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UNIVERSITY OF NOTTINGHAM

Department of Agricultural Economics

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Eleventh Heath Memorial Lecture

THE MILK INDUSTRY IN A DEVELOPING COUNTRY

by

J. L. DAVIES, C.B.E.

formerly General Manager of the England and Wales Milk Marketing Board

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UNIVERSITY OF NOTTINGHAM SCHOOL OF AGRICULTURE

Department of Agricultural Economics

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THE HEATH MEMORIAL LECTURE

WILLIAM EDWARD HEATH was born in Leicestershire in 1906 of a large farming family. All the family have been associated with agriculture and some are now farming in Canada and New Zealand.

He was a student at the Midland Agricultural College and graduated as a B.Sc. of the University of London. (The Midland Agricultural College is now the School of Agriculture of the University of Nottingham).

He started work at the Agricultural Economics Department at Sutton Bonington and then moved to the Farm Economics Branch at the Department of Agriculture for Scotland, in due course becoming Head of that Department. During this period he was responsible for an economic survey of marginal farming in Scotland.

In 1947 he was appointed Reader in Agricultural Economics at the University of Nottingham. He played an active part in the School of Agriculture and later was Vice-Dean of the Faculty of Agriculture and Horticulture. In 1951 he was selected to visit the United States of America to study research and teaching methods.

He was particularly interested in all the international aspects of agricultural economics and devoted a good deal of time to lecturing and writing articles on the subject of food and people. He was an active member of the International Conference of Agricultural Economists and of the Agricultural Economics Society.

Although handicapped from his youth by an attack of infantile paralysis, he refused to bow to this handicap and shared in full in the whole life of the University. It was a shock to many when he died suddenly in 1951 at the age of 45.

The Heath Memorial Lecture was established in his memory, largely through the initiative and generosity of past and present students (The Old Kingstonian Association) and of the farmers who appreciated his work in the East Midlands province.

THE LECTURER, 1967

Born in 1904, the son of a Cardiganshire farmer, J. L. Davies graduated at the University College of Wales, Aberystwyth, and subsequently studied in Oxford and in the University of Durham. He then worked for a number of years with Professor A. W. Ashby at Aberystwyth and published numerous articles on labour utilisation and on various aspects of agricultural marketing.

In October 1933 he joined the staff of the M.M.B. as a marketing assistant and was appointed Marketing Officer in 1936. He was seconded part-time to the Ministry of Agriculture as Chief Milk Production Officer in 1942 and in this capacity was responsible for the direction of the Ministry's milk production campaign. He headed a milk commission to the U.S.A. and Canada in May 1945 and studied closely the conditions of production and marketing of milk in these two countries. He was awarded the C.B.E. in June 1947 soon after resuming full-time work with the Milk Marketing Board. In 1954 when the Board resumed its powers as a marketing authority in milk he was appointed General Manager. He has travelled extensively in Europe and North America to study various aspects of milk marketing.

He retired in 1964 and now lives on the Cardiganshire coast. He is now Chairman of the Mid-Wales Development Association, a member of the Welsh Economic Council and is connected with a number of other Welsh interests. He has recently advised on the milk industry in both Greece and Mexico on behalf of those governments.

THE MILK INDUSTRY IN A DEVELOPING COUNTRY

I appreciate very much the honour which you do me by asking me to give the Heath lecture on this occasion, particularly as I am now retired and therefore outside the continuing stream of events in agriculture. It is for this reason that I decided to speak not of our own problems, but of those in a country which I visited recently and which are still very fresh in my mind. I was asked about a year ago to make a study of the milk industry in Mexico and to advise the Authorities what policies to adopt and how these should be carried out.

Mexico is a warm and dry country—stretched between the two oceans, with Mexico City its very large spreading capital situated on a high plateau covering a large part of the country, at an elevation of around 7,000 feet. The City has been in the news recently, because the next Olympic Games are to be held there, and there is the interesting conjecture regarding the possible effect of the high elevation on the capacity of the best athletes to run the mile in so much less than four minutes. Whether this important event moved the Mexicans to consider their supplies of milk I cannot tell, but my first reaction was to wonder about milk production from dairy cows at this elevation and particularly the problem of growing the feed for them. This of course is only a reflection of our experience in this country, where our mountains, such as they are, do not produce anything very much, for reasons which we all understand.

During my first weeks in Mexico I found it strange to visit dairy farms at an elevation which is rather more than twice the height of Snowdon. The climatic conditions are also those which we believe tend to discourage dairy farming. It is very hot in summer, and the rainfall, which is light, is concentrated mainly in the three months, June to September. There is hardly any grassland or grazing as we know it; there is of course a great deal of rough grazing on the rocky slopes of the mountains and on the more arid plateaux, where the beef cattle, the sheep and the goats roam.

This is only a very brief sketch of the background conditions, but I mention them particularly because they are to be found in various degrees in many of the less developed countries, in South America, some of our own European countries, particularly around the Mediterranean, and in Africa and Asia too, although I cannot speak of these from personal experience. In spite of these conditions there are many millions of cattle in Mexico—the statistics show that the total cattle population is much greater than in the United Kingdom.

When one studies the milk industry in a country like Mexico one is naturally impressed by the high degree of development of our own milk industry. Having been connected with it for most of my working life, I am sure (being so close to it) I lacked a full appreciation of its very sophisticated industrial achievement, on the farms, in transport of milk, in distribution and manufacture. And above all of course in the organisation and control of the multifarious services connected with it. I now appreciate that the difference between this, and what we find in the

less developed countries is enormous. I do not propose to follow this line here, except to say that there may be some danger that we take the achievements of past generations of farmers, industrialists, scientists and administrators in this and other western countries too much for granted, and that we fail fully to appreciate all that lies behind, and all that is contained within a successful, large modern industry. And our milk industry in this country is certainly that.

To some extent this is a natural reaction to the first experience of the baffling problems of a milk industry in a country where conditions are quite different and where economic enterprise and organisation in farming is at a much lower level.

My first reaction in Mexico was to consider seriously whether under the conditions which I have briefly described, there should be much of a milk industry at all. Theoretically we used to argue that under conditions of the international division of labour, milk should be produced in those countries—mainly those with high rainfall and a temperate climate—which have the natural advantages for this enterprise. The operation of international markets when these were reasonably free, developed the pattern in this way. But we have travelled far away from this rather simple conception of unhampered economic laws since then, and this process will go much further as the effort to improve nutrition gathers weight. It now seems to be accepted by Governments and international agencies that milk is essential to the diet of *all* people, and that it should be produced or at least it should be readily available in all developing countries. Agricultural scientists also seem to believe that dairy farming is a useful, indeed almost an essential part of sound agricultural practice in most countries, and this is a philosophy which I find is readily accepted in the countries concerned. I am not in a position to discuss these subjects, which are far reaching in their technical, scientific and economic content. But I am inclined to believe from my limited experience that a milk industry is probably necessary in most countries with a large population, and where the land is available, and can be used, within reasonable limits of costs, to produce the feeding stuffs required. The desirability of the mixed agricultural and husbandry pattern is one reason for this, the weight of the farming and rural population which is available is another, and the small size of most of the agricultural units favours very much the milk production enterprise from a cash throughput and farm income point of view. And we know that milk production can be fostered under relatively unfavourable climatic and other conditions if the cows, the people and the markets are available.

If the teeming populations in the less developed countries are to have milk at all, they must have their own milk industry, and milk produced from their own soil, because the prospects of an adequate surplus of milk in the more favoured countries are not encouraging. The scale of international trade in milk products, important as this is, is a relatively small thing, when it is considered in relation to the minimum milk requirements of the people in the countries with which we are concerned. Even the surplus of skim milk powder in the United States and Canada, which has played a very important part in international assistance since the war has now almost disappeared, and in some western countries,

notably the United States, the number of dairy cows has been declining steadily over the last decade. I am trying to make the simple point that the great need for milk supplies in all forms in the future can only be met marginally by surpluses from the highly developed—mainly Western dairy farming countries. They can assist but not solve the problem of milk supplies, which in my view, will, because of rising demand, become even more difficult in most of the less developed areas as we proceed.

In these circumstances I have become very interested in the pattern of the milk industries including production, handling and distribution which has evolved so far in some of these countries—and in trying to consider what shape this should take, and the instruments and methods to be used in shaping the future. I found the position in Mexico to be most fascinating in this connection. My study concerned particularly the milk supply to Mexico City, which is a great Metropolis, but I was also interested in the supply for the urban areas in the country as a whole. The rate of increase of population now is at the rate of nearly 4 per cent per annum, and the Mexicans estimate their population in 1975 will be around sixty millions. At this time they further estimate that about 40 per cent of their people will still be engaged in rural pursuits, and that they will have more people on the land than ever, although in percentage terms those living in urban conditions will be in the majority. I cannot take this further by talking about numbers and proportions occupied in agriculture, because the Statistics are not available. The great weight of the rural population shows clearly the nature and the extent of the poverty in these countries, it also indicates, the long time and great effort which will be necessary to secure substantial improvement.

The first dairy farm which I visited is within twenty miles of Mexico City. This is on the plateau, the land is flat and all of it (about 600 acres) under tillage crops. The main crops are lucerne, maize, and some cereals. The farmer is a producer-retailer, his herd of 600 Friesian type cows are kept in a large enclosed area—not covered entirely but with shelter from the sun. They are milked in a most modern herringbone parlour by machine, the milk flows by pipeline to a modern pasteurising plant and then to a bottling machine—which is just about to be replaced by a Tetra Pak carton unit. He produces around 2000 gallons each day, which are sold directly to customers in the City. This is a big business, but is by no means unique in Mexico—there are perhaps 200 of this type and size of milk production unit. Apart from my natural surprise at finding this very sophisticated production unit, which seemed to me to be efficient by our standards I was interested because it reminded me of similar enterprises in California which I had studied some years ago. This pattern is not new in Mexico—some of these Ranches are old established and I suspect that they are not copied from the U.S. but on the contrary the probability is that as California was until relatively recent times a part of Mexico that this is a pattern evolved by the Spanish and their descendants who were and still are the big landholders in Mexico. This is only my theory, but I find it attractive to believe that everything connected with size and scale does not originate in the U.S.

In great contrast to the dairy farm which I have described the bulk of the milk produced in Mexico comes from the small properties—

some with up to twenty-five cows, but most with from three to five cows. And on the whole, the arrangements, the cows, the facilities, the land, the water supply are disappointing and poor. Thousands of these individual units provide a poor basis for a decent living for the families dependent upon them. This is the pattern in most underdeveloped countries, where there are many people and relatively few good dairy cows.

I mention all this because we are all interested in the pattern that should be developed in these emerging countries, how this should be arranged, promoted, financed, and the effect on the rural population and the economy. This problem in Mexico is not new to any of us, but perhaps there are not many countries where one finds such marked contrast between the big modern producing units which already exist and have a relatively long tradition and the incredibly poor small units alongside. In Mexico the problem is aggravated in my view by the deliberate policy of Government—and this has been going on for fifty years to break up the large Haciendas or estates—to give land to the people. This is a political doctrine of the Revolution, it continues to hold sway, and not many Agricultural Economists are even available to explain its dire consequences.

The form and size of the milk producing unit in these developing countries will not show a single pattern, but it will be no less than tragic if in Mexico, for example, the Authorities destroy the few remaining large farms to make more small uneconomic units whilst we in Europe try to make holdings bigger, with fewer people on the land and employ more capital to organise farm production (of milk for example) more in line with the modern industrial economy. Already this peasant problem has been tackled boldly in some countries, the Soviet Union is one example, where the collectives and the State farms have been organised to replace the peasant holdings. In Israel the approach has been different but they have also aimed at the big milk production unit almost on a factory basis. These are not the only examples, because in other countries, notably in India, the Authorities have chased some of the cows out of the cities and organised big production centres nearby but in rural surroundings. I am not in a position to assess the results in terms of efficiency and economy of any of these methods, they are obviously in the early stages of development, and most of them are operating in areas where the climatic conditions are difficult and where there is no strong tradition of dairy farming as we know it. We must obviously be patient in our judgement of these developments; because many initial mistakes will be made and there will be failures and disappointments.

The problem of getting the milking cows out of the City is also being tackled in Mexico and I had the opportunity to visit the 'Milk City' which is now being built. This is designed for factory milk production on the grand scale, certainly the biggest I have seen or read about. Here it is planned to house more than a thousand milk producers and a hundred thousand milking cows. The planning and building is already under way. Naturally they are not going to put all these cows under one roof—on the contrary, they are going to preserve the private enterprise tradition in milk production by providing each farmer with his own factory set

up, which includes a large concrete area for the cows, a milking parlour unit and new cottages for the farmer and his employees—all in one unit. And alongside these will be the farmer's neighbours with similar concrete structures. This will be in fact a new town, where about 15,000 people will live on the basis of specialist milk production. The "City" is situated only about 20 miles away from the capital, and all the milk will be pasteurised and bottled—more correctly put in cartons or sachets, at the "City" for sale in the urban area. This is a great and imaginative plan, but I must add that it is only in the early stage of building yet. The reception dairy and the pasteurising, cartoning equipment and buildings, however, are nearly completed. The "Milk City" is planned as a large milk producing factory. The producers have no land—they will buy their roughage and the concentrates from the Co-operative on the spot which is already in business.

This is a big venture, involving large amounts of new capital—the farmers can only provide a small share. The rate of interest is high in Mexico, and capital is scarce for farming developments because there is so much other public and industrial growth proceeding simultaneously.

In this country we are already witnessing some trend towards factory milk production. The Mexicans who have not our tradition of dairy farming in small units are able to go forward with it for this reason, perhaps more boldly, and their need for milk with a rapidly rising population is pressing.

I am not in a position to assess the economy of these factory milk enterprises. But by trying to measure this from our experience in the United Kingdom, we will tend to believe that costs will be high, and that the economy of scale in handling the cows, will not counterbalance the disadvantages of having to bring all the feed into the factory. One has to be careful in making any such tentative judgement in these developing countries because the alternative which they have is the establishment of thousands of small dairy farms and this in terms of capital and technical knowledge may be much more difficult. It is best to conclude that the factory milk production units are on the march here in this country, as well as in the less developed countries. There are problems of capital and of management which are extremely difficult in the new milk areas, and there will be many mistakes, failures, catastrophies, and there is hardly need for me to explain to this audience which can visualise the poverty of materials, the lack of technical and scientific know-how, why this will be so.

As you may have gathered I am personally sympathetic to the industrial, factory production approach to milk production in some of these countries. But in saying this, I appreciate that the great problem of the weight of rural population remains. In the rural areas, in most developing countries, the standards of living are very low, and there are masses of people. They cannot be taken into the towns except as industry and services develop—and factory milk production enterprises will not employ many of them. It can only be concluded that these problems of poverty will remain for a long time, and that to tackle the problem of a supply of milk to urban dwellers, is only a very small piece in the

great complicated pattern of their economic development. I confess that I favour this Mexico type milk production factory for a number of reasons, but particularly because I can see that more milk can be produced to meet the need of the rising population in this way quickly, particularly if enterprising individuals or Companies are found with the capital and enterprise to go ahead. The alternative forms of organisation of course pose interesting problems; the co-operative set up is always a possibility, and there are many variants from these to the State controlled public enterprise. But this is another subject.

At one time I was inclined to believe that in a country where a milk industry was to be established almost *de novo*, it would be wise to plan that the milk should be dried into a form of powder before distribution. This is not a new idea, there are people in this country who have suggested it as a likely development here in the near future. We have always fresh milk or evaporated or condensed milk available. And in the United States particularly the dairies have been offering milk powder and a concentrated milk. The aim always is to take the water element away or some part of it; to sterilise the product and to avoid the costs of delivery, by selling through the grocery chains. By and large the fresh product has not been displaced by processed substitutes partly because these have been and remain relatively more expensive and for most people they have not the versatility of the fresh product. I mention this because some thought has been given to the best form of milk product to be used in the less developed countries where the fresh milk business has not been a strong habit and tradition. The most useful products undoubtedly are the milk powders. The full cream milk powder has not been entirely successful and it tends to be expensive, but the technical problems are being solved at last. Skim milk powders, particularly the spray variety, have a most important part to play in the diet of people who for a variety of reasons have no supply of fresh milk available to them. These are used in their natural form or as a base to which vegetable oils are added to make a nutritionally satisfactory substitute milk. A great deal is being done currently to develop the habit of using 'filled' milk, mainly under the aegis of public authorities, in Africa, Asia and in South America, and the surplus supplies of skim milk powder from the main dairying countries are essential to maintain this service at the present time. In Mexico arrangements have been made for some time for blending skim milk powders with vegetable oils to provide quite a substantial part of the milk supply to the children and the poorer people in some cities.

In spite of all the research and investigation into the problems of milk and milk products in the Western countries, there seems to be no short cut to the provision of a satisfactory milk supply to the teeming millions of people, many of them undernourished, in the less developed areas of the world. It appears that they will have to produce their own milk from their own land and resources. It also appears that they will be using it very largely in the form of fresh milk—pasteurised of course—rather than in some more modern sophisticated product the use of which could avoid the labour and cost of handling a perishable liquid. They will also, as I have said before, be producing, handling and distributing

it under what we regard as adverse conditions for milk. These remarks apply obviously to the circumstances as we see them today, and there is always the possibility that a form of milk or a substitute will come about through some scientific breakthrough which could transform the whole subject.

The field of distribution of milk, which in its complexity and cost is almost as big as the production side in most Western countries, tends also to be a serious problem in the developing communities. The relatively small supply of and the demand for milk in large urban areas, the lack of refrigeration, the irregularity of supplies at certain seasons, the tradition of adulteration of milk supplies together with the lack of organisation make it a poor service in which a large number of people are involved, most of whom earn a poor living. I had the experience of travelling on a milk round in Mexico City one morning and I am not likely to forget the great contrast between this no-system and our own highly organised, effective, but still much criticised method in this country. I mention this particularly because I believe it will be a great pity if the growth of milk industries in these countries should include also an elaborate system of household delivery similar to our own. This will have to make way even under our circumstances, as packages change, refrigeration in the home becomes more universal and milk becomes even less perishable, to a system of selling through the shops and super-markets along with all other food products, which is more flexible and economical.

In the circumstances which I have briefly described for Mexico, many of which apply in other less developed areas, there remains the task—the enormous task of creating a modern milk industry to meet a need for the better nutrition of the people. In many of these countries the cows are already a part of the rural economy, and the use of some milk and/or cheese in the diet is an approved practice and tradition. The problems arise because the production of milk is relatively small and inadequate and the growth of population which is projected to the end of the century together with the natural growth in demand requires an enormous increase in supply of milk and its products. I have felt for many years that skim milk powder (the proteins of milk) will become even more important and perhaps more highly valued in the market than butter. It is almost certain to become scarce and highly appreciated, with a world-wide market as a most valuable element in the better diet of a much wider spectrum of the people of the world.

The supply will be made available partly from the traditional dairying countries, but by far the bigger proportion must come from growth of dairying in the developing countries. Despite the discouraging natural conditions, the dairy cow seemingly must be the instrument to play an important, almost essential, role in the better nutrition of these people. It is difficult to speak of the economics of these emergent dairy industries—the cows in the villages of India or of Mexico cannot be assessed and analysed in this way. On the other hand the modern, factory organised milk production units of which I spoke earlier, appeared to offer better prospects of being efficient, with good cows, and management.

I was intrigued also to find that the price of milk bottled, pasteurised and delivered in Mexico City was lower than it was in London. There is no subsidy, and prices paid to the producers are rather less than ours. The structure in between, its cost and analysis, is shrouded in mystery and there are few milk statistics. The prices and cost structure of course are different from ours—the wages of labour are low, and this is an important counterbalance to the poorer organisation and yield of cows. But if the producers in these areas can sell milk at our prices and live—they can produce more and develop a milk industry, perhaps in a relatively shorter period than we think, provided the right kind of aid is provided.

The question which faces every investigator of this problem, is where and how to begin to arrange the growth of a dairy industry, what organisation should be used, what kind of farm unit or units, what kind of cow, where the supply of capital, where the know-how, scientific and other aid can be derived. The level and intensity of these problems naturally differ from area to area, but when we discuss and debate the finer points and adjustments in our own agriculture, it is salutary again to remember what a fine industry we have, how highly organised it is and what a relatively good living it provides to those few who are now engaged in it, and what high production of food, and high productivity it has attained.

After my limited experience in less developed countries, studying particularly the milk industry, their problems and prospects, I find the tasks which face these people in organising food production to meet the need of their rising populations almost baffling in their complexity. This audience will readily appreciate that much is already being done by the developed countries of the world to assist in various ways. We must also understand that these efforts are only very small in relation to the size and scope of the task. The international agencies are fully involved in these problems, but their scope and resources are limited, and up to now they have only been able to influence the fringes of development in most areas.

Without attempting to follow this subject in all its complexity and describing what we should do to assist—this is fully appreciated in many Western countries—I want to indicate two features which rather appeal to me. First, and speaking now again of the underdeveloped milk industries, I believe that much more should be done by using the experience and skills of the great milk enterprises, Marketing Boards, the Dairy Co-operatives, and the great capitalist companies in Western countries. These have had enormous influence on the growth in organisation and efficiency of the industries in their own dairying countries, and an effort should be made to use them to promote development in these other areas. This is likely to be a much more effective approach than trying to promote growth almost exclusively by setting up public enterprises in the less developed countries, which lacking an alternative is about the only instrument which can be made available. May I suggest to those many agencies which consider these problems that our own instruments and organisations are probably not fully utilised in these campaigns. True it is that many of them work on the basis of the traditional capitalist profit motive, but they can still be harnessed to government and international

development policies, and to a great extent be the means for execution of plans. And it is not the planning but the successful carrying forward of plans into action that always seems to be weak. It is here that the stimulus of financial profit may still be the most effective catalyst to progress and development.

Where I have studied these milk problems I have found a serious shortage of trained milk technologists, scientists and economists, and this of course is also well known. What is less appreciated is the gap that this creates and the little that can be done without them. In Mexico, for example, where a great deal of milk is produced and there are millions of cows, there is no Dairy School, much less a Dairy Research Institute, and hardly anyone that you could describe as a dairy specialist. I paid a visit to the National Dairy Institute one day, and the Director was mostly concerned to show me a very fine set of Charollais bulls! I have already recommended to the Mexican Government that they should train dairy technicians and specialists, but that can only be achieved over a long term. In the meantime surely, not only in Mexico, but in many underdeveloped countries, technologists and dairy scientists trained in Western countries can be used in large numbers. In fact I doubt if much progress can be made without them. This must be a substantial programme, they must be made welcome in the developing countries, and they must be prepared to stay a good part of their working lives in the new surroundings in order to make an impact. A few of us pay visits to these countries; we stay a few months, we then prepare reports and we return to our own work at home. Some of this may be useful, but I suspect that these visits help us more than they contribute to the better economy of the problem areas. I say all this in the precincts of this Agricultural Faculty because there is some tendency for the Education Authorities in this country to believe that the training of scientists for agriculture can be contracted somewhat, and it is already suggested that some agricultural schools be closed in pursuance of this policy.

Although this policy can possibly be justified by the needs of our industry at home, I believe that we can make a great contribution to the developing countries by training many more of our people for service overseas. We may in our new circumstances in this country have to curtail our foreign aid in terms of cash and capital, we may have to reduce the size of the defence services overseas. This I will not debate, but I want to suggest that we could well increase substantially our contribution in terms of trained people—particularly on the agricultural side. The cost will be small but I am convinced that the contribution to the food supply situation will be great. We used to say that trade follows the 'flag' and now that we are no longer a great colonial power, I am convinced that even in our own narrow trade interest an increasing export of our trained agriculturalists and food scientists will be very worthwhile. Let us not underestimate the scope of these problems, nor exaggerate what a few men can do in the difficult conditions of a developing country—and there are many of them. We need to send teams of trained men if we are to make an impact. Naturally in order to succeed they will also need the instruments of capital and organisation but these give scope for the subject of another lecture.

