PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

Opening Address

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Science and engineering have contributed enormously to the post-war success of Britain's agricultural and food industries. In particular the fruits of agricultural research have been taken up by an industry that has demonstrated its remarkable willingness to apply quickly new ideas emanating from the laboratory, an application often accomplished with help from the advisory services.

The outcome is only too apparent. We now have surpluses of many temperate foods and feeds on a huge scale and such surpluses have never before been experienced in Europe. We are facing long-term problems of oversupply which no government in this country, and few governments elsewhere, have had to face before. This new situation presents serious challenges to and opportunities for the agricultural and food industries. It forms a backcloth to these discussions on the contribution of the new technologies to the agricultural and food industries in the 1990s and beyond.

The existence of these surpluses faces us with the need to make painful decisions within the Common Agricultural Policy. The surpluses have arisen not only or even mainly from governmental decisions; equally important has been the success of agriculture in applying new technology to help to provide a superabundance of farm products. Although many people criticize the current size of some of our surpluses and methods for their control must clearly be found, nobody would wish them to disappear altogether. The effects of scarcity of food can be far more dramatic, sudden and unpleasant than the results of an oversupply.

One of the results of surplus food production is that consumers, assured of a secure supply of relatively cheap foods, can exercise choice and consider the quality of what they purchase. In addition, from this secure position they can express concern about the ways in which their food is produced. Such qualms are not very evident when food is in such short supply that people do not know where their next meal will come from. An example illustrates the change. When there was a shortage of eggs (fairly recently) the increased efficiency of the battery system of egg production was seen as a major advance because it improved both the quantity and the regularity of supply. Now, however, and quite properly, we are concerned with the welfare of the hens kept under such systems. This is an example of our concern with the ways in which a civilized country should monitor and control the methods of food production.

Another, and broader, concern is that related to the environment in which we live and the effect on the environment of agricultural practices. Many of these worries arise directly from new agricultural practices but others do not. Animal slaughter, castration of meat animals and marshland drainage with consequent changes in the landscape are very old techniques. Nevertheless, the combination of surpluses, consumer demands and environmental concerns presents us with political, social and economic considerations that must, to some degree,

influence the thrust of future research, how new technology is applied and the kinds of technology that we must seek in future.

Scientists have been remarkably successful in unravelling the complexities of agriculture and in increasing the yields of both plants and animals; the surplus production already referred to is indicative of this success. In the future the problems the scientist must face are at least as challenging as those of the past. The problems must of course be defined in terms of questions that are capable of being answered and in such tasks scientists have a key role. The application of existing technology to new areas and the focusing of development of new technology to meet needs are examples. Room must always be allowed for the pursuit of exciting new possibilities, otherwise science will not progress, but scientists must equally be concerned with the application of their knowledge and must help to anticipate the future needs of the society in which they live.

The scientist at the bench is not, however, especially expert at perceiving the possible broad effects of his work on society. He has valid scientific concerns and, understandably, his commitment and motivation often derive from his view of the future of his particular line of research. To apply science in a constructive and coordinated manner it is necessary to stand further back and to take a broader view.

To provide such a view the Government has recently established the Priorities Board for Research and Development in Agriculture and Food. Under the chairmanship of Mr Kenneth Durham, Chairman of Unilever, its membership combines a wealth of agricultural and industrial experience with scientific eminence. None of its members is there to advance a sectional cause, but, as men of proven experience and knowledge, to contribute to an overall vision. The Board will advise the Agricultural Ministers and the Agricultural and Food Research Council on the priorities for research and development in agriculture and food and on the proportional allocation of research and development budgets. It exists as a single body to look at the comprehensive needs of the whole of the United Kingdom and, as such, it has the opportunity to develop a complete and authoritative view. Its advice on priorities will normally be taken by the Government and the financing of future research programmes will be decided in the light of the Board's recommendations. It is hoped that in this way the necessarily limited funds will be used to the best national advantage. It is also hoped that the scientific community will derive inspiration from the Board's view of research and development priorities.

The central objective of the agricultural industry is to provide food for the consumer. Little of what the farmer produces, however, appears in the shops in its raw state. Today even fresh food is packaged and it may have gone through a surprisingly large range of processes including gas storage or hydro-chilling to help preserve its freshness. Most food is much more highly processed. The technology involved is vital to our well-being and to the well-being of the agricultural industry, which is the main supplier of the raw materials to be processed. The Government regards food research as of high priority and has increased its spending in that sector. Additionally it has launched 'Food from Britain' to help to improve our competitiveness in the market place. Dr Edelman will no doubt discuss some of the current problems in the food sector later in this symposium.

One result of agricultural surpluses is that the suppliers of the raw materials for the food industry will have to improve the quality of those materials. They will have to be more concerned with meeting the demands of the food industry for commodities of a specified quality

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and variety, supplied in appropriate quantities and at the right times. It will be for the food industry to make clear what those requirements are and how they are to be met; food processors will have to be prepared to pay any premium necessary to obtain the precisely specified products they require. Government for its part has a basic commitment to make appropriate regulations, to contribute to raising standards of safety of foods and to help the consumer to assess the quality of and ingredients in foods. For example, more refined techniques for the assessment of the presence of residues in food are becoming available and these imply a gradual refinement of the present regulations. Such questions raise many issues for scientists and in particular create opportunities for them to contribute to better, safer, and more interesting food which, is convenient, wholesome and cheap.

Issues likely to influence the agricultural and food industry include those relating to how we produce our food and the effects of farming on the environment generally. The Government is deeply conscious of these issues and I shall be making a fuller statement about them in due course. Here attention is drawn to them to ensure that they are kept in mind during discussion. Many of these environmental issues are particularly challenging because they have arisen from past needs to grow more food. Although we have surpluses today, they are small in relative terms and the Government continues to have the responsibility of safeguarding the nation's food supply. It is therefore much too simple a view to think that we could revert to a more primitive type of farming. Even within our own times there have been food shortages and it is quite unrealistic to imagine that we could somehow put the last 35 years into reverse or, even if that were possible, that it would be sensible to do so. The problem is to reconcile our continuing need for adequate levels of food production with some very valid environmental and other concerns.

Environmental reasons, just as much as agricultural reasons, point to the need for better information on the precise requirements for fertilizers and spray chemicals and on their more precise application. This kind of information, while helping to alleviate environmental concerns, also helps to reduce farm costs and thereby improve our competitiveness. In addition, we should be seeking safer herbicides and pesticides that do not harm wildlife, or alternative methods of control.

There is equally a need to ensure that our animal production systems are such that society finds them acceptable. Many of the issues involved in animal health and welfare need careful definition and it is here that scientists can contribute. So can others, for the issues – scientific, ethical and of public perception – are complex. For example, the Government would not be permitting the present use of sheep dips and growth promoters unless satisfied that, properly used, they leave no harmful residues and present no hazard to human health. If, as happened in a recent case, however, use of them creates difficulties for our export trade, there is a commercial case for seeking alternatives. It may be that the consumer or the importing government is worrying unnecessarily, and in that case we may try to change their views, but we still have to accept the discipline of the market place.

Society is similarly becoming much more conscious about health and is increasingly concerned about diet. Animal fats may be taken to illustrate this, but the same point could in principle apply to any foodstuff. It is not enough to surmise that too much fat may be bad for us. That may be true, but to formulate sensible policies much more needs to be known about how much is too much, for whom it is too much and under what conditions. This may not be simply a scientific question. Thus it might be decided that a certain amount of fat in the

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diet is safe, even beneficial. Scientists might well have an obligation to dispel doubts among consumers where those doubts were the result of ignorance or incorrect information. If, in the meantime, consumers decide that they are not going to eat fat anyway, the agricultural and food technologists must respond and have the appropriate technology at hand to meet the demands of the consumers.

The application of science to agriculture and food depends very largely on the ability of scientists to identify relevant issues in time to do something about them. This is why I particularly welcome this meeting, which attempts to look forward to the 1990s and beyond. I hope that the discussions will be stimulating and profitable.

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