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Nutritional aspects of food policy

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Introductory

The Ministry of Health is advisory to the other Departments not only on nutrition, but also on toxicological and microbiological aspects of food policy, and in these functions is assisted by the Committee on Medical Aspects of Food Policy, whose secretary I am. In the ensuing paper only nutritional aspects are considered, and the emphasis obviously has to be upon fact finding and its interpretation. These are the bases of advice, the implementation of such advice being the subject of the second paper. Part of the fact finding is initiated by the Committee itself; part is available through other organizations or through independent investigators; part emerges in the course of the resolution of specific nutritional problems for which the Committee usually forms expert panels. These questions of fact finding and of the resolution of specific problems form a large part of what follows.

Problems of nation-wide nutrition surveys

Neither in this nor in any other country is there a system which gives a comprehensive picture of the nation's nutrition employing all available techniques. In 1962 the Committee advised a long-term programme of nutrition surveys of various age and sex groups, beginning with preschool children. In 1963 a pilot study was made of some 400 children aged from 9 months to 4 years 11 months. Time lapsed before results were obtained from the computer, and had been tested for their ability to provide answers to questions of nutritional policy, an essential step before a full-scale survey could be begun. But in the interim certain methodological obstacles to the conduct of surveys of the elderly, and of pregnant women, were tackled and overcome. This made us able, technically at least, to embark during 1967 on surveys of all three groups: preschool children, pregnant women, and the

elderly; and all three will be begun during the autumn of this year and will run for about 12 months. Because there are here today staff from local authorities and other organizations who will be helping us and who have indeed helped greatly in the past, a word on the nature of the problems of large-scale surveys may be of interest.

Ideally, nutrition surveys should be on nationally representative samples—which means random samples in at least forty localities up and down Britain, and should include information on social, economic, dietary, nutritional, medical, anthropometric, biochemical, and often radiological aspects. This is not realistic. The problem therefore is either to collect what can be done on a national scale and to supplement it by detailed circumscribed studies in depth, or to make studies in depth and follow these by more superficial studies in breadth. One can get all the information out of some of the people, or some of the information out of all the people, but not both, and the problem is to integrate the two sorts of information.

The preschool children's pilot survey was made in breadth, spread over Britain. The essential information was judged to be the record of food consumed, and as much socio-economic, and on the other hand as much medical and dental information as possible was got. The information which emerged has justified this approach, as seen below, and therefore a full-scale study will be begun this year. But the approach is not perfect, and therefore in the survey of the elderly the reverse approach will be tried, of a limited number of studies in depth, on samples representative of circumscribed areas, with a view to deciding then what is needed in the way of studies in breadth to fill out the picture.

Experience will show which is the more suitable approach; and no doubt other countries will be doing the same sort of thing and we shall learn from one another. In the meantime fact finding continues by several other means, and problems arise and are investigated, and both are the subject of the ensuing sections.

The indices of nutritional change

The indices of nutritional change are data, often compiled for non-nutritional reasons but bearing directly or indirectly on the state of nutrition, and are usually drawn from the country as a whole and compiled in the same way from year to year.

Records of food consumption such as the National Food Survey indicate a change in pattern of diet—bread, flour and potatoes giving ground to fat and sugar—following release from rationing and price controls with an effect on nutrient consumption. A subsequent recovery occurred owing to increased consumption of foods of animal origin. Growth rates have increased gradually over the period, though there are slight indications of an effect of the nadir of nutrient consumption. The perinatal mortality has fallen, though there can be many reasons for this, and though in fact there are other Western countries with lower rates than ours. The rejection rate for new female volunteers for blood donation has fallen over the years. Again, certain reservations are needed in its interpretation. Deaths due to arteriosclerotic heart disease are still numerous and increasing, and are a warning that though the other indices are reasonably satisfactory there may be new nutritional problems arising.

These indices are the backdrop to the stage whereon are next described more specific problems.

Feeding of babies

These problems begin at birth with the question of what, if any, modifications of cow's milk are suitable for artificially fed babies in the early days before all their digestive enzyme systems have been satisfactorily developed. Because time is short and because the impact on food policy must at most be limited, it is sufficient perhaps here to say that, though the expert Panel's recommendations to date have manifested themselves in the form of controlling Regulations only, it could be that at some future stage a report might be prepared of somewhat wider significance to all those concerned with feeding babies.

Rickets

Rickets excites great emotion, largely because it is thought that it is reappearing and this is a sign of social regression. But, as made clear by the Sub-Committee on Welfare Foods (Central and Scottish Health Services Councils, 1957), it never did disappear; all English paediatricians who were then asked had seen at least one case in the previous 2 years. Further, such freedom from rickets as was enjoyed before 1957 was almost certainly secured at a heavy and morally unjustified price, that of hypercalcaemia in babies who were correctly fed in accord with medical advice but received too much vitamin D mainly from fortified milks and cereals. The Sub-Committee on Welfare Foods advised drastic reductions in these fortifications and, since then, the problem has been to steer the nation down the narrow uncharted channel between rickets and hypercalcaemia. The Report of the British Paediatric Association (1964) showed that, after an inexplicable lag, the incidence of hypercalcaemia fell by more than 50%, without any obvious increase in rickets. Nevertheless there remain some rickets and some hypercalcaemia and in 1965 an expert panel was convened to advise on what, if any, changes were needed in our system of fortification of foods with vitamin D. In the 1st year of life intakes of vitamin D range widely, as shown by Bransby, Berry & Taylor (1964). We have since improved this somewhat. From the 2nd year on there is a marked fall, and most intakes are below the commonly recommended 400 i.u. daily. The expert panel took evidence on the incidence of overt rickets in Glasgow, from Dr Arneil, and from the replies to the Ministry of Health by nine Medical Officers of Health in England who reported, during 1966, thirty-four cases of rickets; the total births of the areas were about 58 000 in 1966. In very round figures, therefore, the English urban rickets rate may be of the order of one per 2000 births, and though the Glasgow rate is uncertain it may not be of a grossly different order of magnitude.

The panel concluded that overt rickets occurred in small pockets, either socio-economic or racial, which might well respond to fairly simple modifications of our existing fortification system. But overt rickets might be the tip only of an iceberg and the prevalence, therefore, needs to be known of subclinical vitamin D deficiency. Evidence is hard to produce because the obvious way of procuring it—by an X-ray survey on a representative population of children—has been opposed on the grounds

of a risk, however minute, of radiation with no corresponding gain to the bulk of those studied. When evidence is obtained, the panel has found its interpretation equally difficult. What it is endeavouring to ascertain is the prevalence of a degree of deficiency so mild that radiologists dispute with one another and with biochemists as to whether the individuals studied have any deficiency of vitamin D at all. If the panel were to decide that major changes in fortification system were required, the pilot survey of preschool children would supply the essential background against which the decisions on fortification would be taken.

On the hypercalcaemia issue it should be remarked that not only is the disease rare but the view is gaining ground that many, indeed the severest cases, are not due to dietary supplies of vitamin D.

Preschool children

The next problem is the diets and nutrition of preschool children. The results reported below came from the survey, already mentioned, of over 400 preschool children made in twenty-five areas drawn at random throughout Britain (Ministry of Health, 1967). A 7-day weighed record was kept by the mother, and the child—where consent was given—was examined by the medical and dental staff of the local authority, to whom we are much indebted. Two points may here be mentioned: first, as pointed out in a previous paper by Berry & Hollingsworth (1963), the National Food Survey comparison of protein consumption with 'requirements' based on the recommended allowances of the British Medical Association (1950) is least satisfactory in families with many children. This could either be because the 'BMA allowances' for children are too high, or because their diets are worse, or both. The average percentage of calories derived from protein was 12.0. The British Medical Association's (1950) Committee on Nutrition's recommended allowance for protein is 14% for children; so that all else being equal every additional child would result in an apparent worsening of the comparison without there having, in fact, been any change in the dietary situation. However, quite apart from this, families with one or two children derive about 0.5% more of their calories from protein than do families with three or more children, and this occurs largely irrespective of income of head of household. Thus a large part of the comparison shown in the National Food Survey records may be regarded as artefact, but a part does represent a difference in intakes. To what extent is this real difference reflected in physique? There is some indication of a relationship, not statistically significant, between protein intake and weight (Berry, 1966). Similar relationships emerged between other nutrients and height, as is to be expected because diets are characteristically high or low in several nutrients rather than in a single one. Whether these relationships are real would need to be tested on much larger numbers, and whether there is a causal relationship with protein or with any other nutrient could only be proved by means of a feeding test.

The second point of interest is the part played by milk in the diet of preschool children. The average amount consumed daily was somewhat below the 20 oz of subsidized Welfare Milk provided daily, but as Table 1 shows, its contribution to the diet

is great. The relationship between height and milk consumption was similar to that for protein. The lowest milk consumptions are by no means preponderantly in the poorest groups; indeed, the figures could be interpreted as suggesting that some children do not like milk and that this dislike occurs irrespective of socio-economic circumstances.

Table 1. *Contribution made by milk to the average intake of certain nutrients by children aged 2 years*

| Nutrient | Average daily consumption | Percentage from milk |
|-------------|---------------------------|----------------------|
| Protein | 40.2 g | 26 |
| Calcium | 696 mg | 57 |
| Riboflavine | 1.1 mg | 44 |

Older children

Had the lifting of rationing and price control in 1954 led to an indefinite prolongation of the fall which occurred in the level of nutrients in the diet, then there must eventually have been some effect on child growth, presumably occurring first in large families. In order to detect this, arrangements were made for a special reporting of heights and weights of large families using only children from the same areas as 'controls'. However, the heights of children in large families remained very constant relative to those of only children—but by the time the collection of information began the dietary situation had been largely rectified.

Next, we should consider public statements by Dr Geoffrey Taylor that the incidence of malnutrition in children is high. As I understand it, this is based particularly on two signs: myotatic irritability or myoidema, and papillary changes in the tongue. Dr Taylor ascribed the former condition to thiamine deficiency (Taylor & Chuttani, 1949), but the condition was widespread in war-stricken Europe, though people perforce then ate flour of very high extraction. In blockaded Berlin no consistent response to thiamine was observed and it was concluded that the myotatic response reflected the compressibility of muscle (Berry, 1954). Before myoidema as observed in Britain is interpreted as a sign of malnutrition, physiological norms, and a response to treatment, need to be established and this also obtains for papillary tongue conditions. At the Ministry's request, Professor John Yudkin is considering a trial of the response to treatment of tongue signs.

Additions of nutrients to food or drink

In this rapid review the additions to food and drink of *creta praeparata*, thiamine, nicotinic acid or iron (to flour) or fluoride (to water) will not be considered: some of them are dealt with by other speakers. But some information about iodine may be of interest. Table 2 shows some relationship between definite thyroid enlargement, at and below World Health Organization Grade I level (World Health Organization: Study Group on Endemic Goitre, 1953), and the consumption of school lunch in two formerly goitrous areas of Britain, among schoolgirls aged 13 years and over.

The meal is cooked with iodized salt and the iodine intake of those who take it is about double that of the others. Though nearly 2000 children were examined, the differences are not statistically significant; but they are consistent and may well therefore be real. The prevalence, of less than 5% in all groups, contrasts so greatly with the figure of about 25% reported for North Oxfordshire in 1943 by Murray, Ryle, Simpson & Wilson (1948) that a further analysis was made including also those suspected of having possible enlargement. Though the differences between the groups were maintained, they were not proportionately increased and, among the enlargements which were only suspected, obviously the bulk are either not thyroid enlargements at all, being due to over-diagnosis, or they represent enlargements which are physiological, or at least non-responsive even to iodine administered over the whole of the previous 5 years—during which these enlargements were presumably developing. The worrying aspect of this finding is in the lower incidences reported (and as Table 2 suggests, validated) compared with the earlier findings of Murray *et al.* (1948). Either there has been substantial reduction in thyroid enlargement in children in the last 20 years without any recourse to compulsory iodization of salt, or perhaps the original evidence included over-diagnosis in the way that perhaps the values in Table 2 do. Whatever the interpretation, the findings have an obvious bearing on the chances of obtaining public acceptance of compulsory iodization of salt, bearing in mind the public reaction to fluoridation of water. Obviously clearer evidence would be demanded and there is work afoot both by ourselves and others which may or may not provide this.

Table 2. *Effect of diagnosing thyroid enlargement at the 5-10% level (probable enlargement) instead of at the 2-4% level (definite enlargement) in schoolgirls aged 13 years and over*

| | Not taking school lunch | Taking school lunch | Difference |
|-------------------------------|----------------------------|------------------------|------------|
| Wiltshire 1960: | | | |
| Definite enlargement (%) | 3.0 | 2.2 | 0.8 |
| Plus probable enlargement (%) | 13.5 | 12.5 | 1.0 |
| Wiltshire 1965: | | | |
| Definite enlargement (%) | 2.9 | 1.8 | 1.1 |
| Plus probable enlargement (%) | 6.1 | 4.75 | 1.3 |
| Oxfordshire 1966: | | | |
| Definite enlargement (%) | 4.6 | 2.5 | 2.1 |
| Plus probable enlargement (%) | 13.6 | 9.8 | 3.8 |

The elderly

The major practical problem of the immediate future is the nutrition of the elderly. The major theoretical problem of the day is, of course, degenerative disease, particularly vascular disease, but this is not yet at the stage at which food policy is involved.

There is an Expert Panel on the Elderly, and it is not proposed here to anticipate their findings: in any event there will be a paper on this subject this afternoon, but a few points may be made. The first is that whilst there are a few specifically geriatric nutritional issues, such as the need by the housebound for vitamin D to make good

the lack of direct sunlight, and the maintenance of good nutrition in the bedfast with their low caloric expenditure, the immediate problems of the elderly are primarily social and organizational. Nutrition may play a vital part in the prevention or delay of what are at present accepted as normal processes of senescence, but the fundamental research on this has yet to be done.

Our surveys will, we hope, provide guidance on the provision of nutrients for the elderly. In the production of meals containing these nutrients, I personally feel that great opportunities may await the food processing industry and a great deal of trial and error has still to be made.

The diseases of excess

Among the diseases of excess, it has been said with some truth that everyone knows what ought to be done about coronary disease but they all know something different. On obesity it is of interest that in our study, as in the London County Council survey of 1959 (Scott, 1961), obesity appeared as a problem of only children rather than of those in large families.

Summing-up

Where then are we? As stated at the beginning, we still have to devise means by which a detailed comprehensive picture of the nation can be achieved. In this, biochemistry is likely to play an increasingly important part, but a good deal of methodological and epidemiological work has first to be done. We have all too few tests of function as opposed to tests of the levels of nutrients in biological fluids; of the former the normal distributions are unknown, and of the latter the clinical significance is often still all too obscure. But though these problems of fact finding have still to be solved it is possible to build up a picture from the existing evidence which is reasonably coherent and comprehensive.

The release of rationing and controls was achieved without too much loss in nutritional content. From the attention that has been given to the minutest signs of possible vitamin D deficiency, to small differences in growth rate, to what are the limits of normality both of thyroid enlargement and of muscle responses and tongue signs in children it may be deduced that, among the young, the malnutrition with which we are concerned is vastly milder in degree than the malnutrition of the past. In addition our control of rickets is now largely secured without the old, unethical, penalty of hypercalcaemia. But we have before us still the problems of an increasing number of old people in an island of which the productivity does not appear to be increasing at anything like the same rate. We also need to remember that though the proximal nutrients of the diet have not been much affected, the pattern of foods in the diet has substantially altered since the war and this can be expected to bring in its train new problems, including those of excess. The day has yet to come when all the nutritional problems of this country have been resolved, and indeed it may never come, in a fluid and progressive society whose eating habits are likely to be equally fluid if less consistently progressive.

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Some aspects of the implementation of food policy

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Introduction

The subject is limited to some aspects of the implementation of food policy because it is too wide to be dealt with in its entirety and because the framework of supply and distribution of our food imposes limitations.

Half our food is produced at home and half imported. The imported supplies enter on a free market modified in some instances by international agreements, while home-produced food is encouraged by a price support system for farmers which enables it to compete with the usually cheaper imports. Excepting liquid milk, there is no form of price control to the consumer.

For the population as a whole policy is concerned with protection of the public from contamination of food with harmful micro-organisms and filth, with possibly dangerous additives either deliberate, e.g. colours, or adventitious, e.g., pesticide and other residues, and from misleading claims. The policy objective is clean, safe food with full retention, so far as possible, of nutritive value and the encouragement of research and development towards these ends and towards increasingly efficient methods of processing, storage and distribution.

Within the framework of our food position it is possible to make certain limited arrangements for helping particularly vulnerable groups of the population which will be described.

Measures affecting the whole population

Responsibilities for regulations as to the composition of food are shared by the Ministers of Agriculture, Fisheries and Food and of Health, using the Statutory powers conferred on them by Section 4 of the Food and Drugs Act, 1955. This