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II. RESEARCH IN AGRICULTURAL ECONOMICS

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I PROPOSE to introduce this paper by quoting a definition of Agricultural Economics written in 1927 by the late John Maxton.

'Starting from the comparatively constant features of land tenure, climate and other geographical conditions and the general organization of farms, the track of agricultural economic research leads through the first operations in the production of farm commodities right to the passing of the commodities into the hands of the consumer, whose circumstances and tastes, in turn, cannot be ignored as factors directing production. It is the charting of this track and the provision of posts and warnings and even the removal of twists and bends and dangerous crossings, that is the work of agricultural economics research.'

In this early definition Maxton shows his inimitable flair for accomplishing the well-nigh impossible. For here he gives as comprehensive a definition as one could wish of a subject which as he always kept reminding us does not, in fact, possess 'nice firm and tidy boundaries marking off a clearly compact body of knowledge. . . . It's comprehensiveness and its pervasiveness are its strength and its terrific interest, and it isn't for us to set narrow theoretical limits to our field.' Nevertheless, there is need 'for some principle on which to select and curtail, and at the same time to retain a cohesive quality'.

It seems to me that those responsible for drafting the programme of this Conference have paid heed to this need and they have succeeded in striking a nice balance. While the main theme of the programme exemplifies the 'terrific interest' of *agricultural economics* to everyone concerned with the welfare and culture of rural society, room has also been found for more mundane topics concerned with the equipment and functions of *agricultural economists* as such.

This group of three subjects which we are discussing today belongs to the second category and carries the term 'professional' in its title. There is need occasionally to draw attention to the existence of a profession of agricultural economists. In this company this will not be misunderstood for a snobbish belief in the role of the expert. Our International Conference has too catholic a membership and too catholic a tradition to permit any one to get away with such a view. As one of the professionals I say, quite sincerely, that that to me is its great merit and its great appeal.

For the purpose of the present discussion I have found it convenient to consider some of the problems of research in agricultural

economics under two heads: problems of method and technique and problems of direction and administration.

Problems of Method and Technique. There is an element of duality in the subject of agricultural economics and there is an element of duality in the equipment of the agricultural economist. The subject itself lies in two complementary fields—one is concerned with the economics of agriculture and with the problems of the industry in the general economy, the other is concerned with the economics of farming and with the problems of the farm. It follows that the agricultural economist should know his economics; he should also know his farming. In other words, he needs to cultivate two disciplines, one mainly reflective and philosophic, the other mainly practical and technical. These joint disciplines are essential if he is to bring an intellect trained in the ways of economic argument to the study of actual problems in the field of agricultural and farming affairs. His claim to professional status rests on his ability to analyse such problems so as to develop general ideas in relation to them, and this trained facility in analysing problems and in developing ideas must show itself in his approach to any particular piece of research.

The starting-point of any piece of research must be an intention—an intention to find something out which was not previously known. But if the work is to have any philosophic or scientific status there must also be an argument which relates the knowledge which is sought to that which already exists. Without such an argument the results of the research will be no more than a formless aggregate of disconnected facts, and cannot represent an addition to systematic knowledge. Thus the first problem of research in logical order is to become clear as to what knowledge is sought and, at the same time, to become clear as to the thread of argument which underlies the desire to obtain this knowledge.

On this point two comments may be made. First, even when the intention of the research is purely descriptive, the need for an argument exists. For no description, however voluminous, can ever be complete, nor can it even approach completeness. Not every fact can be observed and set down. Therefore there must be selection, and, if there must be selection, there must be a principle of selection. One must know why this particular fact can be neglected, whereas this other fact cannot.

The second comment is that there is, of course, a distinction between insisting that the argument underlying a piece of research must be clearly seen, and insisting that a practical application must be clearly seen. It might be that the research is *ad hoc* in character and

that the argument associated with it does no more than link it to some specific practical problem. On the other hand, in another instance, the practical application of some piece of research may seem remote; the intention behind it may be, rather, to extend and develop an existing body of knowledge. But in either case an argument there must be, before the research has any claim to be considered intelligent.

When the intention and the argument are clear the next problem is that of expressing the knowledge which is sought in terms of entities which by their nature are capable of being observed. The basic concepts in terms of which economic reasoning commonly proceeds do not, in general, possess this quality. Such things as the size of farm, the quantities of capital and labour used, the size of an enterprise; and still more, such concepts as intensity or efficiency of production, entrepreneurial skill, human satisfaction or fatigue—these are not capable of being simply observed in the same way as weights or distances or volumes and so on. The entities, relevant to the field of agricultural economics, which can be observed are such things as areas, distances, time taken to perform jobs, numbers of workers, numbers of livestock, yields of crops, quantities and prices of things bought and of things sold and so on. Only very rarely, if ever, can a fundamental concept which occurs in a train of economic reasoning be ideally expressed in terms of the observable entities. Generally something which falls far short of the ideal has to be accepted. Generally, moreover, there is a choice of approximations.

It is here that a clear grasp of the underlying argument is vital. Without it, it will not be possible to make an intelligent decision as to which of the approximations available corresponds most nearly to what the argument requires, nor will it be possible to make any assessment as to how far the degree of approximation finally accepted, impairs the validity of the results. For example, there is no absolute measure of the quantity of labour used but there are several measures which can be used. It is necessary to decide, in the light of the argument of the research, which is the best measure to use in a particular case. It is also necessary to decide whether the best available measure is good enough. This then is the second category of problems encountered: to convert the knowledge sought into terms of entities which can be observed, to do this conversion in the best possible way in the light of the argument, and then to decide how far the discrepancy between what is sought and what can be observed will qualify the results.

Very frequently, when the research goes beyond the purely descrip-

tive, the aim is to find out the relation between one factor or group of factors, and another factor or group of factors. In other words, the aim may be to make possible some estimate as to what changes in one factor will result from given changes in some other factor. For example, the aim might be to find out what repercussions upon the level of farm costs and farm output will follow from certain changes in the intensity of the farming system, or what will be the effect upon the profitability of certain types of dairy farms of introducing, or altering the scale of, some subsidiary enterprise. When the intention of the research is of this sort, there are two main methods of approach, the empirical and the analytical. To take an example, suppose the aim is to find out which of two farming systems is the more profitable. It is possible to proceed by examining many farms within each system and noting their profits (the empirical approach). Or, it is possible to proceed by a detailed study of the inner working of both systems and arrive at a conclusion that way (the analytical approach). The survey, or the examination of mass results, is the typical tool for the empirical approach, whereas a case study would more often imply an analytical approach. Whichever the method adopted certain fundamental difficulties will be encountered other than those indicated above. These difficulties arise from the presence of many other significant factors besides those with which the research is primarily concerned. But the form the difficulties take will depend upon the approach. With the analytical method the difficulty is that of reaching conclusions sufficiently general in application. With the empirical method, the difficulty is that of reaching conclusions which are valid in the sense that they validly indicate some systematic relation between the factors being studied.

Take the analytical approach first. The first requirement is a model to analyse. If a particular farm is taken as the model, there is a good chance that by careful analysis a relationship can be found between the factors being studied which is valid for that farm. But it is almost certain that a number of characteristics of the farm, other than those with which the research is directly concerned, will be relevant to the form of the relationship. In general the greater the precision with which the relationship is expressed, the greater will be the number of those other characteristics which have to be specified. At the same time, the greater the number of other characteristics which are specified the less will be the number of farms for which the relationship will hold. Thus the problem with analytical research is to obtain a conclusion which is sufficiently precise to be helpful and which, at the same time, does not require the specification of so many extraneous

factors as to limit the number of actual cases to which the results apply below what is useful.

Take now the empirical approach. Broadly, the method is to take groups of farms which differ in respect of one of the sets of factors under consideration, and compare them in respect of the other sets of factors with which the research is concerned. This can be done either by taking the same group of farms at different times or else by taking different groups at the same time. Either way there is the possibility that other additional factors besides those primarily being studied will vary between the groups compared. Thus the problem is to obtain groups which are truly comparable in the relevant respect. The method of advance here is to define certain of these additional characteristics, and only to compare groups which are alike in respect of these defined characteristics. The greater the number of specified characteristics, the smaller will be the groups compared, and so the less will be the precision of the results. In theory this might be met by extending the scale of the investigation.

These difficulties of obtaining truly comparable groups are increased if one of the extraneous though relevant factors is found to be linked to one of the factors with which the research is directly concerned. For example, if different levels of intensity are being compared, and if, in the region covered there is a tendency for better farmers to favour a more intensive system, then it will be doubly difficult to obtain groups of farms which differ in respect of intensity but not in respect of the quality of entrepreneurial ability. Thus the problem with empirical research is to be able to obtain groups which are truly comparable in the relevant respects and which, at the same time, are strong enough numerically for sufficient confidence to be attached to the results.

It is worth noting that in many of these problems powerful assistance is sometimes available from relatively recently-developed statistical techniques. But the development of these techniques has not reached the pitch of providing a rule of thumb research procedure which will automatically be valid provided the rules are sufficiently devoutly observed. On the contrary, specific problems have to be specifically and deliberately faced. A statistical technique is appropriate if, and only if, when properly understood, it is found to provide an answer to the particular problem which is under consideration.

In any case, the application of the more spectacular statistical tools is almost wholly confined to handling the mass of data which arises in the empirical approach and to drawing valid conclusions therefrom.

They are not relevant to the major problems of logic which are encountered in the analytical approach, nor are they of direct help in the development of a sound underlying thread of argument to the research project as a whole. Moreover, although in making the conversion from theoretical entities to observable entities the statistician may help by saying whether or not a given set of observable entities seem workable, he nevertheless has no special means of judging how closely they correspond to the theoretical concepts which were originally in mind. Then again, the statistician is dependent on assurances that all the relevant factors have been specified—it cannot be assumed that his special technique will not fail to reveal an omission in this respect. (In parenthesis, a word of warning may be given here, for the use of statistical techniques provides one of the best illustrations of a danger which often besets the research worker. It is the danger that techniques requiring great skill in their manipulation may become so absorbing in themselves that they imprison those who use them.)

These, then, are some of the problems which are encountered in the course of carrying out research and which, in fact, constitute the difficulty of research. It is clear that no research can be absolutely perfect in all the respects mentioned. But the results of the research should be so presented that the reader is given confidence that the research worker has deliberately considered all difficulties of this kind. If some of the difficulties have not been entirely overcome, the research worker must show that he is aware of this fact and, ideally, he should commit himself to an opinion as to how far it impairs the validity of his conclusions.

Problems of Direction and Administration. We now turn from problems concerned with the method of research to problems concerned with its direction and administration.

The extent and the variety of the fields in agricultural economics makes the choice of research projects a bewildering problem in itself. Possessing the skill to spot the problems worth solving is of even greater importance than possessing the economic expertise for setting about their solution. There is need for both imagination and judgment in selecting a piece of research if the research itself is to yield worthwhile results. This does not mean that the selection should be dictated by expediency. It does mean that research should be directed to significant issues in agriculture and in farming so as to develop general ideas and systematic knowledge in relation to such issues.

At this point it is necessary to refer to the two main categories into

which inquiries in agricultural economics may be roughly divided. One category is concerned with work of immediate utility and the projects involved may usefully be termed 'current investigations'. The work in the second category, however, is of a broader or more elaborate character qualifying it to be regarded as basic or fundamental research. Because of the more obvious practical application of the results of current investigations there is always some danger for these investigations to crowd out the more fundamental projects from research programmes. Skilful planning of programmes, however, should not only prevent this but should also, wherever possible, make use of current investigations to facilitate rather than hinder the more fundamental research. Ideally the two categories should be complementary and not competitive.

Many current investigations are purely descriptive and sometimes the work approaches that of fact-collecting. Although research goes beyond mere fact-collecting, fact-collecting is, nevertheless, not to be despised. Three points need to be made here. The first is that the facts which the research economist needs are not confined to figures and statistics—the facts will embrace all kinds of information and evidence which help with the analysis. Secondly, since the economist deals with dynamic problems the relevant facts need to be kept up-to-date, i.e. there is need for continuing fact-collecting. Thirdly, from the point of view of research the important thing is 'to have the facts not to collect them'. This means that not only must facts be collected and kept up-to-date, they must also be stored and catalogued so as to be easily and readily available if and when they are needed.

Once again I quote from the writings of John Maxton who, in an important paper entitled significantly enough *Professional Stock-taking*, advocated that strictly speaking the function of the agricultural economist was as much a service function as a research function. Here are his words :

'the business of organization, whether of one department or of departments jointly, is to have at its disposal for immediate reference all the available variety of detailed knowledge that might be required for analysing any problem. In other words, the function of the professional agricultural economist is to analyse problems, for which he must have at his disposal a large and varied amount of detailed information, and the ambition of the organization is to see that all the available detail in all its variety is systematically filed where it can be promptly obtained—in short, a *systematic detailed encyclopaedia under revision*'.

This service function, which is a necessary prerequisite to most research work, adds serious difficulties of a practical order which, in

fact, may impose the final limitation upon research in agricultural economics. These are the difficulties of obtaining access to the information required, and the difficulties of obtaining the manpower and the financial resources adequate to carry out the work. This is not the place to enlarge on these difficulties, but it is necessary to indicate some of the more important implications which result from their existence.

In considering the difficulties of obtaining access to information it needs to be emphasized that facts collected specifically by economists themselves are only a small fraction of the facts required. On the contrary, an immense body of the most valuable and relevant information is devised and collected for purposes totally unconnected with any research activities. The most important is, of course, information collected by national and international institutions. These may be privately or co-operatively organized groups of producers or traders, or they may be official or semi-official administrations. There is need, therefore, to establish full and harmonious relations with these institutions in order to have the freest access possible to the relevant information in their keeping. It is a generally accepted principle in most countries that scientific workers with bona fide claims to be competent to pursue research should have access to all the relevant information available. But in economic research it has to be admitted that there may sometimes be a real difficulty in implementing this principle. For example, it often happens that the research worker requires information from an institution for the purpose of making a critical economic assessment of the institution itself or of some of its activities. Again, in countries where the Government tends to become an active participant in the economic affairs of agriculture, it is becoming increasingly necessary for independent (i.e. non-official) research in agricultural economics to be directed to the study of the implications of official policy. If such research is to be effective, the research worker will need the fullest possible access to official archives. Independent and disinterested research does not, of course, necessarily mean criticism. But the independent assessment of evidence and impartial judgements based on it are always potentially critical. It is to be hoped that the administrative mind can rise to the stature of giving ample scope to independent researchers who will always be potentially its most thoughtful and impartial critics.

The growth of industrial, commercial, and governmental institutions has also an important bearing on the problems of the manpower available for research. In recent years these institutions—and especially the current crop of international agencies—have created a vora-

cious demand for professional economists to pursue work for the immediate purpose and in the special interests of the institutions themselves. In so far as this is an appreciation that work involving agricultural economics needs to be handled by the professional economist it is an entirely healthy and enlightened development. Nevertheless, it may well have disastrous effects on more basic research if such research is left to a residuum of workers who, for one reason or another, have not been absorbed into the more lucrative employment of the industrial, commercial, and administrative machines.

I would like to enter a plea that this competition should be curbed and replaced as soon as may be by a complementary relationship. There is urgent need to encourage a two-way traffic of workers, for such a traffic would benefit everyone concerned. In Great Britain, we have not, so far, been very successful in this matter. There are a few notable exceptions even with us, but with us it is comparatively rare for the agricultural economist who has left for industry or administration to return to basic research. I understand that in some other countries—the United States for example—the position is healthier. If this is so it would be valuable to be told something about how it is managed.

It would not be appropriate in this paper to give more than the briefest reference to the difficulties associated with financing independent research in agricultural economics. I propose to make three comments only.

The first is the obvious one that research in agricultural economics is expensive in men, time, travel, and equipment. It follows that substantial funds are needed if it is to be pursued on an adequate scale. It also follows that those entrusted with the organization of research have a duty to promote efficiency in the use of funds. Among other things this means the careful planning of research programmes within departments, the best deployment of fairly large teams of research and ancillary workers, and a considerable measure of national co-ordination of activities. In all this there is need to preserve a place for the small as well as the large department, for the small department is specially privileged in being able to make its contribution through the quality and variety rather than through the quantity of the work it does. Above all, there is need to make sure that the inevitability for organized team research and for co-ordinated activities will never be allowed to eliminate individual experiment and initiative. Let us always remember that original advances in agricultural economics, as in other branches of knowledge, are most likely to be made by men who approach their researches in a spirit of intellectual adventure.

The second comment is equally obvious so far as most countries are concerned. It is that the bulk of research funds now come from public revenue. Members of this Conference need no reminder that in the past the social sciences, and agricultural economics in particular, have received munificent financial support and encouragement from some of the great private foundations, and that this support has not been confined within national boundaries. Nevertheless, it would be unrealistic not to accept the position that in the future adequate funds are for the most part likely to come increasingly from governmental sources.

The third comment follows from this situation. Increasing dependence on State funds makes it doubly necessary to safeguard and preserve the integrity and the disinterested character of research activities. This situation is not, of course, unique to agricultural economics. But the position of agricultural economics is specially vulnerable for two reasons. The first is that the increasing intervention of Governments in economic matters has, if anything, gone furthest in agriculture. Secondly the subject of agricultural economics bristles with topics which, in addition to their economic and scientific implications, are also highly charged with social and political significance. All the more, therefore, is it imperative to insist on the essentially scientific and on the strictly non-political character of the work done by agricultural economists.

In the main the status and freedom necessary for disinterested research are best guaranteed by having research departments within academic institutions such as universities or colleges, though it is to be hoped that there will always be a place for institutions with no direct academic affiliations. Provided universities accept fully the administrative implications of developing our kind of work I, for one, am satisfied that they are best suited to withstand any attempt to make research in agricultural economics 'a tool of immediate policy'.

They will be greatly helped in this, however, if the passage of funds between the Government and the agricultural economics departments is indirect and the procedure governed by the three conditions suggested in the *Report of the Committee on the Provision for Social and Economic Research* which was issued in London in 1946. The first condition is that the funds of a department should be continuous over a period of years. This does not rule out *ad hoc* grants for specific projects, but it does avoid the danger that over-reliance on *ad hoc* grants may tempt 'heads of departments, naturally anxious to keep their research organizations together, to improvise projects of a kind and

on a scale which they would not (otherwise) have felt disposed to undertake'. The second condition lays it down that 'public money is likely to be better spent in supporting projects which are formulated by the active workers in any particular field of inquiry than in imposing projects from above'. The third condition, however, accepts the need for a body of scientific reference which, while not interfering with the initiative or the autonomy of individual departments, would 'survey systematically the range of work . . . and if gaps are revealed . . . offer such stimulus as may be necessary to secure that they are effectively filled'. In Great Britain we have gone some considerable way towards achieving these conditions, though the position of agricultural economics is still not entirely on a par with that of most other university departments.

Being members of departments which are integral parts of universities and colleges confers, of course, other benefits on the research worker in agricultural economics. There is, for instance, the benefit of the stimulus of contact with, and preferably some participation in, teaching activities. There is also the great benefit of easy collaboration with workers in fields closely related to our own. This collaboration is essential for not only is it necessary for us to take cognizance of the findings of other workers, it is our duty as agricultural economists to take the lead in bringing about the integration of the social sciences which impinge on the welfare of rural society. But if we claim for ourselves the privilege of university membership, and if we also claim the protection conferred by the system of finance that I have just mentioned, we need to remember that this privilege and this protection demand from us a sense of special responsibility. In the first place membership of a university should mean that we rigorously apply the highest academic standards of intellectual integrity to all the research we undertake and to the editing of all the reports which we issue. Secondly, the sanctuary which the university provides for disinterested and speculative research should not be mistaken for a cloistered existence. On the contrary, if we are accorded the freedom to pursue our research and publish the results without regard to those whose funds make our work possible we are also 'in duty bound to conduct research in the public interest and so far as possible without prejudice'. Those last words are not my own. They were spoken by you, Sir, three years ago when you gave your Presidential Address to the British Agricultural Economics Society.

III. EXTENSION IN AGRICULTURAL ECONOMICS

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I am standing before you on the invitation of our President who must have assumed that my having had opportunities to glance at American extension work in agricultural economics would enable me to point out differences in the conception, methods, and organization of extension in different countries.

I would like to explain at the beginning of my talk that its scope is not quite so wide as its title may suggest. Extension in agricultural economics has already been discussed a good deal both in Europe and in the United States. There are the reports and discussions on Extension Services of the F.A.O. Regional Meeting (August 1949), the O.E.E.C. Working Party (1950), the E.C.E. Committee (February 1951) and the U.S.D.A. Conference (1949), and it seems to me that at an international conference like ours there is no call to repeat what is already known to all of us. But it may be worth while to make a short analysis.

The Report of the Committee on Agricultural Problems of the E.C.E. says that 'the most commonly recognized objective of extension or advisory services is to increase the productive capacity of land as well as the efficiency of the farmer by harnessing to agriculture the results of up-to-date scientific knowledge and inventions'. On other occasions we find similar statements. I believe none the less that this description of the term 'extension in agricultural economics' is far too narrow. But before proceeding further we need an understanding of the working field of agricultural economists.

K. T. Wright, discussing the role of agricultural economists, has said that we have responsibilities to the profession, the students, the farmers, the professional agriculturists, the marketing agencies and society in general.¹ I fully agree. The basic purpose of our work is teaching agricultural economic principles, assisting farmers in all economic problems of their farms and families, promoting efficiency in marketing farm products, developing a sound agricultural policy and presenting to society the economic problems of agriculture so as to promote a better understanding. Extension in agricultural economics therefore approaches the farmer on his farm, the market, and the consumers. Also, many civil servants and statesmen look for basic data and for counsel from agricultural economists.

¹ *Proceedings of the Agricultural Economics Society* (of the U. K.), vol. x, no. 1, 1952.

The responsibilities of agricultural economists are so great and differ so much that extension no less than research calls for specialization if it is to be successful. So we get specialists in farm management, in rural sociology, in farm appraisal, in land economics, in price statistics, in marketing, and in questions of agricultural policy.

I observed on my trip through the U.S.A. before this Conference that some American workers think that agricultural economists cannot accomplish their duties by themselves and must therefore always remain in close contact with economists outside the sphere of agricultural economics. I agree that an agricultural economist must have a good education in general economics, but I believe that in extension the agricultural economist should base his counsels on special experiences and practical judgement rather than on general ideas. Although an agricultural economist may specialize in general economics or a general economist may specialize in agriculture, I agree with C. V. Dawe, when he said in his paper, 'As one agricultural economist to another',¹

I do not think we can over-specialize in these days of specialization, and I become very annoyed when economists outside the sphere of agricultural economics say in a rather disparaging way that we are simply engaged in fact-finding. It seems to me that the whole science of economics requires more and more facts in many other industries and spheres besides agriculture. This is not to say that I think we fulfil our functions as agricultural economists simply by fact-finding. But I do think, the basis of our work must be inductive rather than deductive.

Now I would like to mention the differences in the amount of extension in agricultural economics practised in different countries. We all know how big the differences are. Detailed information on this question can be found in the reports of the F.A.O., O.E.E.C., E.C.E., and U.S.D.A., which I mentioned. Here I would only like to point out some of the reasons for these differences, because if we know the reasons it may be easier to make progress. Let us consider especially the differences between the U.S.A. and Europe. Of course, I know that differences exist even between individual states within the U.S.A., but they are very small in comparison with the differences within Europe.

In the time at my disposal I must restrict myself to general statements, and would say that extension in agricultural economics is determined to a great extent by the education of agricultural economists and their ability, by the readiness of farmers to ask for and to accept economic advice, by the research done in the field of agricultural

¹ *Proceedings of the Agricultural Economics Society (of the U.K.)*, vol. ix, no. 4, 1952.

economics, by the organization of extension and by the way it is financed. I guess there is no doubt that extension in agricultural economics is well developed in the U.S.A. and that even if it reaches only one third of the farmers, it reaches more there than are reached by extension in most other countries. What may be the reasons?

First, let us look at education. We need not consider elementary education, because it is similar in many other countries. But we must admit that in adult education no country gives so many possibilities and so many services as does the U.S.A. The enthusiasm for education in America is proverbial. But it is not only the education but also the suitable machinery by which the results of research in agriculture and in agricultural economics are brought to the farmers. The U.S.A. were lucky to have the Federal Land Grant College Act so early, I believe, as 2 June 1862, by which for ninety years most of the States have had the privilege of having a college which from its beginning aimed at the solution of the problems of farmers. Of course, agricultural economic research and economic extension go back only about forty years, but even within that time a great deal of economic information has been disseminated. The means of bringing it to them has been the Co-operative Extension Service, a very important factor in the contribution to the solution of their economic problems. In most other countries the relation between the farmers and the research done by the universities is not nearly so close as in the U.S.A. A European farmer would not approach a college so readily and he would not have the same confidence in its counsel as an American farmer has.

Look next at the ability of the agricultural economist and the readiness of the farmer to look for economic advice. Here again, America compared with most other countries has an advantage. It lies in the comparatively well expressed economic thinking of the American. There, most economic extension workers and most farmers look at the farm as an economic enterprise which, in a short time, should bring in a good deal of money. Also, our American friends think in a dynamic way. In their minds everything is changing. They believe in great new developments and revolutionary changes in the economy. In most countries of the Old World, on the contrary, agricultural economists and farmers look at a farm as a social unit. They are prone to think in a static way. Generally speaking, a farmer in the New World would be ready to accept the advice to increase the size of his farm whereas a farmer in an old country sees fewer possibilities of doing so. Many old industrial countries also have to import part of their food, and increasing the production per acre has

therefore become the long-term aim. But as in many of these countries the yields are already high, and as the farms are mostly diversified, further increases are relatively slow. This may be another reason for static thinking. Of course, the attitude is not the same in all old countries. But in comparison with the U.S.A., we can speak of relatively static thinking. The individual farmer, of course, may be ready to accept counsel for more economic and more successful farming, as he is anxious to increase his profits. But this mostly concerns details of his farming and seldom the changing of the whole organization of his farm. The Swiss farmer, for example, who builds a new barn, builds it for many generations. The American farmer, on the other hand, thinks in much shorter terms. If, in the corn belt, a livestock farmer has a hundred hogs this year, he is not sure whether he will have the same number, or any hogs at all, next year.

The economic attitude of the American farmer leads to specialized farming. This again favours extension in agricultural economics, though it does not follow that I favour this attitude in all respects. A short time ago I saw an egg farm with 43,000 hens and a dairy farm with 240 cows but with no feed production and no pasture. The cows were in a bare corral, fed with purchased hay and concentrates and milked in a parlour. The machine-milker did not pay any attention to the individual cow, and according to the farmer and the farm adviser, he should not know the peculiarities of the cows because this would mean a loss of time. I could not resist the feeling that I was looking at a factory and not a farm. Certainly in that case the economic attitude went too far. I am fully convinced that farming is not only production and economics, but it also has a duty towards a nation and the culture of men. To fulfil this obligation, a farm should remain a farm—a progressive and efficient farm certainly—but still a farm of which it is true, as is said in an inscription on the great Union Railway Station in Washington, D.C.: 'The farm is the best home of the family, main source of national wealth, foundation of civilized society, the natural providence.' You may say that this is still true for the dairy farm I have mentioned, and I could not deny it, but I do not believe that it will remain so for generations or that it could be generalized. Of course, I am unable to prove this statement, but I would like to ask: Does anybody really believe that to emphasize day in day out nothing but efficiency and money-making gives satisfaction and happiness in the long run?

Turn now to research in agricultural economics and the organization and financing of advisory work. After hearing the paper of

Professor Thomas, I need say no more about research than that it is the foundation of successful extension. Without data from research, extension is extremely limited. The organization and financing of it vary from country to country. As President Hannah pointed out in his address at the beginning of the Conference, in the U.S.A. the Land Grant Colleges are responsible for research and part of extension. These institutions are independent, dispose of great funds and in the course of many years have acquired the full confidence of the farmers and also of non-farm people. We do not envy, but we admire, the U.S.A. for these institutions. In Europe extension in agricultural economics is, generally speaking, either centred around the Government (as an example I would mention Great Britain and the Netherlands), or linked up with vocational agricultural schools (as, for example, in Switzerland), or organized and mainly financed by farmers' associations (as in Denmark and Finland).

Other causes for differences in the extension of agricultural economics are frequently connected with agriculture itself. One could mention as two examples the variations in the sizes of farms and in the systems of farming. We know that the farmers of small holdings and of diversified enterprises generally do not seek economic information so much as do larger farmers and specialized farmers. My purpose in calling attention to the great diversity in farming and in the attitudes of farmers, is to make it clear that there is no uniform method which would be ideal for all conditions. Although it is true that we often find poor farming combined with poor extension in agricultural economics, we dare not conclude that less developed extension is always a sign of a less developed agriculture. In Switzerland, for example, where extension in agricultural economics reaches hardly 10 per cent. of the farmers, the yield of wheat per acre is about 210 per cent. of the U.S. average, the yield of milk per cow about 120 per cent. and the yield of potatoes about 105 per cent.

That brings me to the following conclusions :

1. Extension in agricultural economics is urgently needed by farmers, students, marketing agencies, and Governments. It must be further developed in each country. In looking for the proper way to do so, the methods applied in the U.S.A. can be a challenge, but each country must act in accordance with its own special conditions in farming, in farmers' attitudes, in education, and in research.

2. In promoting agricultural economics we should never forget that farming means not only production and economics, but at the same time a way of living.

3. In addition to more research in agricultural economics, many

countries could make more use than they do of existing material comprised in censuses, surveys, and similar research.

R. N. DIXEY, *Institute of Agrarian Affairs, University of Oxford, England*

Dr. Morales referred to the width of the scope of agricultural economics, a point with which we can all agree and which governs most of what I intend to say, because a good deal more follows from the problems which it raises than, I think, we sometimes allow for. It is not only that the subject is wide, but that some of the various aspects of it are so different from each other that they call for different kinds of training for the people who are to be engaged on them. Those of us who heard Dr. Brandt on Sunday will know that I have his distinguished support in this. I myself would go further and say that certain broad sections of the work are so different as to call for different kinds of people to be trained for them. As an example of what I mean I should say that the kind of person who is interested in a farmer's endeavours to use his resources to his own best financial advantage is not necessarily the kind of person whose interests lie, shall we say, in the problems of inter-regional or international trade. Mr. Huni has just given us several more examples.

If these differences are as great as I suggest, it would seem to follow that when we discuss the training of people for work in agricultural economics we must look for a system which is sufficiently flexible to be adapted to the needs of students of different tastes, who may be aiming to take up any one of several different branches of the work. The alternative would be to have one set course for everybody, and to leave all the students to get what they could out of it. Broadly speaking that is the way we have been inclined to do it in my country, and it is much easier to see how it came to be like that than it is to justify it as a satisfactory arrangement. I am talking of the man or woman who already has a first degree at a university, and who wants to train specially for a career in agricultural economics. That is the kind of person, I believe, to whom Dr. Morales particularly directed our attention. He said that students at that stage of their careers came, most of them, from two sources: colleges of agriculture on the one hand, or schools of business administration and economics on the other. And he finds neither source entirely satisfactory. I think I am right in saying that we find much the same.

I do not want to be misunderstood about this, because I should be ready to die in the last ditch in defence of the British system of education so far as it concerns what we should regard as the traditional

university subjects. The aim of that system has been, not so much to train undergraduates for jobs, as to develop their powers of reflection and understanding. It is sometimes described (with a little extravagance, perhaps) as an attempt to set their minds on fire. We have always tried to draw this distinction between what we care to call education and what we care to call training. We have a horror of the man who emerges from his university trained, as we say, but not educated. Our tendency has been to the opposite extreme. Only the other day our Regius Professor of Civil Law told me that his faculty would be up in arms at once if he were to suggest that an undergraduate in law should be taught anything that might be useful to him if ever he should find himself employed in a lawyer's office—a little exaggerated, no doubt, but one knows what he meant.

I believe our system has been reasonably successful—there are a few examples of its products in this room—but I say 'reasonably successful' because of course it has its failures. We always hope that the failures are exceptional although there are a good many of them, and those whose concern is education continue to look rather askance at what you might call vocational training. We look to education for a general enlarging of the mind, and we usually expect a man to get his training after what we call his formal education is over.

That attitude is rather different, of course, from more up-to-date points of view. There is an American Air Force Base near where I live and, on a notice-board there, there is a chart headed, 'Education means dollars', and it shows that if you left school at eighteen you could look forward to a return for your life's work of 126,000 dollars, but that, if you were to go on and take a university degree, you could expect 228,000 dollars. That may be the sort of thing the President's Commission on Higher Education had in mind when they spoke of giving the student command of what they described as 'marketable ability', though it is perhaps a rather extreme interpretation of it. At any rate, in the United Kingdom, whatever our motives may have been, we have tried, I think, to be a little more discreet about them in the past. But our attitude is changing. I would not suggest that it is changing very fast, perhaps. It was more than fifty years ago that the Bryce Commission rejected the division of education into the liberal and the vocational: 'Technical education', they said, 'must be considered, not as a rival of liberal education but as a specialization of it.' That was in 1894. But after all, it is not easy for those who have been cradled in the humanities to recognize the educational value of the newer subjects. And in spite of all the difficulties, technological studies of one kind or another have wormed their way even into the

older foundations and have taken strong root. All our universities have their natural science faculties today, and most of them have their faculties of medicine, of engineering, and more recently of agriculture, and it is blinking the facts to pretend that they do not mix some technological training with their more cultural pursuits. So there has been some progress.

My point is not so much that these newer and more technological subjects are now accepted in the universities, as it is that the teaching of them is organized, as it is in the old-established faculties, on the system which could be called the closed curriculum. By that I mean that just as a student reading, say, modern languages, would do very little else but modern languages, so would a student reading, for example, natural science read practically nothing but natural science. And the same applies to courses at the postgraduate level as well as at the undergraduate level. It follows that when anyone wants to learn a composite subject, as for example, agricultural economics, almost the only way for him to do it by our system would be for him to go right through his university as an agricultural student, and then right through it again (or most of it) as an economics student, or the other way round, taking perhaps five or six years, and not necessarily being well qualified at the end of it. It is not at all certain that agricultural economics consists of agriculture as such combined with economics as such. We all know what happened to the man who thought he could write a dissertation on Chinese metaphysics by reading up an article on China in an encyclopedia and then one on metaphysics, and putting the two articles together!

So long as this idea of the closed curriculum prevails, it seems to me that a university which attempts to design a special course in agricultural economics, as some of us have tried to do, can hardly avoid wasting the time of some of the students and leaving great gaps in the training of others. As with Dr. Morales, so with us, the students coming forward to take such a course at postgraduate level are usually either economists with only a nodding acquaintance with agriculture—the kind of man we had the other day who wanted a farmer to shear his sheep in December so as to take advantage of the high price of wool—or they are agriculturists with very slight knowledge of economics—and we all know that economics takes some knowing today. Someone referred to Henry George last night. Well, we are long past the days when Henry George could say that economics demanded no special knowledge. That was the line he took in his first lecture to the University of California—and, incidentally, was never asked to give another.

Perhaps I have appeared to digress rather, but it all seems to me to reinforce the need that I mentioned for a flexible kind of system by which each individual student could be steered towards any desired combination of subjects, and in that way be given a proper balance between the mere acquiring of techniques on the one hand and absorbing culture on the other—by which, without being overloaded with matters that may be irrelevant to his particular needs, he can fill gaps in his knowledge of his special line and also learn to appreciate the broad setting into which his special line has to fit. In fact a kind of training such as Dr. Morales referred to, I take it, as 'generalized specialized'.

It seems to me that a system of that kind is not unlike what we see in the United States today, and here I should like to express my deep sense of obligation to the United States taxpayer, to various American organizations, and especially to Dr. Jesness, Dr. Pond, Dr. Engene, and others at the University of Minnesota who gave me unparalleled opportunities last year for observation in some of these matters. There is always a possibility, of course, that a man in a foreign land may get hold of the wrong impression. I was reading Obadiah Walker the other day. He was one of our seventeenth-century educationists, and he recommended everyone to be educated in his own country 'lest', as he put it, 'he bring home a volubility of talking nonsense'. I shall have to leave you to judge that for yourselves. As a matter of fact, I believe it was President Eliot of Harvard who 'broke through the hard crust of education on the British model' and replaced it with the more flexible system. Whether it was his own idea I do not profess to know; I think it likely that he may have got it from Germany. Immanuel Kant, you may remember, was sent to Königsberg to learn theology, but he decided to pursue his studies in all the faculties of the university. Perhaps that was why, when eventually he became a professor, he had to undertake not to lecture in theology at all.

But of course this idea of what I have called a flexible system is not without its critics. Many of us are inclined to raise an eyebrow when we discover that one of the universities in the U.S.A. carries a course for training air-line stewardesses, and others for such branches of learning as costume designing and diesel-engine maintenance. But it may not be as bad as it sounds. The point we should remember is that, whereas in my country we should picture a student of, say, engine maintenance doing just that and very little else, I have no doubt that engine maintenance in this country would be only a part of his work. I am sure it would surprise some educationists, in my

country at any rate, to learn that the *engineering* students at the Massachusetts Institute of Technology, for example, have to give something like a fifth of their time, or more, to the arts or the humanities. The fact is that, although in Britain we talk a lot about the dangers of excessive specialization, it is in the universities of the United States and of continental Europe that most of the active steps have been taken to counteract those dangers. In fact it is held in some well-informed quarters in my country that the students in some of the technological institutions of America and Europe get a better liberal education than many of the students in British Universities.

I make no claim that the American system is perfect, but I do claim that when it comes to training people in a composite sort of subject, such as ours, it has its points. Nor, incidentally, do I claim that the American student always responds to the treatment he is given, but he has his chance. They all have a chance of a thorough grounding in economic theory and in the application of economic principles to agriculture and, after all, those are the things which should distinguish them from other agricultural experts. Beyond that some will have more, some less, of the other things—of agricultural science, of statistical techniques, of farm management, of social organization, of anthropology and psychology, of the theory and practice of education, and all the rest of it. In fact, this American system makes a serious attempt to meet the problem that the students have different backgrounds, different interests, different capacities, that they are going to be engaged on different work, and that if their training is to be effective it should allow for these differences.

Whether our British universities—or any other universities—would want to make any changes and, if they did, whether they would be able to, I am not in a position to say. An optimist might detect a disposition to change—a move towards fitting the education to the student rather than a forcing of the student into a too rigid mould—in our new General Certificate of Education for schools. Our new University College in Staffordshire is thinking along new lines, maybe along some such lines as these. Be that as it may, I am sure that so long as you try to pass all your agricultural economics students through a set and rigid curriculum, their training is almost certain, in all but exceptional cases, to fall short of the best.

SHERMAN E. JOHNSON, *Bureau of Agricultural Economics, U.S.D.A.*

I am going to devote my attention to Professor Thomas's paper, and let me say first of all that I did not find anything in that excellent paper to disagree with. I am going to try to spend my time in

elaborating some of the points that he made, especially with respect to their application to the general theme of the Conference, which has been the problems of the less developed areas. I agree with him that John Maxton's definition of agricultural economic research is excellent. It covers the field and it puts the emphasis where it belongs; that is, on solving economic problems of farmers and of the agricultural industry. Some of these problems are more fundamental than others. Some are chronic and of long standing. Some are immediate and acute, and all are crying for a solution. It is our responsibility as agricultural economists to find answers to as many of them as our resources and time will permit us to tackle. Of course, we have to exercise choices in selecting the problems that we work on because we are dealing with scarce resources. The problems we are tackling involve scarcity of resources, and the means that we have to work on them also are scarce.

Professor Thomas has mentioned the duality of the subject-matter of agricultural economics, and the need for duality of background by workers in the field. Although agricultural economics research covers the problems of individual farms as well as the farming industry and its relation to the total economy, I would stress the need for integration of these lines of work. As to the background needed for effective research I would give three principal requirements: (1) Familiarity with agriculture and its problems, (2) training in economics, and (3) a good background in mathematics and statistics. Although training and experience along these three lines will provide adequate background for an individual who is qualified by aptitude and temperament for research, perhaps the latter is even more important than the type of previous training and experience. Does the potential research worker have scientific curiosity? Does he have ability to probe deeply for objective results? Is he stimulated by finding answers to agricultural problems? Does he feel that he can make his greatest contribution in agricultural economics research?

I was glad to see Professor Thomas stress the need for clearly outlining our research problems, as he said, even if that problem dealt only with the descriptive phases. Unless the problem is simple and clearly understood, analytical description is an essential part of research. We must understand the nature of the problem before we can go about the job of finding a solution. In other words, problem appraising is antecedent to problem solving.

In the discussion concerning the two methods of approach in research—the empirical and the analytical—it appears to me that Professor Thomas is contrasting the statistical with the case method

as they frequently are used in research. Both methods must be analytical if valid results are to be obtained. Usually a combination of the two approaches is needed, and perhaps other methods as well. The research worker should select the tools or combination of tools most appropriate for the job to be done. If the case approach is used on a specific farm management problem, for example, we need to know where the cases fit in the frequency distribution of farms, as a basis for generalizing from the results. On the other hand, statistical data need to be sub-classified to confine each grouping to farms with similar problems and opportunities for change.

I want to turn now to the section of the paper dealing with direction and administration, and come back to the choice of research problems. Professor Thomas states that spotting the significant problems is even more important than expertise in research. With limited research budgets it is indeed important that we select the significant issues. Unfortunately, research takes time and solutions are needed to economic problems when they arise. Therefore, good research administration involves forecasting the problems that are likely to cry for answers some time in the future. In other words, the research administrator must foresee the future in the same way that a manufacturer must forecast future demand for his product in entering upon a given line of manufacture and in making up his manufacturing schedule. Sometimes the researcher does a good job of forecasting future needs, but we cannot always spot the emerging problems. To me this situation calls for considerable flexibility in a research programme, but also collection and summarization of data on current changes that can be utilized to analyse acute problems that may arise.

Publicly supported research carries an obligation to tackle farm and other agricultural problems of outstanding importance. In this period of rapid change new problems are constantly appearing because of (1) changes in the external economic environment, (2) changes in agricultural legislation, and (3) changes in technology which require adjustments in the farming system. The question that confronts all research administrators, especially those with limited budgets is how to organize a research programme to make the greatest contribution with the limited resources. I shall speak here only of the work in production economics. It has been my experience that it is much too easy to tie up or immobilize nearly all research funds in one line of work. For example, farm accounts and detailed cost work are very expensive undertakings. They can easily absorb most of the research resources in the production field. Then there is the

problem of spending so much time on the descriptive and reconnaissance phases that analytical phases are neglected. We need to recognize frankly, however, that a part of the research does need to be descriptive. We need measures of current changes in farming and in the agricultural industry to appraise the problems confronting farmers and to furnish data for analysis of problems that arise without warning. In other words, one phase of the research programme would be in the category of problem appraisal, but the more important phase is the one that provides answers; in other words, problem solving.

The first job, that of problem appraisal, requires up-to-date data on current changes. In production economics we also need input-output data to be used in analysing production alternatives. Farm accounts could serve at least a part of these purposes if the account records represent groups of farms important in the frequency distribution. Periodic surveys could furnish the required information with less expense than farm accounts where the function of servicing farmers with account records is not an important consideration. In this country periodic surveys can be based on census tabulations to obtain stratified samples of representative farms.

With such a background, and current price and production data for the area, annual series for representative farms can be developed in the major farming areas to show the changes that are taking place. These will reveal emerging problems on farms in the different farming areas. In that way they will aid in determining the specific problems that need study.

Researchers, however, need to use all available means to discover the problems that are emerging on the horizon. For example, in this country a workable mechanical cotton-picker has been developed. The Bureau of Agricultural Economics in co-operation with Land-Grant Colleges has carried out studies to indicate the economy of using the cotton-picker as well as its probable effects on systems of farming and on the people in the Cotton Belt. The results are useful to farmers in deciding whether to buy cotton-pickers, and what changes in farming may be involved. Three or four years ago natural scientists were experimenting with direct application of anhydrous ammonia to the cotton crop. The results were startling. Several planters in the Mississippi Delta began experimenting with its use. Our research economists made a hurried field study to try to estimate the costs and returns from this method of fertilization compared with usual methods. The results indicated considerable saving and the study accelerated adoption of this practice. We are now follow-

ing closely all experimental work with chemical weed control and hope to have economic interpretations of this practice available as soon as the natural scientists feel that a workable method has been developed. It should be noted that spotting emerging problems in this way requires close co-operation with natural scientists on farm problems.

This type of research probably would come under Professor Thomas's classification of problems of current interest as contrasted with the more 'fundamental' problems. I would agree with him that it is possible to develop fundamental concepts from current work. We should always be on the look-out for this possibility. Special attention also should be given to some of the more fundamental problems. We need pioneering work on research methodology and we need brave souls to tackle difficult problems of long standing that have not been studied because research workers have not developed procedures adequate to their solution. This has a bearing on Professor Thomas's insistence on freedom of individual research workers to venture into new paths, and I heartily agree.

I am firmly convinced that on many farm problems we shall make more progress by using the case method and budgeting production alternatives than by the various statistical approaches that have been tried. Dr. Morales mentioned this morning that the case method should be used when resources are limited. I agree, but the cases selected for study need to be representative of important groups in the frequency distribution if results are to have general application. Therefore, a combination of case and statistical method is needed wherever this is possible. In that way case studies can be developed that will provide valid generalization for groups of farms with similar problems and production opportunities.

In closing I should like to say a word about the need for an integrated approach to farm and other agricultural problems. If we have a good understanding of the problems that arise on important groups of farms in a farming area, we can analyse better the most important problems for the area as a whole and the different farming areas can be combined into an aggregate picture of farming possibilities for the nation. We have made some crude beginnings on that approach in this country through our studies of production capacity. The problem would be easier in a smaller country where farming conditions are more uniform. To get meaningful answers the production analysis needs to be fitted into the market demand analysis. And that involves the field of prices and marketing. Both Professor Thomas and I have left that for others to discuss.

F. G. STURROCK, *School of Agriculture, University of Cambridge, England*

The assignment I was given this afternoon was to comment and perhaps to enlarge on Mr. Huni's paper. First of all I should like to say that I enjoyed it and agree to a large extent with the principles that he advocated. There is one fact with which I might disagree and that is when he suggests that the economist should not necessarily push his conclusion too far. For example, he instances two specialist farms—one with 43,000 hens and the other with 240 cows—and says that he does not think they look like farms. It seems to me the economist should clear his mind of prejudices of this kind. Now, I do not want to make any special pleas for these two farms. There are obvious economic difficulties there. If the price of feeding-stuffs remained constant and the price of milk or eggs fell, these farms would be in difficulty. But that is irrelevant. If these farms can make a success of it, let them go ahead and do it. Mr. Huni's own country, Switzerland, enjoys a high standard of living and almost entirely because of a high degree of specialization—on the production of such things as watches, precision instruments, on hotel keeping, &c. There is another point. He speaks of farming in Europe as 'a way of life'. When used in this context this expression is nonsense. The European peasant farms in order to make money and as far as my experience goes the European peasant, especially on the Continent, has a very good sense of the value of money. I have never heard the phrase, 'way of life' used by a farmer; it is generally used by a poet or a politician or, perhaps, by a French Canadian, and I am quite sure that it should never be used by an economist. The American attitude that the business of a farmer is to make money is the correct one and it is the business of the economist to show him how to do so. This is in the farmer's own interest in order that he can provide a high standard of living for himself, for his family, and for his workers and keep them contented on the land. It is also necessary in the national interest so that the farmer can make a proper contribution to the national income. Now I am not advocating that the making of profits should be done by mining the soil or by allowing soil erosion or anything of that sort, but provided the farmer can make substantial profits and leave the farm in as good condition as he found it in, or better, then any method is justified whether specialized or diversified.

I should like to enlarge on two points which were only touched on by Mr. Huni. These are, first the techniques of extension in agricultural economics and the organization of this work. I was fortunate enough to spend nearly six months in the United States last year and

it may be of some interest especially to my colleagues from overseas to see how American methods strike someone like myself who has a European background. In farm management the first and the oldest technique is the one of analysing farm accounts. It is a method used widely in the United States and elsewhere and indeed until about twenty-five years ago it was practically the only form of extension work. In addition to providing the farmer with his profits and a comparison with other farms, it allows the use of various input-output ratios. Production or output per acre, output per man employed, livestock output per dollar's worth of feed, and all such measures are so well known both in the United States and in Europe that there is no need to elaborate them here. One interesting point about the organization of the work in the States is the use of Farm Business Associations. Two outstanding examples are Illinois and Iowa. The usual organization includes about 200 farmers who employ a fieldman to complete their accounts and give advice based on them. Under this system a large part of the cost is paid by the farmers, and the farm economics department receives data for research purposes at low cost. This system is not unknown in the Old World. Something like it exists in parts of western Germany and in Denmark.

The next technique I want to mention is that of enterprise costing. That is finding the cost of one department of a farm without necessarily costing the whole farm. It is a system that is fairly common in Europe, particularly in the United Kingdom, where it is regarded as a valuable form of advisory work. It is particularly useful in livestock production, for example, milk production or hog production. The cost can be divided into standardized headings and, by comparison with averages, the source of inefficiency can easily be traced. In the United States it is much less used for advisory purposes. But it is used and is considered important as a means of determining input-output ratios which can be used for other purposes. Indeed an enterprise costing as such is regarded in many of the States here with a certain amount of scepticism. This is for two reasons. First of all, the division of a farm into departments is considered to be artificial seeing that it is an organic whole. And it can certainly give misleading results, particularly when applied to crops. Secondly, it is criticized because the true criterion of economic success, as an elementary knowledge of marginal analysis will show, is not the average cost or the average profit, but the marginal cost and the marginal profit. It also pays too little attention to the alternatives. For example, if a farmer feeds oats to a cow the economist might charge them at cost of production. The farmer will very soon tell him that the cost of

oats is the field of malting barley which he could have grown instead of the oats and sold for cash. From the strictly economic point of view there is a good deal to be said for the farmer. Nevertheless, enterprise costs constitute a valuable technique, especially for live-stock enterprises.

Now, the third technique I want to mention is farm planning. Farm planning, or budgeting, has been used spasmodically as an extension technique for a long time, but it is only recently that it has been developed on a large scale. The justification is that if there is a fault in the organization of a farm it can have two causes. In the first place it may be due to technical inefficiency. The farmer may have a good plan, he may have the proper rotation of crops, the right types of livestock, but he may fail through faulty rationing or the inefficient use of labour. Now, here the traditional methods of efficiency factors and enterprise costings are admirably suited to give the answer. But unsatisfactory results may be due to a second type of error which for want of a better term I shall call economic inefficiency. The farmer may be producing the wrong things; he may be fattening cattle with great care, but it may be impossible under his conditions to make cattle pay. Perhaps he ought to be keeping dairy cows. And, to get the answer calls for budgeting. This distinction between these two types of fault is one of some importance. In a way it is parallel to the military terms, tactics and strategy. Enterprise costings are very good for checking up on the tactics of carrying out the plan on the farm. Budgeting is better for determining the strategy or over-all plan for the farm. The purpose is to take the existing farm organization, see what choices are available and assuming average efficiency calculate the probable returns from each of these choices. The adviser can then show the farmer which is likely to give him the highest return. For example, a farmer in the mid-west is producing corn. How should he market it? Feed it to hogs, to dairy cows, to fat cattle, or sell it for cash? It is possible by means of budgeting to show which of these will give him the best results. This is the argument in favour of budgeting. How is it carried out in practice? Most of this work has been done in the last ten years and in its use there are three outstanding centres: Missouri, Purdue University in Indiana, and North Carolina; also to some extent, Kentucky. One may also add the department at Harvard University in so far as they co-operate with the New England States. As Mr. Huni said, no uniform method is ideal for all conditions, and this applies to farm planning. Budgeting, so far as I can see, is being used for two separate purposes. In the first place it is being used in somewhat less progressive areas as a

vehicle for the general raising of farm standards. In such conditions if one allows individual specialists to give advice separately it may be confusing to farmers and the methods advocated may conflict. Soil conservation experts, for example, may advise more grass without explaining how to use this grass efficiently. Therefore, farm planning is run as a joint project by a committee of specialists of which the economist is only one. A good example of this is the Missouri Balanced Farming Programme. Indeed this State was the pioneer in this type of work. It was started in 1935 and I believe something like eight or ten thousand farmers have been handled so far. This system works very well where the adjustments required are fairly obvious. The farm plan includes the best practices from all the specialists' departments and the advice is given to the farmer in a single packet. The system is worth the attention of economists in less developed countries.

In more advanced areas a more sophisticated approach is needed. The methods of increasing output or returns are very much less obvious. The farmer may have alternatives open to him but it may require careful calculation to show which will be best. For example let us take again the mid-west farmers in the more fertile areas. There, there is a reasonably high standard of living. The farmers are not unduly short of capital, and conditions are much more comparable to the advanced countries such as the United Kingdom, Denmark, or Holland. I would commend to your attention, if you have not been there, the farm planning project at Purdue, and I would put the system advocated by Harvard University in the same category. At Purdue the method of putting across farm planning is to run classes. They are offered to the counties, and each year about sixty counties may accept. A class of about twenty is taught in each county, which means they are handling somewhere about twelve or fourteen hundred farmers a year. The county agent attends, and a course of two longish lectures is given. This is followed up by an all-day demonstration. After the economist has left, the follow-up is done by the county agent who can call in specialists in difficult cases. Now there is one final point I should like to make about farm planning, and that is that you must have a clear-cut philosophy behind it. It must have a logical system for distinguishing between alternatives. Otherwise, budgeting becomes a matter of asking the farmer what he wants and then putting it together. This type of work does not really deserve the title of planning. It is also important that, although much of the work with farmers may be carried out by the county agent, the ultimate direction should be in charge of an economist. Otherwise, the

adviser may have fads. He may be inclined to put in a few hogs in each farm because he has a notion that hogs are a good thing for a farmer to keep. The soil-erosion expert may produce a plan and advise an increase in grass without giving adequate consideration to the effect on farm output. Anti-erosion methods are very necessary, but in some cases they are carried to the extent where they seriously reduce the output of the farm. Thus, in more advanced areas where adjustments are small and subtle, farm planning should be done but under the direction of the agricultural economist. I have touched on only a very few aspects of extension work and will leave the rest to other speakers.

A great deal has been done on outlook, public policy, sociology, marketing, &c. There is also another point which would be of interest to overseas visitors, and that is the publicity used here. The United States is a land of advertising, and no one, not even an economist, can expect to gain attention without publicity. On the whole it is highly efficient, though if one were to find fault it would be that the publicity is more impressive sometimes than the material thus disseminated. Organization is a point of great importance. It is not enough to have a good idea, it must be possible to put it over. The standard of organization in agricultural economics in the United States is very variable but in some States it is of a very high standard and is well worth studying. The second point of organization is the liaison between the research worker in agricultural economics and the farmer. The research worker can, and should, work with farmers. It helps him to keep in touch with them, to find out their reactions, and to try new techniques. But quite obviously he cannot cover more than a very small proportion. Even full-time extension economists who can give all their working hours to devising methods of publicity are too few to deal individually with many farmers. Ultimately, advice in agricultural economics must be given by the general farm adviser—the county agent in the United States, the District Officer in the United Kingdom, and so on. For that reason it is necessary to devise techniques which can be handled by such a man. One final point is that the purpose of extension in agricultural economics should be to help the farmer to help himself. The economist cannot draw up detailed programmes or plans for large numbers of individual farmers. In the first place, he does not have the time. In the second place, a farmer is less reluctant to adopt a programme or plan if he has drawn it up himself. Even if it is not so good as one the specialist could devise for him, he is very much more likely to adopt it.

F. W. PECK, *Farm Foundation, Chicago, Illinois, U.S.A.*

The three able papers presented for our consideration, under the general topic of 'Professional Economic Problems', very properly point out the principal characteristics of the problems involved in the advancement of the profession represented at this Conference. The three authors proceed to outline those principles and those special considerations that appear pertinent in the development of sound research and effective resident and extension teaching in this particular discipline of the social sciences.

It is said that the present expansion of research in technology in all fields is being seriously limited by the shortage of trained scientists and engineers. Whether or not agricultural economists have kept pace with the remarkable growth and effects of technology upon the changing agricultural sector of the economy and the relationships involved I do not know. I suspect there is always a shortage of the highest quality personnel in every profession.

I should make clear at this point that my experience and my major interest have centred in the techniques and methods involved in bringing the results of research in the social sciences to advance the knowledge of farm people with respect to their economic and social problems. This is not to say I do not have a profound interest in, and respect for, fundamental research in all the agricultural sciences. Quite naturally I think I tend towards the practical application of research findings to increasing productivity on and off the farm, but this does not detract from a sincere appreciation of the importance of the many research problems faced by economists and other scientists in specialized fields. On this occasion, I would emphasize problems relating to this subject from observations in connexion with the relations of the Farm Foundation's programme to economic research and extension.

The Farm Foundation has long featured the group-discussion technique in seeking to stimulate improved regional research and extension teaching. Dr. Ackerman and I have noted with a great deal of interest the progressive values of the deliberations of the regional groups of economists and sociologists (both in research and extension) as they have tackled together the problems in land tenure, in farm management, in public agricultural policy, and in rural sociology. This is the twelfth year with the tenure groups, the sixth in management, the third in policy, and the first in sociology.

In these groups are exhibited many of the important points emphasized in the three papers presented at this session of the Conference.

There is evident a strong emphasis upon fundamental research and upon the techniques of improved methodology and statistical analysis that mark the more recent training of the younger economists. There is also evidence of an understanding of the dual nature of the economists' field, indicated by Professor Thomas, namely the application of research findings to the farmer's operations as a basis for his intelligent decisions as well as to those engaged in the distribution of agricultural products. In addition, there are emerging educational programmes, designed to reach consumers of these products, that require special techniques.

There are increasing values in these group discussions of economic problems that bear directly upon training-in-service opportunities for the personnel of these groups. The Federal and State representatives show increasing ability to take broad points of view—to weigh the effectiveness of techniques and to evaluate research findings; to appreciate the value of integrating collective efforts; and above all, to subordinate personal biases to the general good of the larger group interest. I venture the opinion that the quality and the quantity of research in these fields have been strengthened in the several States through the training experiences of those who participate in the group discussions.

However, I would be less than frank if I failed to indicate limited evidence of narrow points of view, of rather set opinions, and reluctance to adhere courageously to sound economic principles where, for example, they collide head-on with political expediency.

As Professor Thomas indicated, we have observed the problem of differentiating between the values of scientific research and the gathering of miscellaneous facts and information that may have value but should not be confused with scientific inquiry. At times I find myself wondering about the utility value of the great mass of statistics that tends to accumulate in the name of scientific research.

In the extension field we have not found the most effective teaching techniques in many of the social sciences. In this country the wide dissemination of economic information through the 'outlook-organized-effort' has been notably effective. Traditionally in this country and, I suspect, in others extension has earned its present place in education and in its service operations by providing prescriptions and formulae as to what to do and how to do it. The pressing demands of farmers and the offerings of the institutions have centred in the natural sciences. This was logical and essential in earlier years and at present is still important. There is need now, however, of much more training in economics, sociology, and

political economy to balance the emphasis upon the *technical* training of extension workers.

In economics, sociology, psychology, and political science the teaching technique with rural groups is very important. There are no ready-made directions on the bottle—here the discussion of principles takes first place. There is *thinking* and *analysis* to plague the student, the extension worker, and the farmer. The problem is how to stimulate their urges to think—to relate cause and effect—to understand long-time effects of decisions that are based upon good reasoning and knowledge of explained economic principles and facts, rather than upon expediency and group pressures.

It seems to me that the rapidly changing dynamics of agricultural growth and development place increasing responsibilities upon economists thoroughly trained in economic principles and concerned with their application to farm problems, if the demands of the times are to be met for advancing the understanding of rural people. This means a comprehensive review and, I think, significant changes in the curricula of both undergraduate and graduate study courses in many educational institutions. It means more opportunity for leaves of absence to pursue graduate study, more short refresher courses, and a much better understanding of the importance of the social sciences by those who make the decisions and who run the educational institutions. I refer to the administrators.

Extension has been organized and largely operated on the commodity emphasis. Selection of personnel has been determined, in the main, by training and familiarity with specialized types of farming. The job essentially is one of dealing with *people*. The more one understands people and how to work with them in groups, the more successful will the extension service be—even though to the farmer the immediate problems may be largely concerned with production planning and farm practices.

Dr. Huni emphasizes the importance of farmer-acceptance of economic information and training. This means, in the underdeveloped countries, and in certain retarded areas in this country, starting where farmers are now and gearing the educational programmes to their peculiar conditions and to the physical and mental capacities of those being reached.

C. P. LOOMIS, *Department of Sociology and Anthropology, Michigan State College, U.S.A.*

I want to call attention to the fact that Dr. Morales not only speaks

of using social science but practises it, and I should like to refer to what he is doing in Costa Rica.

There were on this campus last week two gentlemen who are designing an evaluation project for one of the large foundations, an evaluation of Point IV and related governmental and other types of assistance programmes for Latin America. We could not help but be proud to say that there is only one place, to my knowledge, in the world where there is a real bench-mark study which nails down the economic, sociological, and cultural starting-points before any of these technical assistance programmes begin. And that is the project that is located in the trade-centre area of Turrialba, Costa Rica, where this Inter-American Institute of Agricultural Sciences is located. This is the work under Dr. Morales's direction, with which we have been co-operating here for the last four years. I think it is a demonstration of the absolute necessity for co-operation among the various social sciences if you are going to attempt (as people have in the meetings here) to talk about what happens when you have a technical assistance programme.

In this area of Turrialba there are about thirty-two villages, constituting a trade area having a population of about 30,000 people, with a trade centre of around 6,000. The original plan that Dr. Morales and I worked out was to do two things at once. First, to lay a bench-mark against which we could measure change, or aspects of change that might take place there as a result of various programmes, and, second, to learn something about change, to learn about the 'strategy' of change—how change is induced. The agricultural economist in one of our major institutions here is trying to study this strategy of change. As you would expect, there are certain things which are absolutely necessary, and in this study you find them—for example, a scientifically drawn sample. But this sample is not a typical area sample because in some instances, as in this one, you can speak with assurance about communities, or about other kinds of groupings. The design is such that it is not based solely on random sampling. There are some strata which permit the handling of social and cultural data which are very important in the design of a project of this nature.

Now, of course, you would expect us, since an economist is involved, to have income and farm management data, and indeed we have them and I think, for this type of study, they are as good as we can expect. But there are more important data needed and available. There are many areas in the world where we have fairly good income and farm management data, but where social and cultural data for

measuring social change is lacking. In addition to the economic data, we attempted to find out what the levels of living were in respect to aspects of life in which change was most likely to take place. For instance, we tried to find out what the sanitation practices and levels were in the area, the sources of water supply, the disposal of refuse, and so forth. We tried to find out also the house and living conditions. We went much further, because we were interested in the strategy of change—in what induces a change—by experimenting with different ways of introducing new and improved practices, and trying to work out some principles in the field of the strategy of change.

So, in addition to obtaining the ordinary level-of-living data about economic and social affairs and what we might call practices concerned with sanitation and health, we tried to analyse the values of the people and the social structure. We were thinking largely of social structure in terms of channels of communication, or how information travels through the groups and status structure that exist there. And when I speak of values, I am thinking of the difference, for example, between where the people are and where they want to go, or want to be, or what they want to have. The total design of the study included all these things, and many more. You can see, I think, that Dr. Morales and we have quite a sizable job, mobilizing the necessary disciplines to get all of these data for the thirty-two villages and their centre in this area. We have sociologists, cultural anthropologists, rural sociologists, one human geographer and land-use specialist and, of course, we have had a number of economists working there and we have had other people besides. One man made politics his speciality. But these people do not just go out and follow their own noses. The project is worked out in careful collaboration so that it has an over-all plan, and all the workers do their own specific parts of the whole.

In addition to this larger sample study of the communities, we did a much more selective and much more costly type of project that would not be possible, I suppose, in all areas. But we did need to know where we were starting from and to have some professional standards by which to judge progress. So after we had worked out the social structure and values and knew, from the best procedures we had, who the leaders were, we drew a very careful sample of the whole population. Some 140 families made up this sample for intensive study. I need not go into details of how we defined leaders, but I dare say you can see the importance of the design. If you want to study people's values you can look for them in their leaders. At least

our hypothesis is that people are more apt to follow those who are going in the way that they want to go. So we wanted to know the difference in the practices of leaders and non-leaders, to show us the direction that change might take. Now, when you get the planners together and you decide what they are going to do, or when you talk with the leaders of the community (and we do both) the people have several choices before them. The economists may say that to meet the obvious need for animal protein more eggs should be produced, and the cultural anthropologists may agree that that is better than to grow soya beans which is a difficult business. But if the people produce eggs, they do not eat them; they sell them in the markets for city people to buy. And I do not know how many more chickens you would have to keep before you could get eggs that would stay in the farm family. The reason why they do not eat some of the eggs they produce is related, I surmise, to the people's scale of values. I think I have said enough to show that Dr. Morales practises what he preaches when he talks about integration of the disciplines.

On the campus here we now give a degree in social science, and we have an arrangement whereby you can tie in about four of these social sciences for a Ph.D. degree. Not many people take it, because it involves three or four departments and makes the examinations difficult. In the future we shall have five basic disciplines that will go through the first two years, or which can be taken in one of the two first years, and one of them will be social science, including sociology, anthropology, political science, economics, and psychology. Then the students will take their specialities and will go, for instance, to the Department of Sociology and Anthropology, of which I am the head, where there are three disciplines together, cultural anthropology, rural and urban sociology. So you can see that one can get here an integrated education in social science, especially if you add agricultural economics. Nearly all our rural sociologists who take Ph.D.s here have minors in agricultural economics. I wish I could say that all the agricultural economists take minors in rural sociology and anthropology, but that is not true at present. As a matter of fact, I think that almost all of the rural sociologists now teaching have minors in agricultural economics. And I hope this group can look back on the time when the agricultural economists helped to create rural sociology. Some far-sighted men in agricultural economics, especially Henry C. Taylor, saw the need of something in addition to what he considered was the legitimate field of agricultural economics, and he brought Charles Galpin into the U.S. Department of Agriculture, and quite a large number of us followed. That was the origin

of rural sociology in the Department. You may say, then, that agricultural economics is the father and rural sociology the son. And now you may expect that as the son grows up he will gain more confidence and more independence, and sometimes he may even kick the old man. But you ought to be proud of that. If you have a good son, you ought to want him to throw his weight around once in a while. So do not be too critical of these rural sociologists.

M. TOFANI, *University of Florence, Italy*

Professor Thomas's paper gives me an opportunity to make two observations. The first concerns the independence of agricultural economic studies from political interference. It is very easy to become involved in political discussions and to formulate political judgements when our studies lead us to favour or to disagree with a government programme. But the agricultural economist must consider political situations and government programmes merely as data for his research into economic problems. This should be taken into account in agricultural economic studies so as to avoid useless discussions among agricultural economists. This is not an appropriate place for a discussion of the differences between economic and political problems, but we do well to remember the existence of such differences.

My second observation relates to the critical examination by Professor Thomas of the two traditional methods of research—the analytical and the empirical. Both of course are necessary, but increasing importance attaches, I believe, to studies which are based on the collection of statistical data on a wide scale. The conduct of studies of this kind was one of the main tasks of the International Institute of Agriculture, and I believe that the F.A.O. which has taken over the work of the International Institute should develop them further so as to be in a position to make a better contribution to the solution of some of the international problems with which it is now concerned. International comparative studies of agricultural economics can lessen the danger of misunderstanding among agricultural economists, which is often due to a lack of knowledge of the conditions existing in the various agricultural regions of the world.

I believe that one of the purposes of this Conference is indeed to promote a better understanding and better co-operation among agricultural economists of different countries.

W. K. BURKETT, *University of New Hampshire, Durham, U.S.A.*

I wish to object to Mr. Sturrock's characterizing as nonsense Professor Huni's mention of farming as a way of life. I admit a lot

of nonsense is talked along that line. Yet I think among agricultural economists there may be more danger of something like nonsense in the other extreme, seemingly advocated by Mr. Sturrock, of pursuing only efficiency in terms of marketable output per man on the individual farm. I think that the connexion in which Mr. Huni mentioned farming as a way of life represented an emotional reaction to something seen, and I may say that I suspect the emotions may be a better means of finding a social problem than the intellect, although I would rather use the intellect in seeking the problem's solution.

Why do I object to the statement that it is nonsense to refer to farming as a way of life? In the first place, the farmer has considerable direct consumption; he does not simply work for money and spend that money entirely for consumers' goods apart from those that go with the farm, such as housing. Also, the conditions of his work are a close part of his living and inseparable from the kind of farm he operates. Then I think agricultural economists, especially farm management people—and that is primarily my field too—by their insistence on all out 'efficiency', create about as many problems as they solve. For instance, in pushing labour-saving equipment, which generally increases the size of farm, we create a considerable problem of capital acquisition.

I agree with Mr. Dixey that the *graduate schools* with which I have had contact have considerable flexibility in training. However, I think that characteristic does not extend as fully as it might to our undergraduate colleges of agriculture. These seem nearly all insistent on turning out people based on the physical and biological sciences. By doing this they may discourage people from taking agriculture who would make the best agricultural economists in graduate school. The only thing I would criticize very strongly in our graduate training—with which I have had fairly recent contact—is statistics. On the whole I think statistics tend to be overvalued in relation to their actual usefulness after the usual training. I fear that courses in statistics frequently do not make contact with the problems to which they are supposed to apply. In other words, there is a tendency to teach the methods or mechanics but not enough about where and how to use them.

R. COLON-TORRES, *Puerto Rico*

When training agricultural economists and other technicians for work in under-developed areas, it is important to remember that the agricultural, economic, and social patterns of these areas give rise to

very important cultural features. For example, the majority of people in under-developed areas have developed certain traits and complexes which limit their capacity to assume responsibility, to generate creative effort or to improve their lot. Some of these traits are an inclination to isolate themselves and to suspect the motives of their neighbours, a feeling of helplessness and extreme dependence, and a state of negative resignation. Any agricultural economist who is going to work in such an area therefore has special problems. He must help the people to develop self-confidence, to feel a desire for progress and improvement, and to see that something better lies ahead and to realize the value of self-help. These are new ideas for the people of these areas and it is necessary to instil them into the people.

The need for specialized training has been stressed. We cannot disregard the need for this, but some general training may also be necessary. In backward areas an extension agent has many functions to perform; sometimes he may even have to prescribe treatments for common ailments. Some elementary knowledge of medicine may therefore be useful for him though he can hardly acquire it if his training is too specialized. Thus whilst the training of an agricultural economist may need to be specialized as regards his own subject it must also be broad enough to include some training in other fields.

V. LIVERSAGE, *Ministry of Agriculture, Belfast, Northern Ireland*

Since the talk has turned on the integration of the social sciences, perhaps I may give a little illustration of the value of that integration, taken from what I had in mind to call not under-developed but undeveloped countries. I am thinking of areas in central Africa, and my illustration is the influence of the so-called bride-price. You have to understand that this applies to a society which is still organized on patriarchal lines. I am thinking of a patrilineal polygamous society in which the field work is done by the women and the cattle are looked after by the men. The institution runs something like this. A marriage contract is made between two families (and the family here is a group of near relations, not the small family as we know it). The contract consists of the exchange of a woman or girl from one family for a certain number of cattle or their equivalent in goats and sheep from the other family. It is a contract which is, under certain circumstances, reversible. If the woman will not work she may be sent back and the cattle reclaimed. Under a system like that, it is not the quality of the cattle or the use to which the cattle are put, but simply the numbers that enter into the calculations of the people.

The result is that with common grazing, as you have in those communities, and with no individual responsibility for the state of the pastures, the number of cattle increases to the full extent that the pasture will carry, and a type of cattle is evolved which is distinguished by the maximum of skin and the minimum of inside. Very little use is made of milk, and slaughter is only resorted to as a last resort. The male cattle are kept on as well as the female. The result is, of course, serious over-grazing, and in areas which have seasonal rainfall, severe soil erosion. In parts of South Africa, for instance the Transkei, the topography had assumed a fairly mature rolling condition over the centuries, but now the surface geology is being completely changed by the formation of gullies, or rather gorges, in each valley. Under the kind of social system I am describing, you are dealing not merely with an odd custom but with an economic system. The system is based on the exchange of cattle. The more daughters you have the more cattle you can have in exchange and the more cultivation you can get done. In fact, you get a compound interest that will overshadow anything that can be got in the ordinary way of commercial exchange. How are you going to alter the dreadful conditions that result from a system like that? The economist cannot usually find the answer. The first impulse, generally, is to put in a lot of 'new brooms' and try to sweep the stream of life back in a different direction, but you cannot achieve any worth-while results by those means. Something much more subtle must be devised and it must be based on very careful study of the mentality of the people and their system before you can even make a start. The plans of economic development which we have been listening to during this Conference have very little present relevance to territories that are still in that primitive state. In fact, it is not too much to say that the social anthropologist should precede the economist and the technical officer.

M. EZEKIEL, *Economics Division, F.A.O., Rome, Italy*

I want to make a few comments on the place of agricultural economics in some of the countries that are less developed, and under-developed compared with their eventual possibilities, as we see them from the viewpoint of an international organization which is trying to aid them in their development.

First, I would say that agricultural economists are very important because the resources of these countries are so limited that they need to select what they are going to do and what they are going to use their funds and their people for (particularly the trained people) with

all care as to what is likely to pay best. Second, in addition to this appraisal of projects of all types, agricultural economists are needed for the specific kinds of service which they can render. These include helping to set up improved marketing arrangements and helping of course in the improvement of farm organization and management, and in all the other various direct ways in which they can aid development. They also need to help them to popularize the materials of economics and statistics so that they can be used effectively by those who are responsible for extension work, and to participate in that to the extent that their help is needed.

Now, in trying to approach this problem, I am going to talk about it first from the point of view of the improvement of the agricultural economists of the countries themselves and then, if I have a minute or two at the end, about the problem of getting agricultural economists as technical assistance experts to send to them. The training in agricultural economics available in these countries is widely variable; in fact, it is widely variable even as between North America and much of Europe. In the first place there are many different fields, or rather specialized topics, within the field of agricultural economics, such as those developed in England and to a much greater extent in the United States, where rather specialized work, separate work, is given in college courses and in undergraduate work. These include farm management, land appraisal, land economics, marketing methods, improvement of marketing, farm prices, price situations and outlook, agricultural policy, farm credit, agricultural co-operation and organization. In many of the less developed countries courses in agricultural economics, at least on the undergraduate or university level, seem to be very largely limited to only two of those many fields: farm management and agricultural policy. In talking with the officials of some countries (and not necessarily the least developed countries, but also some of the countries in Europe that have reached a rather sophisticated stage in their teaching of farm management and agricultural policy) and in trying to find out what they were doing in the direction of improving methods of marketing in their countries, I have met the difficulty that their languages have no word for 'marketing'. They had no concept of what we mean when we talk about studies in marketing and the improvement of marketing. Correspondingly, no training, education, or scientific research at all, as far as I could find, was being done on that subject.

One thing we have to do is to help the people in these less developed countries to learn something about the other fields which can be studied by the rational application of agricultural economic methods

beyond simply what happens on the farms themselves and in government regulation of agriculture.

Second, widely based training to help educate their people in these various fields, a need which Mr. Dixey and Mr. Morales emphasize, is not available in their colleges, and even in some western countries too, you get agricultural economists taught with two variations. Either you have a course in general agriculture, leading to what in the U.S.A. is called a general agricultural degree, and what elsewhere may be called the degree of agricultural engineer, or that of agronomist, a man who has general training all across the field of agriculture, with a little exposure to farm management and possibly a little exposure to economic theory. Or else you get a man trained in general economic theory, with a little farm management and agricultural policy sometimes mixed in, but no knowledge of agriculture or the underlying natural sciences. In both cases the courses usually include either no statistics at all or a very brief introduction to it. The idea that anyone who is to do practical work touching economics has to be able to work in the laboratory of statistical studies, just as a chemist has to know something about a chemical laboratory if he is going to be good for anything in that field, has not penetrated to many of these countries.

Finally, little or no attention has been given to the means and the procedures by which the findings of economic research, or the information hidden in statistics and research work, can be popularized so that it can be understood and used. That involves knowledge of the many devices of commodity reports, situation reports, outlook reports, charts and graphs, and all the other materials which the economist needs to provide if his conclusions are to be interpreted in such a way as to be understood and used and be of interest, not only to farmers on the one side, but to business men and marketing people on the other, and even to government administrators. You have just as big a job in my experience to sell the results of scientific research and economics or anything else to government administrators as you have to sell them to farmers.

In dealing with this problem of training people in the underdeveloped countries, F.A.O. is trying to go at it in a number of different ways. We send experts to help develop national plans and programmes or to help improve marketing. These experts conduct seminars for the people with whom they are working so as to give some training directly. Second, training centres of many types have been conducted. Especially significant are those international training centres whose people come in from many countries, such as those on

various types of statistical problem and on agricultural economics and planning. Third, is the provision of fellowships abroad, for study tied in with technical assistance within the countries. Beyond these we have some other things still to come. We have been planning for a long while to make a survey of what agricultural economics teaching is done in different countries, and to try to tabulate the information to show the less developed countries what really is embraced in the subject. I was very greatly interested in Mr. Morales's paper, because he gave the results of such a survey for Latin America. So far as I know, it was the first attempt to do anything of that sort. I hope we can work with him in carrying on a similar survey on a world-wide scale. Another thing: we are planning at future F.A.O. regional meetings to have the agricultural economists in each region meet there too, to discuss economic issues of interest to the region just as we have been discussing them here, and in that way, by F.A.O. leadership perhaps, do something to give them a little more support in their own countries, to dramatize what they are doing and facilitate the interchange of ideas among themselves. Then finally in some countries we are trying to step up the level of college training by sending people as technical assistants, who can give seminars and courses in the colleges. In the meantime we give special fellowships to some of their more promising younger docents, or others in their colleges, for training in the more advanced countries in some of these agricultural economic specialities, so that they will be able when they come back to give broader and more comprehensive teaching in the future.

I would like also to say a word on the problem of getting adequately trained experts from the highly developed countries to serve as technical assistance experts in the less developed countries in the various agricultural economic fields. As I indicated earlier, one of the limiting factors in technical assistance is the supply of trained people to do the job. And I was much interested in what some of the people here have said about the college courses being given to train men better to work in this field. Ideally, when we send a man out as a technical expert, he should have three or four qualifications. He should be a real master of his field; if possible he should be a recognized international authority, although we cannot always insist on that. Second, he should have had sufficient experience in working with governments, preferably the Government of his own country, to understand and know how governments work and how you get things done through governments. A technical assistance expert cannot go direct to the people of a country; for one thing, he does

not usually speak their language. He has to advise and help the Government to do the things that need to be done. Third, he needs to have enough tact, and persuasion, and enthusiasm to be able to sell his ideas and get them across. Some experts may know the field perfectly but may be quite unable to persuade other people to do likewise. And then fourth, he should have the stature so that people will listen to him and follow him. This, of course, is a fairly imposing group of qualifications. No matter how good a man's work may be, and even if he has a Ph.D. in economic development or in geography or in any other of the related fields, he may not have all these qualifications, and in any case he cannot get them all merely by college training. And yet we haven't time to wait for experienced people in all these fields. In some countries we hope we can begin to break that bottleneck by having, for each of them, one highly qualified person as the leader of a group and some younger men to work with him, and in that way begin to give people in the field experience and training and eventually make them into senior technical experts themselves. As yet we have only one or two countries where there are large enough economic groups to justify such a set-up but we hope to develop that kind of specialization and career development by way of building up the people to help with the job.

N. WESTERMARCK, *University of Helsinki, Finland*

By way of comment I should like to point out that the pursuit of agricultural economics includes such scientific work as illustrates physical input-output relations and such as purposes to achieve a maximum of profit expressed in economic terms. In my opinion we in agricultural economics, particularly in farm management, need data from the natural scientists on a much larger scale than we have at present. We need these data for expressing natural production functions in economic terms.

Since research workers in the natural sciences are fast becoming specialists of more and more limited scope, the role of the agricultural economists is to co-ordinate the different enterprises in a farm business. I wish to stress very strongly that we who are primarily engaged in farm management must consider each farm business as a whole.

I would like too to tell Dr. Ezekiel that most of the Scandinavian countries have professorships in agricultural marketing; some of them combine marketing with agricultural policy, but some are for marketing only. And we certainly have words for the subject.

D. S. ANDERSON, *Production and Marketing Administration, U.S.D.A., Washington, D.C., U.S.A.*

Dr. Ezekiel has suggested that it is somewhat difficult to get administrators to adopt what I suppose Frank Peck calls sound economic principles. Now that is one of the things that have bothered me as a government administrator, and I would like to ask the aid of groups like this in finding ways in which those administrators who are willing to do so can use agricultural economists. I can point out what seem to be some of the difficulties.

In the papers this morning you started out with the idea of training agricultural economists for research and for extension, but I think there was a note of sadness and almost of dismay in Professor Thomas's paper when he said that administrators may be bidding against universities for the services of agricultural economists. Now, I do not know whether that is true or not, but I know of some of the things, especially in the United States, which have made it difficult for those administrators who are convinced that trained agricultural economists are useful, to get them into administrative positions. One of these things is this matter of prestige that Professor Thomas talked about. I have heard, for instance, in our American universities the opinion expressed that a government worker, especially in what we call an action agency, is somewhat of an inferior citizen. Another thing which I think has added to this difficulty is that we in government have been charged both with being biased in our research and with permitting political expediency to get in the way of what Frank Peck called sound economic principles. Now, in the United States at least, we do have to recognize that Congress when it passes a law is presumably representing the will of the people, and if those people have been seduced with unsound economic principles we have no choice whatever, I suppose, but to administer the law on the basis of those unsound economic principles. But I do think that if people can be trained to believe that government service is an honourable occupation, even in an action agency, we can take some of the unsoundness out of what some people call our unsound economic principles.

I was particularly impressed with Professor Thomas's plea for two-way traffic, and I am trying to find some way of bringing in researchers from the universities to help us in carrying out the action programme ordered by Congress and conversely of getting our people to help you in your research work. I was impressed also with the statement—an implication rather—that somehow or other

we have something to hide from you people when you are trying to do research. Now, if that is going on in the Department of Agriculture I would like to know about it. I would ask for your help in showing us how to make use of your research; and I would also like you to add to your training list the training of people to help to administer government programmes. What kind of training should be given to such people? A lot of people say to me: get them from business. In my experience I would rather take trained agricultural economists.

H. C. M. CASE, *University of Illinois, Urbana, Illinois, U.S.A.*

It is impossible to cover all of the points that the three speakers bring to our minds, but it appeared to me that they set forth ideals they had in mind instead of dealing with the realities in which we find ourselves in training people for the agricultural economics field. Perhaps we do not begin far enough back in considering some of the needs in training young men, and we would be remiss if we did not call to the attention of our visitors from other countries the fact that all agricultural economists—so called—in this country do not have the same training and experience.

We have not discussed one important aspect which applies especially to technical assistance workers and to much of our work that calls for practical application of the principles of economic production, namely that the basic training of the workers who go into agricultural economics begins with the undergraduate work. There are many institutions in our country and in other countries that would do better if their undergraduate students in agriculture who aim to go into the field of agricultural economics had more training in the fundamental sciences of agriculture as well as in economics. Also much specialization in agricultural economics should come at the graduate rather than at the undergraduate level. It is unfortunate that there are a large number of persons who have gone into the technical assistance field whose undergraduate training was too limited for the task they are attempting to do. So many of our undergraduate students prepare for work which they feel will ensure them a job when they get out of college. We have had too many students, for example, preparing for the field of secondary agricultural school teaching when many of them with a little more guidance should prepare for other types of position. This guidance is now being given by many agricultural colleges and more of the students are obtaining better basic training for agricultural economics and other

fields of specialization which give them more job opportunities than preparing for secondary school teaching.

At present we have a dearth of men when it comes to filling many desirable positions requiring good basic training in both the social sciences and agriculture.

W. H. LONG, *University of Leeds, England*

A conference which runs the whole gamut of training, research, and extension in agricultural economics in one day is not lacking in enterprise. But even more than its enterprise I would acknowledge the wisdom it has shown in its choice of speakers. At this late hour I wish to make only one point, which I believe to be an important one and has been referred to by Dr. Morales. I think that he is not at all satisfied that the type of graduate that he gets has had a really satisfactory training at the school or undergraduate level, and frequently his task of training him as an agricultural economist would be easier if the undergraduate training had been better. My experience in teaching agricultural economics to undergraduates in agriculture for some years leads me to sympathize with Dr. Morales. A few days ago some of us had the privilege of listening to a talk given by the President of Purdue University at the University of Kentucky. He made the point that a university education should develop three C's: competence, curiosity, and conscience. I do not intend to say more about conscience than to remind you that one of the most famous British educationists, Dr. Arnold of Rugby, described the aim of education to be the turning of young barbarians into Christian gentlemen. But with regard to the other two, competence and curiosity, I am not at all sure whether in our attempt to turn out a competent young man we are not neglecting to develop his curiosity. Sherman Johnson has already referred to the importance of curiosity and I would say that, if we could devise our undergraduate courses in such a way that they would develop the curiosity of students rather than make them so competent, we should stand a better chance of producing young people better prepared to start in the business of life. So much undergraduate teaching seems to be a case of cramming knowledge into the student's head, rather than trying to develop ideas and wisdom, that we run a risk of turning out somebody who is so full of facts that his brain is tired by the time he comes to his final examination, and once he is through it he looks for an easier time. How much better if the undergraduate, by the end of his time, realized how little he knew and how much more he had to learn, and having been taught how to learn, he would be stimulated to keep on acquir-

ing the knowledge that lies before him all his working life. If we could persuade the teacher to pay more attention to developing curiosity in his students instead of providing them with so many facts, I think we should have gone some way towards getting really worthwhile postgraduate material to work on.

A. HUNI (*in reply*)

Mr. Sturrock says that to speak of agriculture as a way of life is nonsense, and that it is the duty of the economist to give farmers as much advice as he can. That is how we often think, but I should like to ask Mr. Sturrock, if he only wants farmers to make more money, why he does not advise them to quit their farms and go and work in factories. So far as I know, the farmers in the United States and in most other countries get less income than workers in factories do, and to deny that there is such a thing as a way of life that goes along with agriculture is not realistic. I do not know if it is fair comment, but I would not rule out the possibility that Great Britain might overcome her great economic difficulties more quickly if she had a larger agricultural population. We must be ready to check up on our economic principles. Professor Case has said that if we want to be progressive we must be ready to change; otherwise there will be no progress. I fully agree though sometimes it leads to a dilemma for economists. On the one hand, you know what would be most economical, but on the other, circumstances prevent you from doing it. Here, of course, is the big difference in the thinking of the United States and of a country such as Switzerland. In Switzerland, for example, we have three main languages. The Italian-speaking part of the country is separated by the Alps from the rest of Switzerland. In the time of Mussolini, if these Italian-speaking Swiss had been merely economists they would have said, 'Let us join Italy and have an easier life'. On the other side of the country, in the north, we had unemployment, but across the frontier in Germany with Hitler and his development there was none, so the young Swiss could well have thought, 'We should go to Germany'. On the other side, there is the French-speaking population just across the frontier from France. Sometimes it might pay us to move but we think it over and do not decide these things on economic principles alone.

EDGAR THOMAS (*in reply*)

Dr. Sherman Johnson did me a good service by adapting some of my general comments to the more specific theme of this Conference.

The question of the training of the agricultural economist has been

the most prominent feature of the discussion today, and I would like to make one or two comments on this question though my own paper was concerned with research.

Dr. Sherman Johnson hinted that perhaps I had over-emphasized the importance of pure economics in the training and in the functions of the agricultural economist. I admit there is a danger of this. Indeed, I would be prepared to argue that at this time of day the subject of agricultural economics, imaginatively handled, is sufficiently wide in cultural content to be, in its own right, the basis for an academic training. It is interesting to note how things have altered so far as economics itself is concerned. It has been said that 'classical political economy was built on corn'. But for the past hundred years in Britain at least the so-called pure economists have been shy of dealing with agricultural matters. Perhaps shy is the wrong word, for they have given the impression that agricultural matters were beneath their notice. There are already signs of a change. It may be only a matter of time before the circle is completed and the 'pure' economists will once again develop their theories from the problems of agriculture.

I was interested in Dr. Ezekiel's reference to the survey of the fields covered in agricultural economics training in various countries. Perhaps you will permit me to say that it is not true that the fields which he said were not covered in most countries are not covered in Great Britain. But what interested me was one important omission in the list of fields which Dr. Ezekiel mentioned. He never mentioned the history of agriculture. I have always taken the view that the teaching of the history of agriculture should feature prominently in the training of the agricultural economist for it provides a link with the humanities and gives him the broad cultural background of a liberal education.

There is only one other matter that I ought to deal with since it touches on what I said in my paper. It is the question of the scope for official research and of the relation between the economist and Government. I am grateful to Mr. Anderson for the challenge which he threw out. We are far too ready to make slick criticisms of our professional colleagues who happen to be in government service. I had no wish to join in this all too easy pastime. The points I wanted to make were (1) that by the nature of their employment 'official' economists are bound to be concerned primarily with current investigations rather than with basic research, (2) that the more governments interfere in the affairs of agriculture the greater is the need for basic research concerned with assessing the economic consequences of official policy, and (3) that such basic research must be carried out by

independent, i.e. non-official, research workers if it is to be accepted as completely impartial and objective.

The point which Mr. Tofani raised is, of course, fundamental. As I see it, it is the business of an agricultural economist to marshal the economic considerations which are relevant to the economic assessment of political policies. It is not the business of the economist *per se* to stand advocate for or against any political programme.

J. O. MORALES (*in reply*)

I want to express my appreciation to Mr. Dixey for mentioning the need for flexible systems of training which would have as their objective the enlarging of the student's mind rather than loading him with a lot of knowledge which too often is forgotten in a short while. He also mentioned the 'closed' curriculum as one of the difficulties in training agricultural economists. This is one of the principal themes of my paper on which I want to insist again.

I think it was Professor Thomas who mentioned the 'service' aspects of agricultural economists. We have been very much interested in the need for getting agricultural economists sensitive to the possibilities of turning to other sciences, especially the natural sciences. In the Inter-American Institute of Agricultural Sciences we are at present studying the relationship of methods of pruning coffee as they affect labour requirements. It is amazing how much you can develop subjects of mutual interest when you find common ground with the natural scientists. They are very appreciative of what you can accomplish provided you approach their problems with some understanding. I also agree with Professor Thomas about the need for the study of the history of agriculture. I wish I had had such a course in my training.

Dr. Loomis in his comments insisted on the need for integrating the social sciences. I believe the Conference has heard enough of this subject, but I hate to leave it without insisting again on its importance. I think it was Mr. Burkett who mentioned statistics. I agree with him, but in teaching statistics at the Institute I have found it advisable to insist that my students should learn to respect its limitations. I wish to mention another speaker, Mr. Torres, the Secretary of Agriculture of Puerto Rico. He brought to my mind Dr. Notestein's paper when he spoke about the problems of the colonial pattern of development and the transition from that into full democratic conditions. I think he implied a need for the development of colonial people before this transition occurs. The point is fundamental also to the success of the Point IV programme and to Dr.

Ezekiel's statement on planning for under-developed countries. I hope that neither of these two activities—that is, Point IV and the planning of agricultural programmes—misses the point that it is the development of people that counts. I think the presence here of Mr. Torres is indicative of why Puerto Rico is developing the way it is. His enthusiasm, his sincere appreciation of what people can do, contrasts sharply with the behaviour of other economists who have yet to discover the more fundamental human aspects of economics.

To Dr. Ezekiel I want to offer co-operation in the programme that he mentioned. I also realize that his point about regional meetings and seminars was very well made. I took the narrow aspect of training and failed to realize the possibilities of regional meetings and seminars as a means for keeping up to date the economists who are already in the field. They are also important in stimulating people who are not economists to take up economics as a career.

I am very much in sympathy with what Mr. Anderson had to say in relation to the need for economists in action programmes. Mr. Torres, too, mentioned that a good proportion of the economists who are being trained today are going necessarily to be at work on action programmes, and they should be trained therefore to appreciate the limitations and also the possibilities of work of that kind.

Professor Case mentioned the need for emphasis in undergraduate training. Here again I should mention that my paper took the short-range point of view. From the longer point of view I personally think that undergraduate training is one of the most important problems that have to be faced.

To close, I want to mention Mr. Long's points. I, too, think that there is too much emphasis on detail in the present training of agricultural economists, and a failure to appreciate what he calls curiosity, ideas, and wisdom. I believe the majority of us will tend to agree with him that this is the situation. And the reason why, in the programme that I suggested, only two or three years were allotted for a broad training was mainly because we planned to leave out a considerable amount of this detail which is proving so wasteful of the students' time.