With the war the position was quickly changed in ways rather similar to those adopted for the Egg Industry, as described elsewhere in the present issue of this Review. It is now the future that has to be planned. The Lucas Committee recommends the establishment of Commodity Commissions and a series of amendments to the British Agricultural Marketing Acts as they stand at present, to further advance the cause of marketing boards.

The relevance of the Lucas report to Australian conditions is to emphasize, if additional evidence is necessary, the importance of organised producer marketing whether through co-operative societies, marketing boards or other channels. Whilst Governments can do much by assistance, advice and the passage of necessary legislation, it is producer self-help and initiative which are the indispensables for material progress in these directions.

SOME ECONOMIC PROBLEMS FACING AGRICULTURE IN THE UNITED STATES.

In 1947 the U.S. Congressional Committees on Agriculture held hearings regarding long-range agricultural policy and programmes. The United States Department of Agriculture, represented by some of its senior officers, presented a number of very interesting tables and reports to the Committees for examination.* Recent developments in American agriculture and possible future problems are dealt with at length and a wealth of factual detail has been made available in these pages to the Congressional Committees and to the interested public. The purpose of this article is to summarise some of the recent developments in U.S. agriculture, to discuss current trends in overall economic thinking, and to examine some of the problems which are considered likely to face U.S. agriculture in the future. Many of these problems are discussed at length in the testimony prepared by the U.S. Department of Agriculture, but others again are only barely mentioned.

U.S. Agriculture During World War II.

In the U.S.A. before the war the relative earnings of persons engaged in farming was only about 40 per cent. of that of persons engaged in other occupations. This indicated a fundamental disequilibrium in the distribution of the working population of the country. Low relative earnings in agriculture were largely a reflection of excessive pressure of population on the land, and consequently under-employment of the rural labour force.

To maintain equilibrium in the distribution and hence the earnings of the working population in an expanding economy like the U.S.A., it is to be expected that the proportion of the population engaged in agriculture would decline. The main reason for this is that in a country with a relatively high and increasing

* U.S.D.A. Testimony Proposing Long Range Agricultural Policy and Programmes.

living standard, increasing output per worker in agriculture tends to outpace increases in market opportunities for primary products both at home and abroad.†

The high level of unemployment in industry in the U.S.A. during the thirties restricted this normal movement of population from agriculture to secondary and tertiary industries. In fact, between 1929 and 1933 farm population actually increased by almost two million in spite of a continuous decline also totalling almost two million over the previous two decades. After 1934 there was a slow decline in farm population, but by 1940 farm population was still as large as in 1929. During the war years, on the other hand, there was a great exodus from agriculture, farm population falling from 30 million in 1940 to 25 million in 1945. This was largely the result of enlistments from rural areas and the movement of farm labour to other work.

Since 1945 approximately 2½ million people have returned to farms. However, the gain between 1945 and 1947 must be interpreted with caution; it may partly reflect a movement out of cities of people who keep their city jobs but prefer to live in the open country. Taking the figures at their face value, there has been a reduction of 16.8 per cent. in farm population in 1945 as compared with 1940 and 8.9 per cent. in 1947 compared with 1940.

But the important point is that this reduction in farm workers has been accompanied by a great increase in agricultural production. Between 1935-39 and 1946 gross farm production increased by 23 per cent. and net farm output by 34 per cent. This represents an increase in gross production per worker of about one-third, and of net farm output for human consumption of 44 per cent. This discrepancy between gross and net output figures is due to the increase in mechanisation. Further mechanisation has increased the proportion of total farm produce which is available for human consumption. From the point of view of measuring increases in production by gross production figures, columns 4 and 6 (Table I) are significant, whilst from the point of view of assessing the total quantity of farm product which is available for human consumption, Farm Output and Net Production per Worker, Columns 5 and 7 (Table I), are more significant. Compared with earlier periods, the rate of growth of agricultural production during World War II has been remarkable; gross production increased by 24 per cent., which compares with an increase of 10 per cent. between 1914 and 1918 and another 10 per cent. in the inter-war period.

A number of factors have been responsible for this rapid increase in agricultural production. Favourable weather conditions during the war years have helped to achieve this increase, but according to the Annual Report of the Secretary of Agriculture (1947), only one-fourth of the increase can be ascribed to this cause. The remainder was due to technological improvements. The main elements contributing to the technological advance were the increased use of mechanical power and equipment, improvements in varieties of crops and livestock and increased use of fertiliser and lime.

† For a fuller explanation of this trend, see:—"Population and Agriculture," Wyn F. Owen; Review of Marketing and Agric. Economics, Vol. 16, No. 2 (Feb., 1948).

TABLE I.

Gross Farm Production, Farm Output, Farm Employment and Output Per Worker.

United States, 1929-1946.

Year.	Farm Employment ('000)‡.	Farm Employment Index 1935/9 = 100	Gross Farm Production Index 1935/9 = 100*.	Farm Output 1935/9 = 100†.	Gross Production per worker 1935/9 = 100	Net Production per worker 1925/9 = 100
1929 ...	11,289	103	101	97	98	94
1930 ...	11,173	102	98	95	96	93
1931 ...	11,159	102	105	104	103	102
1932 ...	11,069	101	102	101	101	100
1933 ...	11,023	101	95	93	94	92
1934 ...	10,852	99	82	79	83	80
1935 ...	11,131	102	97	96	95	94
1936 ...	11,047	101	87	85	86	84
1937 ...	10,892	100	107	108	107	108
1938 ...	10,789	99	104	105	105	106
1939 ...	10,740	98	105	106	107	108
1940 ...	10,585	97	107	109	110	112
1941 ...	10,361	95	111	114	117	120
1942 ...	10,397	95	122	127	128	134
1943 ...	10,263	94	119	124	127	132
1944 ...	10,037	92	124	129	135	140
1945 ...	9,844	90	123	129	137	143
1946 ...	10,172	93	124	134	132	144

* Measures total crop production, pasture consumed by livestock, product added in the conversion of feed and pasture into livestock and livestock products.

† Farm output is gross farm production minus farm-produced power of horses and mules.

‡ Includes farm operators, members of their families doing farm work without wages and lined workers. Annual averages are simple averages of 1st of month employment estimates.

The number of tractors on farms increased by 65 per cent. during the war years; the number of mechanical cornpickers by 80 per cent., while the number of milking machines was doubled. Mechanisation affects agricultural production in many ways. The tractor partially overcomes the effect of bad weather by enabling farmers to plough, plant, cultivate and harvest quickly when the weather is favourable. Of equal importance is the effect of mechanisation on the quantity of agricultural produce made available for human consumption. It has been estimated that mechanisation in U.S.A. in the last forty years has had the effect of adding 55 million acres to cropland simply by releasing it from the task of growing feed for horses and mules.* Hence, even if mechanisation had not been accompanied by an increase in productivity per head, the quantity of farm produce available for human consumption would have increased considerably.

Another important factor contributing to the increase in agricultural production has been the increase in the use of fertilisers and lime. The amount of fertiliser used increased rapidly as farm prices improved and in 1945 consumption of fertiliser was more than 60 per cent. above that of 1940, and the consumption of lime and liming materials had increased at an equally rapid rate. As total crop acreage increased only very slightly, this meant a greatly increased application of fertiliser and lime per acre.

* P. 4 U.S.D.A. Testimony Proposing Long-Range Agricultural Policy and Programs.

TABLE II.

Consumption of Fertiliser and Liming Materials in U.S.A.

Year.	Lime (tons).	Fertiliser (tons).	Year.	Lime (tons).	Fertiliser (tons).
1936	*	6,931,000	1941	15,916,431	9,183,000
1937	7,199,007	8,226,000	1942	19,838,305	9,949,000
1938	7,859,225	7,548,000	1943	18,935,162	11,463,000
1939	9,065,870	7,707,000	1944	24,557,388	12,055,000
1940	14,405,985	8,249,000	1945	22,963,109	13,202,000

*Not available.

A third factor of major importance has been the continuous improvement which has taken place in the varieties of crops and livestock and the great rapidity with which American farmers have availed themselves of these new varieties. Perhaps the most spectacular example of an improved crop variety is hybrid seed corn, which yields about 20 per cent. more than open-pollinated varieties. The acreage planted with hybrid corn has increased from 5 per cent. before the war to over two-thirds of the total corn acreage. Hybrid seed strains of cucumber, tomato and onion have also reached commercial production. Nor has plant improvement been limited to the development of hybrids. Higher yielding strains of potatoes, flax, soybeans, and improved varieties of oats have been developed.

MARKETS FOR AMERICAN AGRICULTURE.

There are at the present time no signs that the increase in agricultural production in U.S.A. during the war years is coming to an end, or even slowing down. Mechanisation is proceeding at a rapid rate and, judging from reports of various experimental stations, even greater increases in productivity may well occur in the next few years. The genetic principles which were responsible for hybrid crop varieties are now being applied to livestock production. In 1944 the Bureau of Animal Industry, Agricultural Research Administration, U.S.D.A., reported that results similar to those of hybrid corn may be obtained in the production of pigs. "Hybrid vigour can be expected from crossing inbred lines, even within a herd of pure-bred hogs . . . . Crossing of inbred lines with a breed has produced approximately one-third more pigs per litter at birth, one and three fourths more pigs at five months and thirty pounds more weight per pig at five months than did the parent lines." In the 1945 report similar results were reported for poultry. "When Rhode Island Red inbreds were crossed with unrelated White Leghorns the crossed progeny averaged 224 eggs —about 17 per cent. more than the parent strains."

Hybridisation of dairy cattle is also being attempted, but is as yet still in the experimental stage.

Furthermore, expenditure on agricultural research and extension has been increased greatly. Expenditure on agricultural research in the State Agricultural Experiment Stations and in the Department of Agriculture increased from a total of 13 million dollars in 1920 to approximately 53 million dollars in 1946. In the same period, total Federal-State expenditure on extension work rose from 14 million dollars to 44.5 million dollars. Since the end of the war Congress has authorised further increases in expenditure on research and extension. The total amount to be appropriated over the next five years under the Bankhead Flannagan Act of 1945 and the Flannagan Hope Act of 1946 for extension and research is 73.5 million dollars. Of this amount 61 million dollars are to be devoted to research *in addition* to all existing expenditure on research. This involves an increase of more than 100 per cent. in this five years over the present expenditure by the Federal and State Governments on agricultural research. In the 1946 Act, also known as The Research and Marketing Act, special emphasis is placed on marketing to match the accomplishments already achieved in production.

In the light of the developments mentioned above it seems eminently reasonable to suppose that American agricultural production will continue to grow at a rapid rate. At the present time, with the American economy operating in top gear with less than 4 per cent. of the labour force unemployed and with a large demand for agricultural products abroad, there is little difficulty in disposing of the large volume of U.S. agricultural production at satisfactory prices to producers.

But what of the future when U.S. agricultural production will continue to increase and food production in Europe and the Far East is restored to the pre-war level? The home market is of overwhelming importance for American agriculture. With the exception of cotton, tobacco, lard, wheat, rice and some fruits, there is no agricultural commodity in which net exports normally amount to as much as 10 per cent. of U.S. production. In the case of most farm products increased market outlets are synonymous with increased home consumption.

Increases in farm production will have to be accompanied by improvements in the diet of the American people. In order to set up some sort of nutritional standard which can serve as a guide to agriculture, the U.S. Department of Agriculture has worked out the diet of Americans having an income of 2,000 dollars or more per family or per unattached individual in 1941, and has taken this diet as an objective for the future for the whole population.*

* In 1941 59 per cent. of all income earners in U.S.A. received less than 2,000 dollars per annum.

TABLE III.

Consumption of Farm Commodities Per Capita in the United States.

Commodity.	Human consumption per capita.				
	1935-39.	1937-41.	1941.		1946.
			Total Population.	High Income Consumers.*	
FOODS—	pounds.	pounds.	pounds.	pounds.	pounds.
Corn	60·6	62·6	67·5	68·1	65·2
Peanuts (shelled)	4·4	4·6	4·8	6·0	6·0
Sugar (refined)	96·5	97·5	103·6	108·0	73·2
Potatoes, white	131	127	128	125	131
Beans, dry edible	8·8	8·7	8·8	6·5	8·2
Truck crops, fresh†	96	96·3	96	119·7	123
Truck crops, canned	31·1	33·9	38·6	51·4	47·7
Wheat	220	218	219	219	211
Rice	5·6	5·8	5·8	5·8	4·2
Citrus fruit (fresh equivalent) ...	54·8	61·7	71·8	112·2	91·8
Other fruit (fresh equivalent) ...	133·0	131·2	134·4	215·0	139·1
Edible fats and oils	48·0	49·6	50·8	‡52·9	41·9
Beef and veal	62·8	63·4	68·0	81·8	69·6
Lamb and mutton	6·7	6·7	6·8	5·8	6·1
Pork (excluding lard)	56·1	63·3	66·6	85·7	68·5
Chickens §	17·9	18·2	19·4	27·3	22·8
Turkeys	2·6	3·1	3·6	4·8	4·2
All Meat	146·1	154·7	164·4	205·4	171·2
Milk and Products	801	809	807	1,014	818
Eggs	37·3	38·8	38·9	43·0	46·9

* Estimated average consumption in 1941 of those persons having an income of 2,000 dollars or more per family or per unattached individual.

† Commercial only; including melons.

‡ Composed of 17.6 lbs. butter; 20.5 lbs. lard; 8.1 lbs. soybean oil; 1.9 lbs. other vegetable oils; 4.9 lbs. imported.

§ Including non-farm chickens and commercial broilers.

A comparison of this diet with the average consumption per head in 1941 reveals that the high income earners in that year consumed more fresh and canned vegetables, fruit, beef and veal, pork, chicken and milk products, but somewhat less potatoes, beans, mutton and lamb, than the average consumer. In terms of total agricultural production, between 156 and 157 million acres of inter-tilled crops and nearly 144 million acres of close-growing crops (including summer fallow for wheat) would be needed to achieve production targets involved in this better diet. This total of about 300 million acres involves a slight reduction in acreage compared with pre-war when average acreage was 311 million and a 1946 acreage of 306 million. However, hay and rotation pasture would require 115 million acres compared with 102 million in 1946 and about 95 million pre-war. The main increase in primary production would be required in fruit and livestock industries. In fruit and nut production estimated potential needs call for the use of a little over 8 million acres, compared with somewhat less than 6 million in 1946 and pre-war. Even allowing for increased output per animal unit, increased livestock numbers would be required.

TABLE IV.

Livestock Numbers in U.S.A. in Recent Years and Requirements For an Improved Diet.

	1937–41 Average.	1946.	Diet Requirements
All Cattle and Calves (million head)	69.2	81.1	88.9
Dairy Cattle (million head) ...	10.8	16.4	28.8
Sheep and Lambs (million head) ...	53.2	38.6	47.2
Sows to farrow (million head) ...	12.3	12.9	16.0
Hens and Pullets (million head) ...	376.6	436.5	422.5

These figures were compiled by the U.S. Department of Agriculture to show that there was still room for substantial increases in U.S. farm production if further improvements in American incomes take place. There can be little doubt on this point, but it is questionable whether U.S. exports of agricultural products can be maintained at the levels which are assumed by the U.S.D.A. estimates. It seems likely that dollars will remain a more or less scarce currency in other countries for many years. With the threat of starvation removed the various Western European countries are more likely to reduce their imports of U.S. foodstuffs like wheat and "luxuries" such as canned fruit and tobacco rather than curtail imports of more essential goods from U.S.A.* An over-estimation of the long-range volume of agricultural exports would affect mainly the estimate for inter-tilled crop acreage and also fruit acreage, but livestock figures rely almost wholly on U.S. demand prospects.

However, the mere demonstration that a rising standard of living of Americans will provide American agriculture with an outlet for its products does not, in fact, prove that standards of living will improve and that demand for farm products will increase. The U.S. economy has been violently unstable in the inter-war period and a recurrence of unemployment on a larger scale than at present is a very real possibility. In this case, action will be required to cushion the fall in farm prices and to protect farm incomes. If the disastrous fall of incomes of U.S. farmers in the 'thirties is to be avoided, plans must be formulated to prevent the ruinous fall in farm prices which accompanied the increase in unemployment and the decline in the demand for farm products as in the past.

To meet such an emergency the U.S. Department of Agriculture has suggested that first emphasis be placed on programmes designed to stabilise consumption rather than by restricting production or by the maintenance of prices by government guarantee. Among programmes designed to stabilise consumption, the School

* This assumes that these countries retain their freedom of action to choose which goods to import from U.S.A. It is, of course, equally possible that the U.S.A. will use her economic advantage to force other countries via Marshall aid to buy foodstuffs which are in excess supply on the U.S. market.

Lunch Programme, Direct Distribution and a Food Allotment Programme, occupy an important place. Under the current School Lunch Programme about 25 per cent. of all U.S. school children are furnished with school lunches. The Department of Agriculture suggested that this programme be extended to cover all school children and that the nutritional value of the lunches be improved. Such a programme not only improves the health of the children concerned, but also is of great educational value in improving food habits.

Whether such programmes can be effective in maintaining food consumption in times of low economic activity depends largely on the amount of money appropriated for this purpose by Congress. It seems likely that the sums required for these programmes to maintain consumption will be far in excess of the amounts which Congress would be willing to appropriate. In addition to programmes to maintain consumption, emphasis is placed on restrictions of production such as acreage allotments and marketing quotas as a second line of defence—"We would expect them to be in operation much of the time." Finally, efforts to protect Farm Prices and Incomes by means of Price-supports in the form of non-recourse loans at between 50 per cent. and 90 per cent. of a modernised parity are also suggested. Parity, being based on pre-World War I figures in most cases, is regarded as outmoded and a new parity price measure by the use of averages of farm prices for the previous ten years is suggested in its place. In the interests of flexibility it is put forward that supports should be lower than 90 per cent. of parity, but in order to provide some sort of stop-gap they should be above 50 per cent. The general effect of modernising the parity formula would be to increase the parity prices for livestock products relative to grain prices, which corresponds with the long-term shifts necessary in U.S. agriculture as mentioned above. Another suggestion made to protect farm prices is to use a system of multiple prices, so as to raise prices in the home market as opposed to export prices, or to differentiate between wheat as sold for human consumption and wheat as feed for livestock. Such schemes have been condemned in the past by economists as being against the general interest as they grant the farming community a kind of monopoly power. There is, however, little doubt that this method does raise farmers' incomes.

It can be seen that there are many diverse methods by which the United States Department of Agriculture hopes to avert a repetition of the disastrous experience of the 'thirties, when wholesale prices of agricultural products fell by 63 per cent. within three and a half years. However, it must be admitted, without casting any doubt on the efficacy of the various means outlined above, that lasting prosperity in U.S. agriculture can only exist when the rest of the U.S. economy runs in full gear. For only under those conditions will the demand for agricultural products improve and only those conditions offer sufficient opportunities in the non-agricultural sector to ensure the gradual decline in the proportion of the working population engaged in agriculture.

IS THE STRUCTURE OF AMERICAN AGRICULTURE CHANGING?

Although it may become a very great problem in the future, the danger of low farm prices and a reduction in the demand for agricultural products does not exist at the moment, whilst some of the other problems confronting American agriculture are already in existence. Perhaps the most urgent of these is the great disparity in productivity between different areas. The main "depressed" area in American agriculture is the South, which has one-third of all U.S. farms and accounts for over 40 per cent. of total farm employment, but produces only between 20 per cent. and 25 per cent. of the value of all U.S. farm products. In terms of productivity per worker, the average for the South is only one-half of the national average and, compared with the prosperous Northern and Western Regions, we find that the output of one Northern or Western worker is roughly equivalent to that of three Southern workers. In mechanisation, too, the South lags far behind, and the rest of the country is still mechanising at a faster rate. To raise productivity in this region would appear to be one of the most important problems confronting the American legislature. The solution of this problem is further aggravated by the fact that a large proportion of the primary producers in this area are negroes and any attempt to improve their position may meet with violent opposition.

Low productivity per worker is a problem which, although most glaringly shown in the South, is not restricted to that region. Just before the war one-half of all American farms accounted for 90 per cent. of total farm production and the other half accounted for 10 per cent. There has been a tendency for larger farms to grow larger and for a larger proportion of total farm produce to be produced on the larger farms. Thus we find that the proportion of the nation's land in farms of 1,000 acres and over has increased from approximately 23 per cent. in 1920 to 34 per cent. in 1940 and to 40 per cent. in 1945. If farms are classified acording to the value of products we again find that the proportion of the value of total farm products produced by farms which have a value of products of 10 thousand dollars or over increased from 8 per cent. in 1900 to 18 per cent. in 1940. In 1945 these farms contributed 21 per cent. of the value of total farm products. Whilst no clear distinction is possible between family farms and those which should be regarded as larger than family farms, farms with a value of products of more than 10 thousand dollars can roughly be regarded as larger than family farms. It seems reasonable to conclude from the above evidence that larger than family farms are increasing in importance, even though they are as yet only a small proportion of all U.S. farms. However, even those farms which are operated mostly by family labour are increasing in size and require more and more machinery for efficient production. This means that capital requirements are increasing and farm ownership will become even harder to attain for the ordinary farm worker than it has been in the past. These changes in the structure of U.S. agriculture, even though they are still in their infancy, may have far-reaching social consequences which have as yet received comparatively little attention.

—F. H. GRUEN.