

be to some extent reduced, and their place taken by cooking oils. In this way, the oil consumption might be half an ounce a day, and this, to my way of thinking, is a far more potent way of battling with this disease than to administer a strict diet after the damage has been done.

THE RIGHT FOOD FOR THE RIGHT AGE

I

Children

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It seems almost inevitable that a lecture of this sort should begin with the quotation of a few aphorisms, a text or two, whilst a Sunday morning audience settles down and the lecturer loses his first nervousness. The first of my texts is a much-quoted phrase from Sir Robert McCarrison's lecture of 1936. He said then that "The great single factor in the acquisition and maintenance of good health is perfectly constituted food." Almost equally well known is the following conclusion of the United Nations Conference at Hot Springs in 1943: "The first essential of a decent standard of living is provision to all men of those primary necessities which are required to promote freedom from disease and for the attainment of good health. The most important of these fundamental necessities is adequate food." In passing, let me call your attention to what seems to be a significant difference in phrasing between these two utterances. The first speaks of "perfectly constituted food" and the second of "adequate food". A world war, widespread famine, and an enormous volume of nutritional research took place between these two statements. We are less certain now of perfectly constituted food, and we are satisfied if a diet be adequate.

If statements like these be true of populations generally, they must be especially true of the young, because growth makes extravagant demands upon nutrition. Though the effects of an adequate diet appear slowly even in actively growing children, and though mothers everywhere will starve themselves before their young go hungry, the children of any community are especially susceptible to the effects of malnutrition. How then do we judge the nutritional state of the

child? I take it that you and I today cannot concern ourselves with the painstaking methods of nutritional research, but rather with the rough and ready clinical appraisal. Here I find another quotation to help me in Robert's classical monograph on nutritional work with children in which he states that the judgement of adequate nutrition should be based upon an appearance of vitality, a well-grown skeleton, muscles well developed and strong, and subcutaneous fat giving the body a well-rounded appearance. Something of this sort, I presume, forms the basis of our everyday clinical judgement. To these vague criteria I would add that the child's growth should be adequate as judged by appropriate standards for his race, age, and sex.

Before the war, 25 per cent of our childhood population was judged to be undernourished, and this is reflected in the pre-war anthropometric data and the present size of those adults who were young then. Present-day children are so much bigger than those of a generation ago that for some years, and until quite recently, British paediatricians tended to use American standards in assessing height and weight. The cause of this change is not in doubt. It stems from improved nutrition during the growing years, but other factors may also contribute, for example, a slow ebb and flow of an anthropometric tide that seems to affect populations in a manner quite independent of standards of living. I think, however, that we would all agree that the improved standard of living in the community as a whole, with opportunities to buy a varied and adequate diet, is probably the biggest factor in the improvement of the nutrition of the young in this country at this time. Growth is the business of childhood, and just as absence from work is an important feature in the medical history of an adult so an interruption of growth is a significant observation in paediatrics. As my own standards of comparison or normal controls, the children of my own family, grow to maturity I find it more and more difficult to tell at a glance if a child patient is adequately grown up for his age, and I find here that the charts prepared by James Tanner are the most useful.* The difference in growth patterns of girls and boys makes separate charts necessary, and to provide a sufficiently open scale three charts are needed for each sex to span the years of childhood.

As a practising paediatrician trained to recognize malnutrition, I ought to see examples of dietary deficiency if they exist. The plain fact is that my patients, by and large, are very adequately nourished, I can recall one case of rickets in five years, in a child erroneously diagnosed elsewhere as suffering from infantile hypercalcaemia. She was put on a low calcium diet by a colleague, and I am grateful to

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that particular paediatrician for an example of what is now so rare but was once called the "English disease"—florid rickets. From time to time a case of scurvy presents in a child who does not like orange juice and whose mother does not recognize the need for a substitute source of vitamin C, perhaps because she is so dazzled by the statements about vitamin content on the tin from which she makes her child's feeds. Frank marasmus from underfeeding is also rarely seen. I can recall one death from starvation in ten years, in a baby who was nursed alternatively by his mother and granny. Whenever he cried they picked him up and walked the floor with him. He fell asleep promptly whenever he was given the bottle, and by the time he reached us in hospital he was so exhausted that he died before we could save him.

My first conclusion is that in this country at this time almost every child must be having the right food for a child of his age. Perhaps therefore at this point I should sit down, but I would like to continue for a few minutes because like every paediatrician I am bedevilled by feeding problems. As a provincial paediatrician I see more cases of feeding problems than any other single diagnostic entity. At Great Ormond Street, perhaps because my London general practitioner colleagues are somewhat less robust than their East Anglian counterparts, I see proportionally many more. If I conclude that at most ages children are receiving mostly the right food, I cannot refrain from a comment or two on the trouble so many have in getting it. The trouble begins, of course, with the decline in breast feeding. I am content to accept as a fundamental premise that the milk of any given mammalian species is the most appropriate food for the newborn young of that species. Moreover, the intimacy of the relationship between a nursing mother and her suckling young is so fundamental to the satisfactory development of a mother-child relationship that I wish we had more time to devote to this most neglected aspect of child care.

The first feeding problem is introduced with some such words as "my milk does not suit my baby". I suppose this conclusion is always fallacious but I also suppose that I must say a word or two about human *versus* cow's milk in infant feeding. Recent biochemical investigations have revealed more subtle differences between the two milks than the simple difference in casein-lactalbumin ratios with which every medical man is familiar. We know that at four months of age the chemical composition of the body of a bottle-fed infant has more nitrogen, calcium, and phosphorus than that of a breast-fed contemporary; indeed at six months the body of a breast-fed baby contains less of these essential elements in proportion to body weight than it did at birth. I am satisfied that

even the smallest premature infant can be reared satisfactorily on a cow's-milk formula, and I am persuaded that there is no essential difference in resistance to disease that can be attributed to the milk consumed in the early months. But for all this I remain a staunch advocate of breast feeding.

As regards milk feeding generally, a word must be said about individual requirements. We were taught that these were $2\frac{1}{2}$ ounces per lb. per day, our sons are taught that they are 150ml. per kg. per day; 50 Calories per lb. or 100 Calories per kilogram seems a more scientific statement. Let us remind you of Talbot's basic calorie calculation in this respect. For the first three months of life he found that basal metabolism accounts for 55 Calories per kg. per 24 hours, growth accounts for 5 Calories per kg. per 24 hours, excreta losses account for 15 Calories, and muscular exercise for 35 Calories per kg. body weight. Mothers of small families may be forgiven for overlooking the biggest variable, exercise. Welfare clinics workers ought to remember it more often than they do.

Dr Widdowson has given you some account of her classical study of individual children's diet, and you will recall that the outstanding feature of this investigation was that in each age group there was always one child who ate twice as much as another. Similar differences were observed when children of the same height, weight, or surface area were compared. One can never legislate for individuals from a knowledge only of the average. In welfare clinics and places where they weigh, I should like to see this phrase written indelibly on the wall where all can see it. Somewhat earlier than Widdowson's work in 1945, Wallgren showed much the same thing after studying 400 breast-fed babies. He found no significant correlation between the body weight and milk consumption and also showed that the amount a particular baby might take is quite unpredictable. Unpredictable it may be, but demand feeding taught us how easily an infant may estimate his requirements himself if he is given half a chance.

In animals in the wild state, Le Gros Clark found that the time of weaning depends on: (1) the ability of the young animal to live independently, avoiding danger, and foraging for itself; (2) the ability of the young to digest the food of the grown adult. There can be no doubt of the ability of the human infant to digest the food of grown adults, provided only that it be given in assimilable form. Indeed the feeding of semi-solids from three to four months of age, or even younger, is one of the characteristic fashions in present-day feeding practice. By the second of Le Gros Clark's criteria, then, four months might be the time for weaning, but the ability to live independently, foraging for himself and avoiding

danger, would seem to carry the age of weaning to three or four years for humans at least. Such late weaning may indeed be desirable in a primitive community. The need to avoid kwashiorkor and other nutritional disorders in the tropics and sub-tropics leads to the recommendation of prolonged breast-feeding, through the first two years of life anyway, as a measure of greatest importance and value. To be effective, this must of course depend on nutritional measures directed at the mother during pregnancy and throughout lactation. For my own purposes, in determining the time of weaning I am guided by the simple observation that most maternal mammals become somewhat restless at suckling when the first incisor tooth is through the infant gum; and when the young animal has two opposing incisor teeth and can nip the nipple, the maternal hoof is apt to be used to cuff the infant away from the udder and encourage it to forage for itself. Weaning for the human baby, therefore, might begin at six months and be complete by nine months. Earlier weaning to solids seems unnecessary to me.

No sooner is weaning more or less accomplished than we meet the trials and tribulations of the toddler's fight for some reasonable measure of independence from his mother. This commonly shows itself as negativism, most particularly perhaps in the refusal to eat at mealtimes.

Another stage of feeding problems is presented by the schoolchild. It has been my experience that an actress will not readily accept an invitation to dine out with you before the performance; she is wrought up and the thought of food is enough to sicken her. After the show she will gladly come out with you for supper, and she may then eat more than you can comfortably afford. The same seems to be true of the schoolchild, and I would emphasize in passing that these are not necessarily children who dislike school or who do badly there. Commonly, they are highly-strung, nervous children who take an intense interest in their school life and who have no stomach at breakfast time; if forced to eat then, they may actually vomit. Later in the day, not often by lunch time but by tea time, appetite returns and then presumably such a child takes care of her calorie requirements.

A common factor throughout the age of childhood in the pathogenesis of the feeding problem is a maternal obsession concerned with what is good for the child. The child does not like milk, will not eat meat, or will not touch greens. So much is the modern mother at the mercy of advice from grannies, health visitors, doctors, paediatricians, articles in the press, advertisements, and, for all I know, on the television too, that often enough she is in such a dither that it hardly seems to need the failure of the child to co-operate (or should I say the co-operation of the child?) to produce

a first-class feeding problem.

May I here refer you to another classical feeding experiment, that of Widdowson and McCance, carried out at Wuppertal in Germany shortly after the war. There, you may remember, bread was made from three different extraction flours, and bread comprised 75 per cent of the calorie intake given to three otherwise comparable groups of undernourished children. All these children, regardless of the types of bread on which they were fed, grew at one and a half times the normal rate during the period of experiment. Surely the conclusion to be drawn from this is that, given an adequate supply of calories in the diet and sufficient quantities of all the significant food factors, a child will grow at the optimum rate and will enjoy optimal health. Presumably the child's digestion extracts from the food what is needed and only the unnecessary is eliminated.

My conclusion then is this; that throughout the years of childhood there is no such thing as the "right food". In infancy milk is appropriate, human milk for preference but there are satisfactory alternatives. At later ages a wide variety of food substances will be selected and digested. The necessary will be assimilated and the redundant excreted. In this country at this time there is only one outstanding nutritional problem in the paediatric age group. It is the prevalent maternal preoccupation with the right food for the right age for children. This might well be termed an occupational neurosis amongst modern mothers.

Begging forgiveness of the Shakespeareans amongst you, I would summarize my advice to mothers thus:

Keep these few precepts in the memory:
 Seek thou variety. Give thy young their choice,
 But not any unproportioned diet.
 Be thou pliant, but by no means lax. Those rules thou hast and their
 adoption tried,
 Grapple them about thy young with bands of steel
 And do not dull thy pate with entertainment
 Of each new-hatched unfledged theory.
 Costly thy menu as thy purse can buy,
 But not expressed in fancy, rich nor gaudy,
 For the table oft proclaims the man.
 Neither a worrier nor a pleader be,
 For worry weakens in the end
 And pleading blunts authority.
 This above all, to the young give plenty,
 And it must follow as the night the day
 Thou canst not then starve any child.