as a result of stockpiling. In October, 1950, the landed cost of linseed at Australian ports was £A80 os. od. per ton. In April, 1951, a Sydney firm was quoted £A120 os. od. per ton landed. At present there is a ban on exports of seed from India and Argentina. These bans are imposed periodically whenever the quota for export has been shipped.

⁶ Commonwealth Economic Committee, *Vegetable Oils and Oilseeds*, 1950, pp. 24 and 28.

⁷ F.A.O. Commodity Report, *Fats and Oils*, December, 1950, p. 14.

(c) Trends in Exports Between Oil and Oilseed.

During the last decade the three main exporters of linseed and linseed oil, Argentina, India and Uruguay, have developed their own crushing industries. As a result, most of their exports now take the form of linseed oil and linseed cake. Table VI reveals this trend up to 1949.

TABLE VI.

Exports of Linseed and Linseed Oil from Principal Exporting Countries (1,000 tons oil equivalent), 1938 and 1949.

Exporting Country.	1938.			1949.		
	Linseed	Linseed Oil.	Total.	Linseed.	Linseed Oil.	Total.
India	95	1	96	21	7	28
Canada ... ..	...	...	...	34	19	53
Argentina	411	...	411	...	57	57
Uruguay	23	...	23	9	31	40
United States ... ..	...	...	...	26	2	28
Total	529	1	530	90	116	206

Source : Commonwealth Economic Committee, *op. cit.*, p. 27.

Complete statistics for 1950 are not yet available, but there is evidence that there was a continuance of the trend towards the export of oil rather than linseed in that year. Some countries, such as the United Kingdom and Germany, have found it necessary to stipulate, in trade agreements with Argentina, that a certain proportion of their imports of oil from that country shall take the form of oil-in-seed⁸.

(d) Prospects of Increased Overseas Supplies.

The extent to which Australia can increase its share of the seed-crushing business will depend, partly on whether a sellers' or buyers' market develops for linseed, and partly on other bargaining factors associated with foreign exchange and bilateral trade policies.

Large surpluses of seed accumulated in South American countries in 1949-50. In that year Argentina resumed exports of linseed and cut linseed oil exports by more than half. Under the influence of the surpluses, prices for the 1949-50 crop were lowered to discourage expansion. This policy was reversed in April, 1950, when the price to growers was raised substantially. Growers were asked to plant nearly five million acres for the 1950-51 harvest compared with three million acres in 1949⁹.

Despite this development, the United Nations' Food and Agricultural Organisation reported in May, 1950, that "near-future prospects are somewhat bleak as regards any sizable expansion of export supplies (of linseed) from soft-currency areas"¹⁰.

⁸ Commonwealth Economic Committee, *op. cit.*, p. 27.

⁹ Commonwealth Economic Committee, *op. cit.*, p. 24.

¹⁰ F.A.O. Commodity Report, *Fats and Oils*, 31st May, 1950, p. 12.

It was also predicted that most European countries would have to import meal rather than linseed for their livestock industries¹¹. Subsequent events have lent support to these predictions.

(e) The Effect of Rising World Prices for Linseed Meal.

Prices being quoted on the world market for linseed meal have played an important part in forcing up the price of linseed. Recent quotes for linseed cakes of high oil content from Argentina are equivalent to more than £A70 os. od. per short ton landed in Australia. The local factory price for linseed meal is now £20 to £21 10s. od. per short ton. Throughout 1950 the local factory price was £11 10s. od. per short ton.

The United Kingdom has been a large buyer of these concentrates at high prices. Australian farmers could not afford to use linseed meal at world prices, partly because they are receiving less than the world price for some of their products. Because seed imports reflect meal prices higher than the local crusher obtains for his meal, the deficiency must be made up by means of a higher local price for oil from imported seed. In this sense users of linseed oil in Australia are subsidising Australian livestock industries.

Imported oil is much cheaper than oil from imported seed. According to one manufacturer, no seed has been imported since the price rose above £A80 os. od. per ton landed. If seed were imported at £120 os. od. per ton with meal selling at £20 os. od. per short ton (factory price), the factory price of oil from imported seed would be about 26s. 6d. per gallon¹². In April, 1951, the local factory price of oil, which is fixed by the New South Wales Prices Commissioner, was 17s. 9d. per gallon. This was the blended price resulting from the averaging of the price of imported oil (then being delivered at 15s. od. per gallon) and oil from Australian linseed.

(f) Linseed Oil Prices.

The price of imported oil has also risen considerably over recent months, though not to the extent of seed prices. On the basis of prices being quoted in December, 1950, the local factory price of Argentina oil would have been 13s. 5d. per gallon and that of Indian oil 15s. od. per gallon approximately. Quotations received in April, 1951, would bring these prices to more than 19s. od. per gallon. There is a time-lag of three to five months between a rise in the world price for linseed oil and the impact of that rise on the Australian factory price. Recent quotations indicate that the cost of imported linseed oil will soon be as high as the cost of oil from Australian seed. A large rise in the factory price of linseed oil is probable within the next few months.

Supplies of linseed meal in Australia, in the absence of seed imports, are dependent on the quantity of linseed grown in this country. The amount grown is largely governed by the price that crushers can offer farmers, and this in turn is dependent on the price the crusher can obtain for his oil and meal. There are limits to the extent to which the local price of oil may be raised to stimulate Australian production of linseed and linseed meal. Firstly, in the absence of import restrictions the local price of oil cannot rise above import parity, otherwise it will be economic to import oil from overseas. However, at the

¹¹ F.A.O. Commodity Report, *Animal Feedstuffs*, September, 1949, p. 33.

¹² Calculations based on figures supplied by one local crusher.

present time, import restrictions exist, insofar as the Minister for Trade and Customs has given processors an undertaking that they are the only firms which will be issued with permits to import linseed oil. An import duty of ninepence per gallon provides additional scope for raising the price of linseed to growers. Once protection is imposed, another limiting factor enters. If local users of linseed oil, such as paint and linoleum manufacturers, had to pay a price for oil considerably higher than world parity, their products would be threatened by overseas competition.

(g) Australian Linseed Production.

It has been estimated that 200,000 acres of linseed would need to be planted annually to meet an Australian consumption figure conservatively estimated at 15,000 tons of oil per annum¹³. The linseed obtained from this acreage would yield about 25,000 tons of meal per annum. The supply of linseed meal in 1948-49 was 15,000 tons.

Australian linseed production has expanded rapidly in recent years, but is still small compared with annual requirements. Details of the Australian and New South Wales crops in recent years are shown in Table VII. The linseed acreage sown in Australia and New South Wales in 1951 is probably not much higher than the area sown in 1950.

TABLE VII.

New South Wales and Australia—Production of Linseed, 1947 to 1951.

Year ended 31st March.	New South Wales.			Australia.		
	Acreage.	Yield.	Pro- duction.	Acreage.	Yield.	Pro- duction.
	Acres.	Bushels per acre.	Tons.	Acres.	Bushels per acre.	Tons.
1947	121	1.7	...	121	1.7	5
1948	1,019	4.2	108	1,844	5.9	273
1949	5,048	6.0	757	14,789	8.1	3,000
1950	6,085	10.5	1,602	28,812	9.3	6,728
1951 ^a	23,000	5.2	3,000	50,000	<i>b</i>	<i>b</i>

^a Unofficial estimates from linseed processors of estimated quantity available for crushing after allowance for seed for planting.

^b Not available.

Source : Commonwealth Bureau of Census and Statistics.

Between 1943 and 1945 the Commonwealth Government guaranteed a price of £34 per ton for linseed of specified quality under contract. This guarantee was discontinued in the subsequent season, and in later years prices were guaranteed by the linseed-crushing firms.

Apart from the farmers' conservatism, the main factor limiting Australian production of linseed is the competition with wheat. The production of a new crop must usually be more profitable than established crops if it is to expand. Furthermore, the fact that wheat has a Government-guaranteed price makes it, in the eyes of growers, a safer financial venture than linseed. The very large financial commitments now involved have led the crushers to discontinue the price guarantees

¹³ This calculation assumes a yield of eight 56 lb. bushels to the acre.

they formerly made to growers. Whilst many farmers are growing linseed under contract to processing firms, these contracts do not set a minimum price, but merely give the processors a first option on the crop.

The production of linseed is unlikely to expand considerably unless it offers similar conditions of stability and profitability to those that apply to wheat. Nor will it expand (without governmental assistance) if oil can be imported more cheaply than it can be processed from Australian linseed. An enquiry has been held by the Tariff Board on the question of imposing a higher import duty on linseed oil. Its findings have not yet been released.

The present price being offered by processors for Australian-grown linseed of specified quality is £80 per ton. However, Australian Linseed Industries, a recently-formed co-operative organised by growers, is demanding £87 10s. per ton, and litigation is pending.

At the present prices received by growers for linseed and wheat, linseed appears to be the more profitable crop. Average gross returns per acre for linseed are considerably greater than returns from wheat, assuming average yields for both crops. However, the cost of production of linseed is probably greater than that of wheat, although no conclusive evidence is available on the extent of the cost differential.

As pointed out previously, there seems little doubt that linseed meal and other concentrates have been undervalued in Australia in relation to the prices paid for farm produce. The low price of linseed meal in Australia reduces supplies (1) by reducing the price which crushers can offer for linseed, which in turn tends to reduce Australia's linseed acreage; and (2) by encouraging imports of oil rather than seed.

6. COCONUT MEAL.

Coconut meal is a by-product from the crushing of copra for coconut oil. The oil is used in the production of margarine, white fats, soap, candles and pharmaceutical preparations. From every hundred tons of copra crushed, about 35 tons of meal is derived. There is no price control on coconut meal, which is selling at about £22 10s. per long ton ex factory.

Although large quantities of coconut oil were imported during the 1939-1945 war, imports are normally negligible. Almost all of Australia's supply of coconut oil (and coconut meal) is produced in Sydney from copra. Most of the copra is imported from New Guinea.

Although the landed cost of copra has risen from a figure of £14 to £20 per ton before the war to £74 15s. per ton in 1951, there has been no trend towards increased imports of coconut oil, as is the case with linseed.

The wide variations in the annual Australian production of coconut meal are due largely to variations in the quantities of coconut oil used in the production of table margarine. In the early war years, N.S.W. production of table margarine increased four-fold, with the result that production of coconut meal rose to nearly 12,000 tons. In the later war years and in the early post-war period supplies of copra from New Guinea fell considerably with the result that coconut meal production fell to about 4,000 tons.

By 1948 copra supplies had reverted to normal while demand for table margarine on the local market was high because of butter rationing. Overseas demand for margarine was also high. Consequently, the production of coconut meal rose to over 11,000 tons. Since 1949 Australian production of margarine has declined and the output of coconut meal has fallen as a consequence. The main factor responsible for the decline in the production of coconut meal was the cessation of butter rationing in June, 1950, combined with the continued existence of the consumer subsidy on butter. The consumption of table margarine in Australia is restricted by legislation to about one pound per head per annum in order to protect the Australian dairying industry from competition from the former product. The cessation of butter rationing has resulted in Australian consumption of margarine falling to about one-third of the fixed quota. The consumer subsidy on butter has reduced the price differential between margarine and butter to such an extent that margarine has become difficult to sell¹⁴. Furthermore, export outlets for table margarine have declined considerably over recent years. Australian exports of table margarine fell from 5,332 tons in 1948-49 to 3,614 tons in 1949-50 and 1,065 tons in the first nine months of 1950-51¹⁵.

Mainly as a result of these factors, N.S.W. production of coconut meal in 1950-51 is likely to be about 2,200 tons (23 per cent.) lower than in the previous year¹⁶.

There seems to be no evidence of a decline in the utilisation of coconut oil for purposes other than the production of table margarine. In any case, other uses have absorbed less than one-quarter of the Australian production of coconut oil in recent years.

7. PEANUT MEAL.

Peanut meal is a by-product from the extraction of peanut oil. The main use for the oil in Australia is in margarine. The meal has a very high protein content (nearly 50 per cent.) and sells at £18 17s. od. per ton f.o.r. Sydney. A recent quotation from Uruguay for imported peanut meal would be equivalent to more than £A60 per short ton landed in Australia. Up to 1946 Australian production of peanut meal was about 4,000 tons per annum. Since that year, production has dropped by more than half.

(a) Australian Peanut Production.

Australia's production of peanuts is confined almost wholly to Queensland. Production has fallen continuously from 51 million lb. in 1946-47 to less than 18 million lb. in 1949-50. Over this period the acreage

¹⁴ Since the above was written the position has altered, in that the retail price of butter has risen by 6d. per lb. in New South Wales and Queensland and 1s. od. per lb. in other states. This development should result in an increase in the production of table margarine for local consumption.

¹⁵ Commonwealth Bureau of Census and Statistics, *Production Summary* No. 41, March, 1951.

¹⁶ This forecast is based on the fact that consumption of table margarine in Australia in 1951-51, judging by monthly figures so far to hand, will be about 4,700 tons lower than in 1949-50. This means that the amount of coconut oil used in the manufacture of table margarine will have fallen by 3,900 tons, with a corresponding decline in production of coconut meal of 2,200 tons.

under peanuts has dropped by more than half. The yield per acre has also declined, from 1,314 lb. per acre in the 1946-47 season to a preliminary estimate of 732 lb. per acre for the 1950-51 season.

Only those nuts which are unsuitable for edible purposes are sold for the extraction of oil. The percentage of the crop used for oil extraction has varied over recent years between 11 per cent. and 32 per cent. The 1950-51 crop was poor and the percentage of nuts processed for oil will be high. The price received by growers for "oil nuts" is about one-half of the price received for edible nuts. No nuts are grown specifically for oil. According to the Queensland Peanut Board, there is small likelihood of this occurring.

(b) Imports of Peanuts and Peanut Oil.

Australian imports of peanuts have fallen from a war-time average of 6,552 tons of kernels to 270 tons in 1949-50. Over the same period imports of peanut oil have increased. At the present time there is a ban on exports of nuts from India, formerly Australia's main supplier. In any case, the price of £105 sterling c.i.f. Indian ports, recently quoted, is prohibitive, according to one Sydney processor.

Mainly as a result of the decline in imports, the quantity of peanuts crushed for oil fell from 7,900 tons in 1945-46 to 2,900 tons in 1948-49¹⁷. There seems small prospect of any greater quantity of peanuts being imported in the near future. Indian exports of peanuts in 1949 were only about 5 per cent. of the pre-war level. This is partially due to increased domestic consumption in India. Furthermore, as with linseed, exporting countries have shown an increasing tendency to export peanut oil rather than peanuts. In 1949, 25 per cent. of the exports of the four principal exporting countries was in the form of oil, compared with only 3 per cent. in 1938.

8. COTTONSEED MEAL.

Cottonseed, a by-product from the ginning of cotton, is crushed for cottonseed oil. This oil has been used in Australia in the manufacture of margarine, salad oil and soap. From the milling of cottonseed for oil emerges a further by-product—cottonseed meal. This meal is a valuable stock food having a crude protein content of 41 per cent.

Australian supplies of cottonseed are produced in Queensland and are milled by the Queensland Cotton Marketing Board. Practically all supplies of cottonseed meal are sold by the Board to Queensland dairy farmers. Production of cottonseed meal has declined from 4,300 tons in 1940 to an estimated 230 tons in 1951. The decline is due partly to the cessation of imports from East Africa in 1943. According to the Queensland Cotton Marketing Board, the prices being asked by overseas firms for cottonseed are prohibitive. No oil is imported.

The rapid decline in the acreage of cotton in Queensland over recent years is also responsible for the fall in meal production. Over the five-year period immediately preceding the war an average of 56,000 acres per annum was under cotton. Despite subsidies and Government-guaranteed prices, the area under cotton in 1950-51 is estimated to be 7,000 acres. This acreage supplies only 2 per cent. of Australian spinners' requirements.

¹⁷ Commonwealth Economic Committee, *op. cit.* p. 5.

As the result of an inquiry in 1949 the Tariff Board reported that the industry was "in a state of collapse," and recommended that no further Government assistance would be justified. World prices for cotton have since risen to such a high level, however, that an expansion of production is possible. The introduction of mechanical harvesters in Queensland may also help to make the industry economic. Nevertheless, a significant increase in supplies of meal from this source in the near future is unlikely.

9. FISH MEAL.

Fish meal and fish oil are produced in Australia from fish offal and small fish unsuitable for canning. The oil is used mainly for medicinal purposes, whilst the meal is a valuable stock food. Only one firm in Australia produces fish meal. Its plant is situated at Eden, New South Wales, and produces only about 50 tons of meal per annum. It would be possible to expand the meal plant to produce 500 tons per annum. However, according to the manufacturer, it would not be profitable to expand production at the present price of £27 per ton. Meal is being produced at the present price merely to utilise existing plant and to serve as a means of disposal for offal and small fish. The present price which the manufacturer can afford to offer fishermen to bring in fish for meal, namely, one penny per pound, is insufficient to attract supplies. The manufacturer believes that a meal price of more than £40 per ton would be necessary to enable him to offer a sufficiently attractive price to induce fishermen to supply fish for meal. Fish meal has a high protein content (about 55 per cent.) and it may prove profitable to feed it to stock at that price. The Fisheries and Oyster Farms Act also puts difficulties in the way of an expansion of meal production, according to this manufacturer.

The Federal Government is at present considering possible methods of encouraging the production of fish meal. One possibility being investigated is the granting of a subsidy. Another method which has been suggested is the granting of permission to export part of the meal produced. It is estimated that exports would realise more than £A60 per ton. On the other hand, the manufacturer is investigating the possibility of utilising fish and offal previously used for meal in the production of albumen. Whatever steps are taken, there are no prospects of a marked increase in fish-meal production in the near future.

10. WHALE MEAL AND CONDENSED WHALE SOLUBLES.

The expansion of whaling in Western Australia may mean some increase in Australian supplies of protein concentrates. During 1950 these by-products of the whaling industry were produced in only small quantities. However, it is anticipated that production in 1951 will be approximately 1,500 tons of whale meal and from 4,000 to 5,000 tons of condensed whale solubles. A large part of this output will be absorbed by Western Australian livestock industries.

Whale meal has a protein content of 55 per cent. The fixed retail price in Western Australia is £27 6s. od. per ton, ex factory, Carnarvon. Condensed whale solubles have a protein content of 45 per cent. This product is new to Australian farmers and experimental work is being done to ascertain its value as a stock food. Experiments in other

countries have yielded encouraging results. The price of the solubles has not yet been finalised, but on present indications it should sell at £30 to £35 per ton, ex factory, Carnarvon.

Freight rates would considerably raise the price of these products to New South Wales farmers. According to one Sydney producer of coconut meal, the cost of sending small quantities of meal from Sydney to Perth is in the vicinity of £7 10s. od. per ton. If this rate applies to whale solubles, the price to New South Wales farmers may be more than £40 per ton.

11. SUMMARY.

The present serious shortage of protein concentrates is due to a number of largely unrelated causes, none of which, in isolation, would have created such an acute shortage. It is unfortunate for the Australian livestock industries that they have occurred together. The main causes of the shortage are:

1. *A decrease in the number of livestock slaughtered.* This has reduced supplies of offals from abattoirs. The recent fall in meal production occurred despite a long-term trend towards increased production of meal from refuse collected from butchers' shops and a diversion of offal from fertilizer to meal production.
2. *Large rises in the prices of linseed meal and peanut meal on the world market.* This has meant that the price of oil-in-seed has risen in relation to the price of oil. As a consequence Australia has been importing oil rather than linseed and peanuts.
3. *A world shortage of vegetable oils since the war.* This world shortage has been revived by recent stock-piling.
4. *A decline in the production of Australian table margarine.* This is associated with a fall in exports of margarine as well as a fall in local consumption. The cessation of butter rationing and the effect of the consumer subsidy on butter in reducing the price advantage which table margarine normally has, are two factors which are closely related to the fall in supplies of coconut meal¹⁸.
5. *An increase in demand for protein concentrates.* This is a reflection of an increase in the prices of livestock products relative to the prices of concentrates. Both sets of prices are subject to a number of direct and indirect government controls. The increase in demand for concentrates is also associated with an expansion of the cockerel-raising industry since the war and a fall in supplies of milk protein available for stock feed.

¹⁸ Since the above was written the position has altered, in that the retail price of butter has risen by 6d. per lb. in New South Wales and Queensland and 1s. od. in other States. This development should result in an increase in the production of table margarine for local consumption.

Imports of concentrates, which are insignificant at any time, are particularly unlikely to increase with world prices at their present levels. Nor is it likely that local production of peanut meal, cottonseed meal or fish meal will expand markedly in the near future.

Livestock slaughtering, and therefore meat meal production, would increase if a drought or a fall in prices caused more stock to be sent to market. Production of meat meal would also be increased by a concentration of slaughtering in the larger abattoirs. A transfer of offal from fertilizer to stock food would be encouraged by a rise in the price of meat meal in relation to production costs and fertilizer prices.

Production of coconut meal would only increase in the near future if the cessation or reduction of the consumer subsidy on butter brought margarine consumption back to the maximum level permitted by legislation.

Supplies of whale meal and condensed whale solubles from Western Australia may prove to be important, but the price will probably be much higher than New South Wales farmers are paying for any other concentrate at present.

Possibly the most practicable source of increased supplies of concentrates in the next few years is an expansion in the local production of linseed. This is feasible at least whilst world prices for linseed and linseed oil remain at their present high levels. However, the areas sown to linseed in both New South Wales and Australia in 1951 are not much greater than in 1950. If overseas linseed prices fall, as they no doubt will when stockpiling ceases, then there are three major possibilities.

First, it may become much cheaper to import oil than to produce it from either Australian or imported seed. In the absence of governmental assistance, this would mean a further decline in Australian linseed production and in meal supplies.

Second, there may be a reversion to the situation which existed prior to 1947 where almost all of Australia's linseed oil requirements were met from imported seed rather than from either imported oil or Australian seed. In this case, meal supplies would increase above their present level.

Third, the linseed-growing industry may expand in Australia despite a fall in overseas prices for linseed. The possibility of this occurring is largely dependent on the price paid to Australian farmers for wheat.

A rise in the Australian price of meat meal, linseed meal and fish meal, besides reducing demand for these products, would probably have a significant effect in increasing Australian supplies.

Over the next twelve months supplies of protein concentrates are not likely to rise above the level achieved in the year 1950-51 if local and overseas prices for concentrates persist. At the same time the demand for protein concentrates will probably continue to increase.