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THE GROWING DEPENDENCE OF COMMERCIAL FARMING ON ANCILLARY INDUSTRIES

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THE title of this paper implies that commercial farmers are becoming more dependent on farm supply, food processing and food marketing industries. The weight of empirical evidence supports this hypothesis. Increasing scale of operation, specialization, mechanization, and adoption of other technologies requiring the use of non-farm inputs has increased the importance of ancillary industries in food production. The trend away from smaller diversified subsistence farm units has also meant that the farmer is now more dependent on commercial markets for his produce—more affected by market price fluctuations. For the purposes of this paper I have assumed that these conditions exist, and I have concentrated on an examination of their impact on commercial farms.

I wish to emphasize that, merely because there is a greater degree of economic interdependence between farming and other sectors of the economy, one should not assume that farmers will be necessarily worse off. This is a possibility, particularly if the technological and social adjustments in the farm sector do not keep pace, but there are also possibilities that farmers will be better off. As our farms become fewer in number and larger in size it should be easier for farmers both individually and collectively to exercise more control over their production and marketing. Thus, from the farmers' point of view 'growing dependence' could have both desirable and undesirable results.

I will endeavour to highlight what I consider to be the more important consequences of this development on commercial farms in Canada and the United States of America. Insufficient knowledge of commercial agriculture in other areas of the world prevents me from drawing conclusions for them, and I look forward to learning more about them in the discussions to follow. However, I expect that the relationships between the farm and non-farm sectors of the economy in the less fully developed economies are very different from those in North America where food surpluses have been a chronic problem

for the past decade. Nor may the situation in North America be repeated in Europe. My general impression of European agriculture is one of a high level of production per acre and government intervention aimed at stimulating food production for domestic needs. I expect that such policies tend to insulate agriculture from the full impact of economic forces originating in the rest of the economy, and that the impact of these forces on commercial farming would therefore be less noticeable.

However, regardless of basic differences in commercial farming throughout the world, I think we can safely assume a trend towards a more commercial agriculture in all countries, the differences which exist being largely in rates of change. Agricultural economists have been concerned with this trend and its implications. In his assessment of United States agriculture at the conclusion of World War II Professor T. W. Schultz[1] stated:

> As farm families have become more dependent upon selling and buying, they also have become more vulnerable to the actions of other groups in the economy. The well-being of most farm families is now directly linked with decisions of other firms affecting production, consumption, and savings. More specifically, the production and price policies of management and of organized labour, imperfections in competition, the periodic destruction of aggregate demand, the lack of sufficient expansion outside agriculture to provide employment for all available labour, equipment, and plants, and to put to account advances in technology, the strangling of world trade by growing regionalism, and the inadequacy of government policies, especially in the monetary-fiscal sphere—these private and public actions have come to have a direct significance for farm prices and income.

Since 1945 when this was published many of the conditions to which Professor Schultz referred have persisted and become more acute, while others have become less important. Severe oscillations of the business cycle have been reduced in the post-war period and various policies to buffer fluctuations in consumer income have been introduced. Consequently, fluctuations in the aggregate demand for food have been less severe. However, the problem of maintaining a high and stable rate of general economic growth is still of primary concern to agriculture. It is not possible within the scope of this paper to discuss the implications of many of these developments, and I will confine my remarks to some of the more obvious implications for production and marketing adjustments at the farm level.

The following indexes give a general indication of some of the important production adjustments which have occurred in United

[1] T. W. Schultz, *Agriculture in an Unstable Economy*, chap. ix, p. 187.

States agriculture since 1910. Available statistics suggest that similar trends have developed in Canada. These indexes undoubtedly underestimate the upward trend in farm inputs because of the difficulty of measuring changes which have occurred in the quality of the inputs used. Disregarding this bias they indicate that during the past fifty years total farm output in the United States more than doubled, while total inputs increased by only about 18 per cent. and productivity, measured in terms of output per unit of input, increased by slightly over 75 per cent. During the same period, there was a marked shift in the source of inputs used in farming; purchased inputs increasing by approximately 125 per cent., while non-purchased inputs decreased by 45 per cent. It is also of interest to note the accelerated rate at which the use of non-purchased inputs has been decreasing since World War II. The greatest increases in purchased inputs occurred during and since World War II.

Index Numbers of Inputs, Output and Productivity
United States Agriculture 1910–62

(1957–9 = 100)

	Farm inputs				
	*Non-purchased**	*Purchased†*	*Total*	*Farm output*	*Productivity‡*
1910–14	166·8	46·8	85·4	52·4	61·4
1915–19	167·0	52·6	89·6	54·8	61·0
1920–4	165·4	57·2	92·2	57·0	61·8
1925–9	166·6	61·8	96·4	61·2	63·4
1930–4	165·0	58·0	92·6	60·2	70·0
1935–9	150·0	61·8	91·2	64·0	70·0
1940–4	139·8	76·4	99·2	77·6	78·0
1945–9	129·4	82·4	99·6	84·2	84·6
1950–4	118·4	93·6	102·6	90·6	88·2
1955–9	103·8	99·0	100·6	98·6	98·0
1960–3	93·0	105·3	101·0	107·0	106·0

* Farm produced inputs include unpaid farm operator and family labour and operator-owned capital.

† Includes all purchased goods and services excluding the value of inter-farm transactions of feed, seed, and livestock.

‡ Output per unit of input.

Source: *Changes in Farm Production and Efficiency*. U.S.D.A. Statistical Bulletin, no. 233, revised July 1963.

It has been frequently claimed that farmers use the same or even greater amounts of inputs when they are faced with declining prices and incomes. The relative stability of farm inputs has been used as empirical evidence of this condition, and the belief that the typical farm firm has a high proportion of fixed costs has lent credence to the

conclusion that over wide ranges of product prices it would be to the individual farmer's advantage to maintain his output. It follows that supply would be relatively unresponsive to price fluctuations. Professor Schultz's analysis of the pre-World War II situation indicated that agriculture was characterized by relatively stable aggregate production and fluctuating product prices, whereas the industrial sector was characterized by fluctuating production and relatively stable prices. As a result, farm people 'found themselves pitched about by the forward and backward surges of other sectors of the economy'. During the expansionary phases of the business cycle, the terms of trade turned in favour of agriculture, and farm incomes rose.

Since World War II there has been mounting evidence that farming is becoming more responsive to market forces. Recent analyses by Hathaway and Bryant[1] of the relationship of agricultural output and farm income to various categories of purchased and non-purchased farm inputs, indicate that inputs for agricultural production do vary over the business cycle. Evidence is cited of declining expenditure for hired farm labour, purchased feeds, fertilizer, petroleum, and capital expenditure during periods of declining demand for farm products. When the economy was buoyant, on the other hand, sharp increases in these inputs were evident. Furthermore, because of the steadily increasing importance of purchased inputs in agriculture, they predict that input variations will probably become an increasing cause of output variation in the future. Bryant is also of the opinion that substitution of farm for non-farm inputs has limited possibilities as a means of reducing farm costs. His analysis suggests that during periods when aggregate demand was increasing farmers did not substitute the farm-produced inputs which were least affected by rising prices for the non-farm inputs which increased relatively more. Some substitution of inputs did occur, but it was confined in the main to substitutions within each of the two main input categories. One of the more frequent substitutions during this period was the more intensive use of motor vehicles for hired labour. Since the price of both of these inputs is determined in the main by non-farm demands, and their price changes are likely to be closely correlated, there would appear to be only limited possibilities of reducing farm costs through substitution of inputs.[2] As purchased inputs form an increasing

[1] D. E. Hathaway, 'Agriculture in an Unstable Economy Revisited', *Journal of Farm Economics*, vol. xli, no. 3 (Aug. 1959). W. K. Bryant, *An Analysis of the Origins and Impacts of Inflation on Farm Input Expenditures, 1910–1958*, Master's thesis, unpublished, Michigan State University, 1960.

[2] Based on an analysis of relationships between the agricultural and non-agricultural

proportion of the total input-mix, farmers should be able to expand output more rapidly during periods when aggregate demand is increasing. However, the downward flexibility in output may still be relatively small if machinery and other fixed asset inputs continue to represent a substantial proportion of the inputs. Furthermore, as primary agricultural production becomes a smaller sector of the economy, the level of prosperity in the economy as a whole will be less dependent on the prosperity of the agricultural sector. The paradox of a relatively depressed farm sector in a buoyant economy will probably occur with greater frequency in the future.

Faced with these unfavourable prospects what are the possibilities of improving the farmers' incomes? The average Canadian farmer at the present time receives an income from both farm and non-farm sources which is approximately 50 to 60 per cent. of the income earned by non-farm workers. This difference exists even though during the past twenty years the number of farms decreased by 23 per cent. and the labour force in agriculture decreased by 40 per cent. while the total labour force increased by 52 per cent. During the same period the area of occupied farm land decreased slightly, but capital investment per farm measured in constant dollars increased by 136 per cent. Resource adjustments, even of this magnitude, coupled with rapid technological advances were not sufficient to overcome the income disparity.[1] Further substantial reductions in the labour input, and withdrawal of sub-marginal land, are required. But a transfer of labour out of farming of this magnitude is dependent not only upon available jobs but also upon whether the labour leaving farming has the necessary skills to fill them. These requirements are certain to become more demanding as industry becomes more highly automated.

Up to this point I have dealt with the impact of economic forces as they affect production adjustments on the farm. Let us now turn to the changing conditions facing the farmer as he markets his products. A number of significant changes have taken place, including greater emphasis on marketing services and concentration of food merchandising in fewer and larger firms. These changes have been associated with the growing importance of the supermarket[2] in food

sectors of the Canadian economy during the period 1947 to 1961 in which it was found that year-to-year changes in wages paid to hired farm workers varied directly with changes in hourly rates of pay in manufacturing industries. B. E. Rourke, *Relationships between the Agricultural and non-Agricultural Sectors of the Canadian Economy*, Unpublished Master's thesis, University of Toronto, 1963.

[1] Comparisons of the net asset position of farm and non-farm workers indicate a more favourable relationship for the farmer.

[2] In Canada between 1941 and 1960 the number of retail food chains decreased from sixty-six to thirty-five and the gross sales per store increased by 455 per cent. (constant

retailing and have brought about changes in the channels of food distribution. In merchandising food the modern supermarket relies on selection by the customer and a minimum of personal selling by retail clerks. The shelves are stocked with large displays of food items for which a favourable reputation has already been created in the minds of the consumer. As a general rule only those processors who can supply an attractively packaged, nationally advertised product of uniform quality in large quantity on a regular basis can continue as suppliers of the large retail food chains. This has meant that the smaller processing firms serving local markets are less able to compete. The merging of these firms has been an evident trend in recent years. Similarly the small farmer who peddled his product directly to small retailers or consumers is disappearing. For some products, notably poultry and processed fruit and vegetables, contractual arrangements covering price, quality, quantity, and delivery schedules have become common between farmers and processors. These changes in food marketing have resulted from consumer's demand for a wide assortment of food products of uniform quality in a convenient form. In order that this consumer demand be met, it has been necessary for farmers to rely more heavily on the marketing services provided by food processors, wholesalers, and retailers, and to adjust their production practices to conform with these new conditions.

Consumers are also demanding more marketing services with the food they purchase. In Canada it has been estimated that we had about 28 per cent. more services in our national food-market basket in 1958 than we had in 1949.[1] These services include a wide range of activities performed at various stages in the marketing process, such as packaging, freezing, and pre-cooking of foods and other innovations, to add to the shoppers' convenience. They were introduced to cater for the consumers' needs and desires, and to meet the requirements of a market which became much broader as transport and refrigeration facilities improved. In the main these were services that the typical commercial farmer could not supply. He had to rely on other institutions to provide them.

The trend toward concentration of food marketing (and farm supply) firms is cited frequently as evidence of a decline in farmers' bargaining power. While this may be true it does not necessarily

dollars). During this same period these stores increased their share of the total retail food market by 50 per cent. and now account for about 46 per cent. of retail food sales. Source: *Retail Trade*. Dominion Bureau of Statistics, Ottawa, Canada.

[1] *Royal Commission on Price Spreads of Food Products*, vol. xi, p. 124, Queen's Printer, Ottawa, Canada.

follow that farmers will suffer as a result. As Robinson has pointed out 'it is clearly misleading to imply that an oligopolistic market structure necessarily leads to a type of performance which is detrimental to agriculture. The critical question is performance, not market structure.'[1] Nevertheless, farmers suspecting that their bargaining power has been weakened, have attempted by various means to establish conditions that will protect their interests in the market. They have organized and operated farm supply and marketing co-operatives with the hope of improving their bargaining power in these markets. Supported by enabling government legislation they have formed and operated marketing institutions with varying degrees of compulsory powers to control production and marketing. The activities of these institutions range from negotiation of terms and conditions of sale to actual participation in the physical marketing processes and control over pricing and the flow of product to the market. In still other instances the Government, at the farmers' request, has taken complete control of the marketing of certain farm products. The net benefits resulting from these activities are very difficult to evaluate in specific instances, but there is considerable evidence to indicate that they have produced conditions which have been beneficial to the farmers.

Predictions are always hazardous, particularly when they relate to an industry so dynamic and complex as agriculture. Nevertheless, it is unlikely that the trend towards larger, more specialized, production and marketing units will be reversed. These trends have fostered general economic growth by lowering costs and raising productivity. These basic economic objectives will be retained and strengthened in the future, and as time goes on farmers will be forced to consider and evaluate an increasing number of complex variables in reaching their management decisions. In the long run, at least, farmers will become more responsive to market prices for both products and inputs. In the short run, there will probably be less need for adjustments at the individual farm level because of declining variability in product prices. To ensure a stable and progressive farming industry it will be increasingly imperative that the appropriate price signals be transmitted to farmers from both the factor and product markets. As they obtain increasing amounts of their fixed and variable inputs from non-farm sources they will require more technical knowledge and skills pertaining to their use. This need will be met to an increasing extent by the farm supply industries. Farmers will also require

[1] K. L. Robinson, 'Market Structure—How Important in Explaining Long-Run Price and Output Behaviour?' *Journal of Farm Economics*, vol. xlv, no. 4 (Nov. 1963).

more professional financial, legal, and management services. Above all they will require a better understanding of the economic, social, and political forces at work in the society in which they live. If we may consider education as an industry, it is reasonable to assume that it, together with the research upon which it is based, will be the most important ancillary industry for commercial farmers of the future.

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Most of what Professor Lane has said about the high degree of dependence of North American agriculture on ancillary industries is true for New Zealand and, I would imagine, for Australia; but there are also some points of difference which are interesting enough to warrant special mention. In his study of the ratio between farm and non-farm incomes in about twenty countries, J. R. Bellerby[1] found that for the first forty-five years or so of this century New Zealand, Australia, and France alone showed an 'incentive income ratio' of over 75 per cent., i.e. after excluding rent and interest elements from net incomes, only in these three countries was average farm income consistently as high as 75 per cent. of average non-farm income. Recent New Zealand figures show a ratio even higher than this. Nevertheless, a high ratio of farm to non-farm incomes is not necessarily a good indicator of a high degree of dependence by agriculture on ancillary services. I have used the following F.A.O. figures to indicate the comparative level of agriculture's dependence on other sectors (or on imports) for its inputs.

TABLE 1

Purchases from Non-Agricultural Sectors and Abroad as Percentage of Gross Agricultural Output in twenty-two Countries in 1958–60

	per cent.		*per cent.*
United Kingdom	50·7	Ireland	27·1
Netherlands	38·8	Austria	26·1
New Zealand	37·2	Finland	21·5
Switzerland	36·8	France	21·1
Israel	35·4	Japan	19·0
Belgium	33·6	Italy	15·2
Sweden	31·9	Poland	10·9
Germany, F.R.	30·4	Portugal	10·1
Norway	29·3	Yugoslavia	8·7
Denmark	27·5	Spain	8·3
United States	27·5	Greece	8·2

Source: *The State of Food and Agriculture*, 1963, F.A.O., Table III, 17, p. 125.

[1] J. R. Bellerby, *Agriculture and Industry: Relative Incomes*, Macmillan & Co. Ltd., London, 1956.

Of the top nine or ten countries in Table 1 New Zealand is the only one which is overwhelmingly dependent upon agriculture to maintain its standard of living. It is unusual for such a country to have a high real income per head. How has she been able to achieve it? It has not been because we have large areas of naturally fertile soil, nor have we any mineral resources to speak of. Most of our country is hilly or even mountainous. We are small in area and in population, and we are remote from the main markets of the world.

TABLE 2

Non-Factor Inputs as a Percentage of Gross Output in New Zealand Farming

	per cent.		*per cent.*		*per cent.*
1921–2	24	1935–6	22	1949–50	41
1922–3	25	1936–7	23	1950–1	45
1923–4	27	1937–8	25	1951–2	44
1924–5	28	1938–9	27	1952–3	46
1925–6	31	1939–40	28	1953–4	44
1926–7	30	1940–1	29	1954–5	43
1927–8	28	1941–2	31	1955–6	41
1928–9	27	1942–3	33	1956–7	43
1929–30	26	1943–4	36	1957–8	37
1930–1	25	1944–5	36	1958–9	33
1931–2	25	1945–6	34	1959–60	35
1932–3	22	1946–7	31	1960–1	29
1933–4	21	1947–8	34	1961–2	30
1934–5	22	1948–9	33		

Our chief natural advantage lies in our climate, which is admirably suited for pastoral production. Following the law of comparative advantage, we have therefore specialized in the production of meat, wool, and dairy produce based on pasture. In the formative period (which for New Zealand was less than a century ago) there was plenty of land, but labour was scarce. As a result of the low level of labour inputs per acre we have for many years ranked highest in the world for output per *man* but among the lowest for output per *acre*. In a recent F.A.O. study[1] we are bracketed with Ireland, Pakistan, Spain, and Thailand for gross agricultural output per unit of area. The same study shows, however, that in respect of gross output per man we rank about 50 per cent. above Australia and the United States, and several times higher than most European countries. New Zealand's position on this scale is undoubtedly due to the high level of input of land and capital per man, and also to the receptivity of our farmers to new ideas.

The dependence of the level of non-factor inputs on the level of

[1] The State of Food and Agriculture, 1963, F.A.O., pp. 116–17.

farm incomes has been mentioned by Professor Lane. The major piece of New Zealand research on this subject is that of Philpott and Stewart,[1] and I set out in Table 2, based on their findings, the total non-factor inputs as a percentage of gross output (all in real terms) for the past forty years.

I have quoted every year because this brings out, in addition to the long-term upward trend, the fluctuations which have occurred in periods of higher and lower farm incomes. Three such periods are immediately obvious—the lower level of the percentage of purchased inputs between 1932 and 1937 during the depression; the higher level (over 40 per cent.) in the good years from 1950 to 1957; and the rapid falling-off since then as the terms of trade moved against meat, wool, and dairy products. The lowest percentage for twenty years was reached in 1960–1.

To be a little more specific I have taken from our survey of sheep farms an example of the adjustments in farm expenditure which farmers make when gross income rises and when it falls.

TABLE 3

Adjustments in Sheep Farm Expenditure (Average of 170 Randomly Selected Fat Lamb Farms)

Average per farm	*Upward adjustment (between 1954 and 1955)*	*Downward adjustment (between 1957 and 1958)*
	£	£
Change in gross farm income	+589	−414
Change in expenditure on:		
Wages . . .	+68	—
Fertilizer and seeds .	+97	−95
Repairs and maintenance	+69	−65
Contract work and cartage	+32	−64
Depreciation . .	+105	−136
All other expenses .	+69	+7
Total change in expenditure	+440	−353

Source: *New Zealand Meat and Wool Boards' Economic Service sample survey of sheep farms.*

Apart from wages, which exhibit the well-known *ratchet effect*, the items which received the greatest share of the increased expenditure when incomes rose were also those which were cut back hardest

[1] B. P. Philpott and J. D. Stewart, *Income and Productivity in New Zealand Farming, 1921–56*. Brought up to date in an unpublished communication.

when expenditure had to be curtailed. Including depreciation (which is a fair indicator of the quantum of investment in fixed farm capital) all the items listed are closely linked with production levels. Such a reduction in inputs, if continued, would lead to a decline in the rate of expansion of farm production; and in the absence of increases in non-farm exports, this would have an adverse effect on New Zealand's balance of payments.

Another point of difference between farm organization in New Zealand and in the United States, Canada, and the United Kingdom is our greater reliance on the traditional concept of the one-man, or one-family, farm. I know that there are many small farms in these countries but there does not seem to be any antipathy to large-scale farm enterprises organized on industrial lines. The origin of our adherence to the one-man farm concept lies in the socio-political field but it has had some economic justification, in that livestock farming on open pasture (which is New Zealand's chief industry) is much less amenable to large-scale mechanization than is the production of grain or root crops. There are basic strengths in the owner-operator farm unit but there are also inherent weaknesses, some of which are accentuated by the growing dependence on ancillary industries. Since output now has to be greater because of the cost-price squeeze, technical efficiency has to be higher and the problems of management, both technical and financial, have become more complicated. Very recently, there has been much discussion about the merits of large-scale farming, and the trend towards greater complexity in both technology and farm management may eventually lead to a reconsideration of our traditional attitude to the owner-operated farm.

On the marketing side, we have in New Zealand examples of nearly all the types of activity which Professor Lane has summarized, ranging from the loosely-knit Federated Farmers with their commodity sections, through the Meat Board and the Wool Board (neither of which actually trade in their product but do have a tremendous influence on marketing), the Wool Commission which administers the wool floor price scheme, to the completely co-operative dairy industry, at the apex of which is the Dairy Production and Marketing Board.

I cannot conclude without endorsing wholeheartedly Professor Lane's final sentence and the paragraph which leads up to it. There is no doubt that the key to greater efficiency is greater knowledge. The use of improved technology has led to productivity increases in farming which must represent a very high rate of return on the

resources which have been invested in agricultural research and extension agencies. Yet in all countries too little effort has been devoted to research and education on the problems of agriculture—production, marketing, sociological, structural—and it is surely time that public investment in this highly profitable ancillary industry was stepped up.

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Professor Lane has covered the most important items which characterize the increasing dependence of agriculture on the rest of the economy. Many of his findings, although derived from the Canadian point of view, apply also to Switzerland and, so far as I am able to judge, to its neighbouring countries. Thus, agricultural enterprises increase in size; they decline in number (in Switzerland this applies mainly to the formerly very high number of part-time and small-scale farms); contrary to the general rate of population increase, the share of the rural population decreases, absolutely and relatively; there is a decrease in labour force with rapid technological advances, while rising yields lead to a rapid development in productivity. Better training of the farmer (schools, courses, and extension service) has contributed considerably to this development.

On the whole, I find it difficult to differ from Professor Lane in these matters. I should, however, like to make the following remarks.

First, he says in his paper that as purchased inputs form an increasing proportion of the total input mix, farmers should be able to expand output more rapidly during periods when aggregate demand is increasing. However, the downward flexibility in output may still be relatively small if machinery and other fixed asset inputs continue to represent a substantial proportion of the inputs. Furthermore, as primary agricultural production becomes a smaller sector of the economy, the level of prosperity in the economy as a whole will be less dependent on the level of prosperity prevailing in the agricultural sector. And he adds that the paradox of a relatively depressed farm sector in a buoyant economy will probably occur with greater frequency in the future. So far as this goes, I agree with him. I think, however, the analysis of the agricultural enterprise should not be restricted to its inputs and outputs. We must also take into consideration the impact of fluctuating demands for consumer goods by the farm families. Decreasing incomes of the farm families will lead to decrease in demands on the consumer goods market and vice versa, whereby the demand elasticity can vary greatly according to the

kinds of consumer goods. I do not want to enter into great details, but to review briefly the question; how the demand situation can be changed from the farm families' point of view during the economic development of a country. The demand situation depends on (1) the share of the rural population in the total population; and (2) the amount of essential consumer goods, not produced on the farms but obtained from the consumer goods market.

I believe, there are in this lecture hall a number of representatives from countries where the farm families produce almost all goods they need for their, admittedly humble, standard of living, or at least do not use much more than is at their direct disposal. At the same time the share of the rural population is comparatively high in these countries. Figures up to 70 and 80 per cent. have been quoted during this Conference. On the other hand, the rural population in Switzerland is now only 10 per cent. and, because of their high standard of living, they obtain up to 90 per cent. of their consumer goods from the consumer goods market. The trend towards production specialization is also one of the reasons why only a very minor part of the goods used by these farm families is still produced on the farms. Between these two extremes there are a number of intermediate stages connected with the decrease of the rural population and the rising tendency to cater for the consumer goods demand from the consumer goods market. An analysis of the mutual dependence between agriculture and the economy as a whole should not only take into account the agricultural enterprise as a productive unit but also the farm family as a consumer and an influentual factor on the consumer market.

Secondly, Professor Lane in discussing the income disparity between agriculture and the rest of the economy, says that even large resource adjustments coupled with rapid technological advances are not sufficient to overcome the disparity. He says that further substantial reductions in the labour input, and withdrawal of submarginal land, are required. I agree that the long existing trend towards surplus production and insufficient market outlets, as well as rapidly increasing techniques, make it necessary to employ surplus labour outside agriculture. Only thus can we achieve a productivity increase. I am not convinced, however, that a real productivity increase will also bring about an increase in income. Any profit gained by productivity increase can be skimmed off again either by higher prices for production inputs or by decreasing prices for the products. In periods with a tendency towards general price increases, as ours, the increase of prices for agricultural inputs compares unfavourably

with the price increase for agricultural products. Agricultural scientists or technicians and agricultural economists may make a combined effort to increase the productivity of agriculture. In the long run, all these efforts will not improve the income level so long as competition of the individual countries in the agricultural sector dictates the prices. In other words, to put an extreme case, Messrs. Heady, Weinschenck, Renborg, and others may be successful in applying profit maximization to all agricultural enterprises of the world. This profit maximization will bring about a productivity increase but no income improvement in the long run, if the farmers are willing not to pocket the profits, but to let the input or output sides of the rest of the economy profit from this productivity increase by changing prices according to the situation. I can well imagine that, even when there is no surplus production, a complete skimming off of the profits made by productivity increases will be possible in favour of the whole of economy, mainly because agriculture all over the world is badly organized and will remain more difficult to organize than other economic sectors.

I have to admit that certain countries with their progress in productivity will always remain ahead of others. This may apply to Canada, whereas the European countries, and especially Switzerland, will always be at a disadvantage because of topographical, climatic, and traditional reasons. In other words, we in Switzerland have less chance than other, more favoured, countries to keep pace with productivity increases as a possibility for income improvement. Yesterday, in order to reach a certain level of income, one had to have one hectare of land, now it is two hectares and tomorrow it will be three. To put it more clearly, as a result of productivity increases the area of a full-time farm has to be increased. Present-day full-time farms will become part-time farms if the farmers cannot expand. For others, additional sources of income must be made available. Such sources may be the tourist trade, especially in mountain regions, jobs in village administration, &c., and finally the decentralization of industries. For economic, social, and political reasons it is always better to bring industry to the labour supply than to move manpower to already existing industrial centres, where water supply, sewage filtration, litter utilization, traffic, &c., present almost insoluble problems, and where the individual citizen becomes a negligible part of the masses.

Thirdly, Professor Lane mentioned, and I can confirm this for most European countries, that there is a clear tendency towards larger agricultural enterprises, which can use cheaper and more rational pro-

duction methods. In my opinion this development has its limits. It has been proved again and again that the economic efficiency of large-scale enterprises decreases as soon as the proportion of hired labour outgrows the family labour, since the former show less initiative and interest in the work. For that reason and because of the general lack of manpower in Switzerland, for example, the number of large-scale farms has decreased in favour of medium-sized family farms since World War II. I believe, therefore, at least for the Western world, farm size will remain within the framework of family farms. Expressed in terms of area, this will vary from a few hectares to a few hundred.

H. DE FARCY, *Vanves, Seine, France*

I would like to comment on Professor Lane's excellent conclusion that education must be considered as a basic industry of our new society. A new society means a society where one of the more urgent objectives is to alter the social situation so as to provide more things as services for mankind; where all the sectors are more and more interdependent in this process of social transformation. The present form of society inflicts deep injuries on many farmers. In France, for example, many small farmers feel themselves to be victims of their lack of capital and of the unfairness of business and of government indifference. To use a slightly vulgar expression for which I beg your pardon they get the impression that society is inclined to kick them in the pants. But, as a friend of mine from Lyon often says, there are occasions when the philosophical explanation often lies as much with the pants as with the kick. Something like 90 per cent. of the responsibility for the farmers' backwardness is due, no doubt, to the cupidity and fixed ideas of other people, but if the farmers do not undertake the remaining 10 per cent., nothing happens. They lack money and advice, but when they receive this money and advice they never make use of it. Obviously they need a new structure. But let us be careful! This is a policy of defence, and we must help them to attack, whether they stay in agriculture or move out. There is clearly a waste of natural resources and, what is worse, a waste of good intentions which, as things are, contribute almost nothing to the modern world.

To help them to develop their own faculties a new pedagogy must be used or, as we are referring to adults, let us speak of andragogy emphasizing particularly the following points: (1) *To learn how to participate.* Sir Tafewa Baluwa, Prime Minister of Nigeria, having

spent some years in England, used to say that he saw a people where each individual regarded the law and the respect for others as part of his own character. Therefore, there is a need for andragogic teaching to impart common aims and to regard other people's feelings not as something exterior to oneself but as part of each human being. (2) *To put questions.* An American Nobel prize winner, Isaac Rabi, used to say that he owed everything to his mother. When he was in primary school, instead of saying: 'Have you recited your lessons today?' She used to ask: 'What intelligent question did you put today?' (3) *To accept the risks of progress.* Progress is a process of advance. This means that we leave what we have with a reasonable hope of finding something better. But the little that we have we cannot keep. Progress is made by sacrifice. Henry Ford used to say that he knew men in business who would never have money, because they liked it too much. They were too afraid of losing it. People who are poor have little money, but they often know how to give it, splendidly, for non-economic reasons. Should they not be helped to find the key notion of applied economics, the calculated risk? No doubt, the greater the loss in a case of failure, the less easy this becomes. But are there not cases in which this attitude can be taken, so to speak, on a small scale? (4) *To compel a dynamic attitude.* The story goes—but it is not true—that in the United States of America a correspondence law-school used to make its students pay for twelve lectures, but only sent eleven. If a student went to law against the school for breach of contract and won his case, the school sent him his diploma, because it proved that he was making use of the knowledge he had acquired. (5) *To appreciate people.* Some people are backward; to help them to start on the way towards progress and co-operation we must know how to appreciate them. Let me quote what Dr. Elmhirst wrote in his book on Rabindranath Tagore: 'When he used to arrive at a village in India he knew just how to speak to the poorest peasant, as if the man had a particular secret, vital to humankind, and that he was the only one who could give it to the world.' The economic change we hope for, will not take place without this internal and personal revolution in each participant in this reform, in which everyone gives before he receives.

Can you really believe that we can start this profound reform in others without at least trying to do it first ourselves?

S. G. KOLESNEV, *University of Moscow, U.S.S.R.*

In relation to the development of interdependence between marketable agricultural production and industries connected with it

Professor Lane in his report defined a series of interesting problems of general interest.

In order to understand clearly the complicated process of interdependence of marketable agricultural production and industry deriving from it, it is necessary to examine this process historically.

This is most apparent in industries using agricultural products. Factories using agricultural products were established in the earliest period of development of capitalism. Under the action of objective economic laws a continuing process of concentration of industries processing agricultural products went on. Gigantic slaughter-houses were built as in Chicago, enormous factories for wine, vast establishments for the production of canned food were set up. Raw materials for such giants were carried over thousands of kilometres. To cover the costs and make sure of gains, these industries profiting from their colossal strength, began more and more to oppress agriculture, lowering prices of raw materials and selling at high prices the factory products to the people of the countryside.

In the middle of the twentieth century, at the same time as differentiation, there began a quick process of integration and unification of production and elaboration of agricultural products in different forms.

The process of integration developed rapidly in the U.S.S.R. The basic forms of integration are the following:

(1) Some kolkhoz and sovkhoz built their own factories.
(2) Some kolkhoz joined together to build factories.
(3) Government factories utilizing agricultural products organized large undertakings for the utilization of by-products from these factories, e.g. cattle-feeding stations, &c.
(4) First experiments occurred of integration of industries with establishments producing raw materials.

In all the forms of integration enumerated, the leadership of the various establishments is conducted democratically. Soviets or Councils are instituted composed of representatives of each establishment.

At present the process of integration does not embrace all branches of industry, but it is going on quickly in wine production, fruit canning, and cattle-feeding.

Integration as a form of co-operation is very effective economically in a variety of ways:

(1) Industries are necessarily concerned with the rational organization of raw materials and need the help of kolkhoz and sovkhoz.

(2) The best prices are established for raw materials and deficiencies in production are prevented.
(3) Workers in industry and agriculture receive equal pay.
(4) Seasonal work in agriculture is evened out by making use of workers in industry.
(5) The use of by-products of industry is improved and as they return to agriculture the natural cycle of organic matter through its return to the land is completed.

Not all problems are solved. A good deal of scientific work by economists and organizers is still needed. The Soviet Government gives a lot of help to integrated establishments through credit machinery, &c. In the whole elastic system of socialist agriculture the process of integration meets no obstacles, develops quickly, and the foundations are there for its successful completion.

G. KADDAR, *Tel-Aviv, Israel*

In order to prevent the emergence of a relatively depressed farm sector in a buoyant economy, such as was described by Professor Lane, it is the established aim of public policy in Israel to enable the rural and farming population to obtain as large a share of the consumer's dollar as is compatible with economic efficiency. Although we do not have a centrally controlled and directed economy there is an established trend towards putting the industries which process farm commodities, as well as those making certain farm supplies, such as feeding concentrates, in the hands of the farmers. We try to base this rural industrialization on our rather elaborate and varied system of farmers' co-operatives and collectives. Provided that management and capital are available, and markets clearly outlined, there is no reason why the farmers themselves cannot perform a considerable part of the additional services required by the consumer which were so ably commented upon by Professor Lane.

In addition, I can promise my French friend that, given facilities for vertical integration, the farmers do kick back! This is not always to the liking of the Government authorities who were partly instrumental in helping the farmers to gain control of ancillary industries.

H. FRANKEL, *Agricultural Economics Research Institute, University of Oxford, England*

I should like, if I may, to give a few examples of the dependence of farmers on input industries. In a number of countries the consumption of fertilizers is encouraged by government subsidy. In the

United Kingdom such a subsidy on potash was not found feasible, as potash is imported from the Continent. The Minister of Agriculture gave as a reason the probability that the Franco-German cartel would raise prices, forcing the U.K. Government to step up *pro tanto* the rate of subsidy. Such alternative measures were indeed the feature over a number of years of the subsidies on other fertilizers produced in Britain, until the Monopolies Commission shed light on this matter, censoring some British superphosphate manufacturers. Fertilizers, unlike most feeds, are not products of agriculture. Thus the essential dependence of land is on a highly centralized industry which, according to evidence, is more oligopolistic in the larger European countries than it is in Denmark or Holland. One might add that in Britain the fertilizer bill is larger than the total of farm grants, and is equal to 25 per cent. of net farm income. This income is only 10 per cent. larger than the bill for feedingstuffs. A substantial part of the latter is the residue of industrial production, and it is the feedingstuffs processors who take over sections of agricultural production such as broilers and not vice versa.

In the agricultural machinery industry farmers find a highly organized oligopolistic industry where price competition is of a very peculiar nature. As in the motor-car industry dealers, cutting prescribed prices, are likely to be deprived of their supplies.

As Professor Lane has pointed out, farm supply co-operatives could play a vital role and, theoretically, supply the bulk of what the farmer needs if it were not for the ceiling of their supplies prescribed by manufacturers and, what perhaps is more important, their inability to give enough credit. For this many farmers are inclined to pay their non-co-operative suppliers as much as $2\frac{1}{2}$ per cent. per month, equivalent to 30 per cent. per annum.

Professor Lane suggested that the bargaining power of farmers would increase in the future as the result of the increasing size of farm units. Although these units may never attain the status of U.S. Steel, the fact that industrial entrepreneurs are entering in increasing numbers the field of commercial farming, and not only hobby farming, probably emphasizes this trend. Factory farming, with possible Stock Exchange quotations, would certainly be a better match for the input industries than the traditional farmer, always short of capital and credit which is so largely available for these industries from the savings of the public through share-holding facilities and company law.

S. H. LANE (*in reply*)

Time does not permit me to comment on many of the points that were raised in the discussion. Several of them referred to the impact of vertical integration on commercial farming, and since this topic will be discussed in the next paper I will not comment on it at this time. Some of the speakers have described the changes which have been taking place in commercial farming in their respective countries. Most of these comments, and in particular those of Mr. Keen, indicated that agriculture is using a greater proportion of purchased inputs, and that as this occurs agricultural production becomes more responsive to changing factor prices. However, I did not detect any optimism that this development would be a sufficient condition to remove the income gap, whatever the extent of it may be, which appears to exist between agricultural workers and workers in other industries.

Dr. Dettwiler referred to the importance of farmers' demand as a component of the aggregate demand for food. This factor will vary in importance from country to country depending upon the degree of specialization (or self-sufficiency) that is characteristic of its agriculture. In Canada specialization has proceeded to a considerable degree and is still increasing, with the result that our farmers are becoming increasingly dependent on retail food stores for their food and the services associated with it. In such situations, there would seem to be little gained by distinguishing farmers' demand for food from that of other consumers. Dr. Dettwiler also drew attention to the fact that technology is continually increasing the optimum scale of farm operations and that policy makers should be concerned with the implications this trend may have on the farming sector. Certainly, this development merits close examination, but for the time being I feel that for the large bulk of agricultural production we have not yet reached the stage where a family farm size of operation is not the most economic unit.

Professor Kolesnev suggested that we needed to take a closer look at the historical development of agriculture and, in particular, at the effect that concentration of power in farm supply and food marketing firms may have on the welfare of agriculture. Such studies are necessary, but I would also suggest that a problem of equal concern is how to safeguard consumer interests when farmers attempt to improve their bargaining power through the organization and operation of compulsory producer-controlled monopolistic marketing institutions.

The suggestion was made that farmer-owned co-operatives could play a useful role in improving the bargaining power of farmers.

While this is true, I think we should recognize that for any firm to compete effectively in many of today's competitive markets it must be large, expertly managed, and primarily concerned with sound business considerations. This suggests to me that the small local farmer co-operative will become an increasingly less potent force for protecting the individual farmer's interests.

I am sure we all are indebted to Father de Farcy for presenting important considerations in developing an educational programme whereby rural people will be assisted in making decisions and taking actions which will enable them to improve their welfare. I am in complete agreement with his premise that the attainment of a higher level of rural welfare will be largely dependent on the success achieved in creating a growing awareness among rural people of the need for more rapid adjustments to changing economic and social conditions.