✕ FOOD AND HEALTH ✕

BY

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The theme selected this year for World Health Day is "Food and Health," but I think it would be better slightly to alter this to "Food for Health." It is not always remembered that the purpose of food is to promote health, and nutrition stands here pre-eminent, as it is now the most important single environmental factor affecting health. Since *salus populi suprema lex*, the Ministry of Health should be the key Government Department, but it tends to be a rather junior Ministry of Disease.

A century and a half ago my great-grandfather, Sir John Sinclair, created and became first President of the Board of Agriculture. Later Fisheries were added, and recently Food was included as an addendum. The purpose of agriculture and of fisheries is to produce food, and the purpose of food is to promote health. To ensure that the maximum amount of the right type of food is produced these activities might best be concentrated in the Ministry of Health, and I should like to propose the abolition of the Ministry my great-grandfather created. Indeed, during the second world war the Cabinet sensibly decided that nutritional policy should be dictated by the Ministry of Health and that the implementation of that policy was the province of the Ministry of Food and only secondarily of the Ministry of Agriculture and Fisheries. Under the wise scientific guidance of Sir Wilson Jameson at the Ministry of Health and of Sir Jack Drummond at the Ministry of Food, that policy was highly successful, particularly as in this war, unlike at certain disastrous periods in the first world war, we had brilliant Ministers, outstandingly Earl Woolton, who sought and took scientific advice.

Nutrition of Children

We all know the remarkable effect that the diet of the expectant mother has upon the complications of pregnancy and upon the health of the infant. The infant mortality in this country is only one-seventh of what it was a century ago and half what it was twenty years ago, and it continues to fall in a most encouraging way. But the stillbirth rate is not falling and the death rate from toxæmia of pregnancy remains high. The Welfare Foods Service, which costs over £15 million yearly and was recently transferred from the Ministry of Food to the Ministry of Health, is no doubt responsible for a very significant part of the improvement, but I suspect that we have been a little too complacent about its merits and have not striven through research to reach perfection in it. There are, we know by experiment, defects in cow's milk as a food for infants, since it is demonstrably inferior to human milk in the type of fat it contains, and National dried milk has more serious defects; orange juice may not be the ideal vehicle for vitamin C because of the citral it contains (though almost no research has as yet been done on this); and cod-liver oil is far from being the best vehicle for vitamins A and D because of its negligible content of vitamin E and essential fatty acids and high content of foreign unsaturated fatty acids.

*Address (here slightly abridged) delivered in the Beveridge Hall of London University on April 6, 1957, to celebrate World Health Day, in the presence of Mr. Dennis Vosper, the then Minister of Health, and of H.E. Mrs. Pandit, with Sir Allen Daley in the chair.

An annual expenditure on research of one-hundredth of that cost of over £15 million might well have saved millions of pounds; for instance, the Government has accepted a recommendation of a committee under the chairmanship of Lord Cohen of Birkenhead that welfare orange juice is not required by children over 2 years of age, to whom it has unnecessarily been administered for 15 years at a cost of about £½ million yearly. A little research costing a few thousand pounds could have established that and so saved £7½ million. Therefore, though the Welfare Food Service has been and is a great contribution to the health of the nation, we might do well to examine it critically and make it even more significant.

A remarkable improvement has occurred in the heights and weights—and indeed in the health—of schoolchildren. The present admirable school meals service may be traced to the Destitute Children's Dinner Society of a century ago, but as recently as 1934 an administrative rule was made that a child must be both poor and suffering from malnutrition in order to qualify. We passed through the period of "feeding centres" for necessitous and undernourished children to the present excellent school meals and milk services, which in their present form date from 1945 and 1946 respectively. I hope these have come to stay, because they not only contribute importantly to the nutrition of the child, but also educate the child—and through the child the family—in the right choice and preparation of foods.

Having handed this well-deserved bouquet to the Ministry of Education, whose Chief Medical Officer is the Chief Medical Officer of the Ministry of Health, I must add a word of caution. I have for years carried on a lonely campaign against the overfeeding of children. In every animal in which the experiment has been made it has been shown that overfeeding during the period of growth and development shortens this period, so that adult size is reached earlier, and also shortens life. I believe this is a real danger in the U.S.A., and I believe we also must be careful lest by overfeeding children we hasten chronic degenerative diseases. Cow's milk is not a perfect food for man, mainly because of the composition of its fat, and I think we most seriously need research into the optimum diet for producing the optimum rate of growth of children.

Degenerative Diseases in Adults

I have mentioned chronic degenerative diseases, and we think of these in particular in turning as I now do to adults. A former Surgeon-General of the U.S.A., Dr. Thomas Parran, once said that like an iceberg nine-tenths of our malnutrition—and the most dangerous part—lies under the surface. One-tenth is obvious and easily detected; not many years ago we had gross cases of rickets, scurvy, and nutritional anaemia in this country. Still in different parts of the world pellagra and beriberi are endemic, and in certain countries goitre and imbecility from cretinism are widespread; indeed, though we know the cause and method of prevention of beriberi, it is increasing. No research is needed to detect these tragedies, because they are so obvious: food and education are required for their prevention. Only 22 years ago, Dr. Cicely Williams first described kwashiorkor, a disease of protein malnutrition that kills half the infants born in certain underdeveloped countries. Can it be that other nutritional disorders remain unrecognized?

When Dr. Williams made that discovery I was a medical student, and I started to work on human nutrition because I had become convinced that what was and is perhaps the most serious problem in medicine arose from alterations in our diet from the processing and sophistication of foods. My clinical teachers could not answer why the expectation of life in this country of the middle-aged man is hardly different from what it was at the beginning of this century or even a century ago. That means that despite the great advances in medicine—pneumonia almost abolished, tuberculosis comparatively rare, the magnificent advances in surgery, endocrinology, and public health—a middle-aged

man cannot expect to live more than four years longer than he could a century ago—and indeed in Scotland the expectation of life is now actually decreasing. This is because of the dramatic increase in this country, and in the more privileged countries of the world, of certain chronic degenerative diseases. Degenerative diseases found predominantly in the more highly civilized countries include coronary thrombosis, pulmonary infarction, cancer of the lung, peptic ulcer, gall-bladder disease, appendicitis, and the so-called collagen or mesenchymal diseases (which include such widely diverse conditions as certain allergies—for instance, asthma, nephrosis, disseminated lupus erythematosus, ulcerative colitis, and rheumatoid arthritis).

From work on lower animals combined with a study of the distribution of these diseases of civilization there is reason to suspect that they may have their origin in a relative deficiency of essential fatty acids. These highly unstable vitamins are found mainly in vegetable oils, and they are stabilized in nature by the presence of vitamin E. In the body, conversion into the even more unstable vitamin arachidonic acid is achieved by vitamin B₆, and again vitamin E is required for protection. We therefore have this trinity of vitamins required: essential fatty acids, vitamin E, and vitamin B₆. Absence of one or other or all can produce deficiency. The balance of the diet is far more important than is often supposed.

In deficiency in lower animals three main structural defects occur. First, cholesterol and phospholipids, which with protein comprise the building-stones of cells, are not transported properly and become deposited for instance in arteries. Secondly, because the building-stones are absent, cell membranes, including the myelin of nerves, are not formed properly and the mitochondrial membranes inside cells are probably defective, with consequent faulty metabolism in the cells. Thirdly, the connective tissue that binds cells together is defective. The cholesterol is deposited in the intima as atheroma, in the skin as xanthoma, in the cornea as arcus senilis, and in the lens of the eye as senile cataract; it is perhaps of interest that when early in the war I examined Canadian Indians living on a primitive diet in Northern Canada I found arcus senilis almost absent even from elderly ones, whereas in young English and New Zealand pilots being trained there—carefully selected for full health and carefully fed according to accepted rules—10% had this cholesterol deposition in the cornea. I was therefore not surprised at the very high incidence of atheroma found in young United States soldiers killed in the Korean War.

The faulty structure of cells and of connective tissue gives rise in lower animals to a precarious state in which a slight insult or stress to the body produces a violent reaction which the normal tissue would avoid. Several years ago Professor Ramalingaswami, now of the All India Institute of Medical Sciences, showed with me that follicular hyperkeratosis, a common skin condition in India, was probably caused by this deficiency; and more recently I have suggested it also causes the alarmingly frequent bladder stone of malnourished children in the Far East.

We believe this deficiency of this trinity of vitamins is a basis of certain diseases of connective tissue, of certain nervous diseases, of duodenal ulcer, of certain diseases of bone and teeth, of degenerative diseases of the circulation such as coronary thrombosis and dissecting aneurysm of the aorta, and that it even plays a part in carcinoma of the lung, since the defective structure of the cell makes it more susceptible to a chemical carcinogen. In this connexion it is worth recalling, as Sir Ernest Kennaway has recently done, that cholesterol is carcinogenic. It appears that the damaged epithelial lining of the nose and gut allows foreign proteins to enter more easily, with consequent allergic disorders, and perhaps allows viruses to enter more easily; poliomyelitis is now a disease of adults in civilized countries and is no longer "infantile paralysis"; and there is published evidence indicating that essential fatty acids in the diet protect man against the virus that causes the common cold.

I must add a special word about teeth, for they are connective tissue, and caries—the most prevalent disease of man—is a disease of civilized countries. Yet, as in all these other conditions, almost no research is done into its cause. The annual cost of the National Dental Service is of the order of £40 million, and since the prevention of caries would enormously decrease that expenditure research into the cause might seem desirable on financial considerations alone. Research has indeed proved that deficiency of vitamin B₆ in lower animals can produce caries, but instead of seeking the cause in man we embark upon a policy of adding fluoride to drinking-water without, in my opinion, fully adequate investigation by research into the chronic effects of that, particularly in old people. I am not alone in that view. Two days ago I received a letter from one of the leading nutritional experts in the U.S.A. in which he mentions his recent experimental results that cause him to question the value of fluoridation and to deplore "the regimentation of the American physicians and dentists [who] know nothing about fluoridation and say what they are ordered to say." I believe this is one of many examples where a little learning is a dangerous thing, and where health may be injured and science brought to disrepute by the incautious and premature application to public health of insufficiently investigated procedures. Enthusiasm to apply the fruits of research is laudable, but eagerness must be tempered with wisdom, which includes having all the relevant facts available.

Processing of Foods

Some may wonder what has happened to the diets of more highly civilized countries so that these chronic degenerative diseases are increasing so rapidly. Almost every alteration we make tends to decrease the trinity of vitamins I have mentioned, and in some instances adds antagonistic fatty acids that increase the dietary need of the essential ones. It has been known for twenty years that the fat of cows and sheep contains very little of the essential fatty acids and a large amount of an isomer that may be antagonistic; milk, butter, dripping, and the fat of the meat of these animals are seriously deficient, therefore, and the time may well come when we shall have to abolish the cow unless we undertake research to overcome this defect by alteration of the fat of milk or of the balance of the diet. The advice given in Leviticus vii, 22-23 may be sound if divorced from its context: "And the Lord spake unto Moses, saying, 'Speak unto the children of Israel, saying, Ye shall eat no manner of fat, of ox, or of sheep, or of goat.'"

Further, our present practice of producing prime beef and mutton by feeding stable concentrates decreases the unsaturated fatty acid content further. We do the same with pigs, and we stabilize lard to make it keep better. Then we fry it, which not only tends to destroy essential fatty acids but can produce substances that will cause cancer in rats and mice. We feed hens on concentrates that are deficient in the unstable fatty acids, and the eggs in consequence are deficient. We hydrogenate fats to make margarine, though some margarine contains important amounts of essential fatty acids. We now remove from bread and flour much of the vitamin B₆ they contain, and they were our most important source of this vitamin; and we add the flour "improvers"—agene (now forbidden) and chlorine dioxide—which oxidize most of the vitamin E and destroy at least some of the essential fatty acids as well and even chlorinate part of these, with production of what may be a powerful antagonist. We do not know as yet whether this is significant, because the requisite research has not been done. To show the extent of our ignorance of what we are doing, let me mention that recent work at the British Baking Industries Research Association has shown that bran contains a powerful antioxidant which will permit cakes baked from wholewheat flour or from white flour to which bran has been added to keep at the temperature of the body for a whole year, whereas without bran they keep only a few days before going rancid—and rancidity indicates loss of essential fatty acids.

Need for Nutritional Research

The problem is not only one of Western countries. Coronary thrombosis, described recently by Dr. J. N. Morris, of the Medical Research Council, as "a modern epidemic" here, is becoming prevalent in India as foods are altered to make them more stable and more easily stored and distributed. Despite this we admit the necessity of altering natural food by processing and by the addition of chemicals. This is done to alter and improve taste and to preserve foods, and it is hallowed by tradition: spices were added primarily to conceal off-flavours, but it is interesting that we have lately learnt that they contain powerful antioxidants that protect essential fatty acids and vitamin E. I pay tribute to the high standard of the food manufacturers, who have a laudable sense of responsibility; and even if they did not, they, being astute business men, would hardly produce products intentionally that would eventually harm their customers. The difficulty, as Sir Charles Dodds has pointed out, is that it seems to be no one's business to do the relevant human nutritional research and to watch what is being done and keep abreast of advancing science.

The Food and Drug Administration in the U.S.A. carries out extensive toxicity tests on lower animals, and, as Sir Edward Mellanby pointed out six years ago, "we are in the undignified position of having often to rely on the decisions arrived at in the U.S.A. before policy or action can be determined." This Food and Drug Administration in the U.S.A. has stated that of 704 chemicals used in foods no fewer than 428 are known to be innocuous. Perhaps that is comforting; perhaps not. And those believed to be innocuous are so classified because they do not kill rats or mice. Man is a different animal, as is sometimes forgotten. When, after some ration trials I attended in Canada during the war, it was found that a soup prepared by a U.S.A. scientist made ill those troops who managed to drink it, he plaintively remarked: "That's odd! Rats grew all right on it." We know a great deal about animal nutrition, and millions of pounds are spent in its study, yet only a negligible sum is spent upon research into human nutrition.

Surely it is to the advantage of the Government, of the people, of the food manufacturers, and of the life assurance companies that more research should be done: obviously to the Government because the National Health Service costs £630 million annually, and untold millions are lost through minor illnesses and absenteeism, and even through the lassitude and vague ill-health that malnutrition early causes. Poor health impairs productive capacity, low production brings undernutrition and ill-health and less productive power, and so the vicious cycle goes on.

We need what exists in certain other countries—an Institute for Human Nutrition, where all information will be gathered together and collated, to which people will come who seek such integrated knowledge, be they medical practitioners or educators or food manufacturers, and in which the frontiers of knowledge will be advanced by experimental research and by the epidemiological correlation of diet with disease, and where ideas can be interchanged between different countries. Such work is international. Much knowledge is still to be gained by studying food practices that are hallowed by tradition and established in folk-lore. Much ignorance is still to be dispelled because of the fads and prejudices and nonsense that surround the subject of food. As the population of the world increases, doubling itself in the next fifty years, we must seek new sources of foods and new methods of preserving and transporting foods. New problems thereby arise. The aim of all is the same: to produce not dehydrated canned fodder but appetizing wholesome food. "Good digestion wait on appetite, and health on both"; but appetite is largely a matter of custom and experience; "one man's meat is another man's poison," and we must study and respect local preferences.

Physical science has provided most of the comforts that man needs, and medical science has conquered most of his ills

except the degenerative diseases. These lie, at least in part, in the province of nutritional science. We know that the right food is the basis of health, but we are still ignorant of what constitutes the right food and how to provide it for mankind. The objective of human nutritional science is long-range, but with an immediate dividend in health and happiness. We need more knowledge upon which we can base an intelligent and effective provision, use, and management of food. The new science of nutrition will shed much-needed light on one of the most fundamental, widespread, urgent, and inadequately managed problems in the whole domain of human welfare. For nutrition has now become the most important single environmental factor affecting health in every country of the world. All men seek freedom from want, and the two fundamental wants of man are food and health.

PROMOTION PROSPECTS OF SENIOR REGISTRARS IN SCOTLAND

BY

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This paper is an attempt to analyse, on the basis of detailed information, the extent and nature of what has come to be known as the senior registrar problem as it applies to Scotland. It has been prepared from tables supplied to the British Medical Association by the Department of Health for Scotland, giving the year of birth of all consultants and senior registrars in Scotland as on December 31, 1956. The figures for consultant vacancies are based on the assumption that they will retire on reaching the age of 65 years, and no account has been taken of any "wastage" factor. No names have been given and the figures have been broken down to cover all specialties in each region and also in Scotland as a whole; total numbers and average ages have been used for the conclusions reached.

Present Establishment

From Table I it will be seen that there are 250 senior registrars in Scotland; 41 of them have already held their present posts for more than four years, and many others have held previous appointments in this grade. Their average age at 35 is already three years more than the Spens report envisaged, and their prospects are so poor that the few who do gain promotion will find their total life earnings considerably less than they should have been, because the salary scales were based on the Spens assumption that 32 would be the average age of consultants when first appointed. For the same reason the remuneration of those in all the junior hospital grades is correspondingly very much too low. The present salary scales were designed to ensure a steady rise with age and experience for those considered worthy by appointment boards. They are not only too low for the reasons just given, but the plateaux which have become established for those marking time at the second-year registrar and fourth-year senior registrar salaries were not envisaged and are quite contrary to the understanding and interpretation of the hospital staffing structure which was accepted by the profession in 1948.

Much has been said about the ratio of consultants to those in the training grade, and it is often suggested that if only some satisfactory mathematical formula could be found the problem would be resolved. Closer examination of the situation, not only as it exists to-day but as it will present in future years, shows that this is far from being true, and that such a "solution" would give rise to future