to physiological development, and many children ceased to get supplements at the phase of development when extra food was most needed.

Assessing the Nutrition of the Individual Child

In Europe this problem is not so much that of distinguishing optimum nutrition at one end of the scale or manifest deficiency disease at the other, but in deciding where the child should be placed in the wide region of suboptimal nutrition which divides the two. Innumerable formulae have been suggested, based on physical measurements, performance tests, and the like, their very number indicating the inadequacy of any one. It is interesting historically to remember that the American Relief Administration in Austria after the war of 1914-18 based its relief on the selection of children according to two formulae constructed by von Pirquet. The nutritional index used—namely, the cube root of ten times the weight in grammes divided by the sitting height in centimetres and multiplied by a hundred—showed on subsequent tests that whilst the error in estimating the sitting height was up to 5 cm, a difference of 1 cm. might cause a child to be placed in or out of the malnourished group (Faber, 1923).

Since this time the value of the haemoglobin, of physical performance, and of muscle tone in assessing nutritional status has been more clearly recognized; attempts have been made to standardize the measurement of subcutaneous tissue; the biochemist has added his contribution in estimating vitamin levels and saturation, blood pyruvic acid, phosphatase, and the like; the cornea has been examined for vascularization, and night vision has been tested. But despite the punching of innumerable cards and the clatter of concatenations of calculating machines it is still largely left to the clinician to decide what is or is not a malnourished child. I need not labour the fallacies of unaided clinical appraisal: this has now become almost a credo of medical education. But I would emphasize once again the difficulty of assessing the effect of malnutrition on subsequent development. A short-term loss of weight can usually be made good; but long-continued deprivation may result in retardation of growth or infantilism, which will partially mask, on a single examination, the degree of malnutrition from which the child is suffering. This difficulty cannot altogether be overcome by the use of standard height-weight-age tables, particularly when these have been prepared from normal children of a different race. It is only the long-term study of individual children which can in the analysis tell us the ultimate effects of such malnutrition as has been the result of the war years.

Conclusion

It would be only too easy to end on a note of disillusion and despair. We have widespread evidence in Europe of unrest, bitterness, disease, and destitution among those who suffered as children in the early war years and are now approaching manhood. But I feel rather that the experience of the recent war can give us certain grounds for hope. The general recognition that children must be preserved at any cost, the good will that alone made possible the evacuation of children from danger zones, and the equal distribution to children of rations on a scale which made the already heavy burden of the adult community even harder to bear all point to a new understanding of the child's importance to society. These may seem small advantages to set against the havoc and chaos occasioned by war. But they are certainly symbolic of the new spirit which has entered into the protection of child life and health. This is becoming less and less a matter of sentiment or charity and increasingly one of vital concern. The fact that every country

has put children first instead of last when survival was at stake is surely an omen for the future, and we can only hope that this at least of what has crystalized in the crucible of war may not be lost in the uncertain years which lie ahead.

Part of the subject matter of this address was included in a Mayo Foundation Lecture delivered at Rochester on July 21, 1947. An abstract of this was published in the *Proceedings of the Staff Meetings of the Mayo Clinic*, 1947, 22, 441, and I am indebted to the editors for permission to republish it in more extended form.

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OBSERVATIONS ON RATIONING IN TUBERCULOSIS

BY

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Investigations into the adequacy of the diet of tuberculous patients carried out during the earlier war years (Ross, 1943; Keers, 1945) seemed to confirm the official view that the dietetic restrictions imposed by rationing had exercised no deleterious effect and that the patient's nutrition had been maintained at a level high enough to enable him to combat his disease successfully. In those investigations the average gain in weight was used as an index of the nutritional state of the patient, although it was recognized that this method did not provide full information regarding possible dietetic deficiencies such as mild degrees of avitaminosis. The years 1938 to 1942, as they affected the patients in certain Welsh sanatoria and a Scottish sanatorium, were covered, and the figures produced indicated that on the whole the average gain in weight recorded was no less than in the years preceding the outbreak of war.

The investigation has recently been reopened and extended at Tor-na-Dee Sanatorium, as it was felt that during the past two years the average gain in weight had been less satisfactory—an impression which it was considered necessary to confirm or refute by a detailed examination of the weight records. The method of investigation adopted was that which was used in the previous publication. Each patient in the sanatorium is weighed once a month, and the gain or loss in weight during the preceding month is noted. These gains and losses throughout the patient population, added together and divided by the number of patients

weighed, give the change in weight of the average patient for that month. This average monthly variation has been plotted in graphs showing the variations for the years 1938 to 1942 (Chart 1) and the years 1943 to 1946 (Chart 2).

CHART 1.—Monthly variations in weights of all patients, 1938 to 1942.

CHART 2.—Monthly variations in weights of all patients, 1943 to 1946.

A survey of these graphs shows that during the years 1940 and 1942 the average gain in weight was well up to the standard of pre-war years, but that from December, 1940, there was a steady decline which lasted until May, 1941, when there was an average gain of 1 lb. (453 g.) throughout the sanatorium. This was followed by a further decline in June and July before the normal upward trend was resumed in August. In searching for a possible explanation of the decline it was noted that the final month of 1940 and the first three months of 1941 saw a fall in the meat ration from 2s. 2d. weekly to 1s. weekly, at which level it remained until it was finally stabilized at 1s. 2d. weekly in July, 1941. Furthermore, in May, 1941, cheese, previously an acceptable and freely used alternative to meat, was rationed for the first time. The initial allowance was 1 oz. (28 g.) weekly, and this was raised to 2 oz. (56 g.) in June and to 3 oz. (85 g.) in July. It is felt that these two rationing measures must have played a part in the loss in weight noted at that time, for, although substitute fare was available, it did not make the same appeal to the palate, and a period of readjustment was necessary before the weight of the average patient showed a satisfactory upward trend. During the

early months of 1942 the gain in weight was poor until May, when it rose more sharply and continued to climb steadily throughout the remainder of that year. Here again it should be noted that the cheese ration was increased by stages from the end of May, 1942, reaching its maximum of 8 oz. (226 g.) in July of that year, where it remained until January, 1943, after which it declined gradually to 3 oz. in May, 1943. The reduction to 3 oz. weekly coincides with an average loss of weight during May, June, and July, 1943, from which one is again tempted to postulate a period of readjustment to altered diet, followed by a gradual recovery. No further notable fluctuation in basic commodities took place until March, 1945, when cheese fell to 2 oz. weekly, followed in May by a reduction of 1 oz. in the bacon ration.

The position with regard to unrationed foodstuffs deteriorated steadily throughout the years under review, poultry and even the humble rabbit becoming increasingly scarce until from 1944 onwards a meal of poultry for the sanatorium was practically unobtainable.

During 1944 a further factor entered into the picture owing to the increasing numbers of Service personnel admitted and the gradual elimination of civilian patients. Thus at the end of 1944 the ratio of civilian to Service cases was 2 : 1, at the end of 1945 it was 1 : 2, while by the end of 1946 our patients were drawn entirely from the Services. Practically all these were admitted from Service hospitals, where they had been enjoying a scale of rations considerably more generous than that allowed in civilian hospitals. The result of this change was that the majority of these patients lost weight after admission, in contrast to their civilian predecessors, whose initial response to treatment was usually a substantial gain. This loss in weight is of course reflected in the graphs for the later years.

Apart from this influx of Service cases other factors which might be considered to have a possible bearing on the subject remained relatively constant throughout the course of the investigation (see accompanying Table).

	1940	1941	1942	1943	1944	1945	1946
No. of patients admitted	66	97	106	97	107	110	102
Average age of patients	35.7	32.6	33.4	36.6	32.08	32.09	32.4
Ratio of male to female admissions	2 : 1	2 : 1	2 : 1	3 : 1	2.5 : 1	2.5 : 1	19 : 1
No. of cases requiring collapse therapy	46	38	33	66	66	60	115

The sudden alteration in sex ratio noted in 1946 is due to the fact that by that time the sanatorium was reserved entirely for Service or ex-Service personnel, in which naturally the male element predominated; but it is not considered that this change has had any notable bearing on the investigation as a whole.

Policy regarding treatment remained the same throughout—collapse therapy, including major surgery, being always available and being freely used where indicated. Clinically the proportion of moderately advanced and advanced cases, admitted remained constant until September, 1945, when, owing to the great demand for accommodation, it became necessary to practise some selection of material; and from that time onwards very advanced cases were not admitted.

It is universally accepted that an adequate diet is necessary for the treatment of tuberculosis, and a satisfactory gain in weight is regarded as one important indication of the patient's progress while under treatment. During the past three or four years it has been our impression that the healing of the pulmonary lesion has been a slower process and that an infiltration which would previously have

responded to a period of rest in bed and sanatorium regime now failed to show such response, collapse therapy being required on an ever-increasing scale. The records for the years 1940 to 1946 were inspected and the amount of collapse therapy carried out during those years calculated, with the results shown in the Table.

The figures suggest that the impression of less satisfactory pulmonary healing is correct, and it would appear reasonable to regard the stringent dietetic restrictions to which the patient has been subjected as an important causal factor in the absence of clear-cut evidence pointing to any other cause operating on a general basis throughout the sanatorium. It is much more difficult to assess the degree to which the curtailment of a specific element in the diet has been responsible; for experimental evidence of the part played by protein, carbohydrate, or fat in influencing resistance to tuberculosis is scanty and inconclusive. It is worth mentioning, however, that one of the most interesting and best-documented studies of nutrition and tuberculosis (Faber, 1938) adduces evidence to show that the rise in tuberculosis mortality in Denmark during the First World War was associated particularly with a deficiency of protein in the diet. In Britain it has been possible to maintain the total calorie intake by the use of carbohydrates, but the protein and fat content of the rationed diet has suffered severely, and the weight graphs suggest that the fluctuations in the meat and cheese rations are of significance. The importance of adequate protein for the tuberculous patient was recognized in America, where Ration Boards were empowered to grant extra meat allocations to patients suffering from the disease (Pottenger and Pottenger, 1946).

Summary

Observations on the weight records of sanatorium patients during the years of rationing show that from 1943 onwards the average patient failed to show a gain in weight comparable with the gains recorded in pre-rationing years.

This failure to gain weight satisfactorily was accompanied by a diminution in the powers of natural healing of the disease.

It is impossible on the evidence to indicate definitely the specific elements lacking in the rationed diet, but there is a suggestion that the curtailment of protein and fat (meat and cheese) may be of significance.

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Sir Andrew Davidson, Chief Medical Officer of the Department of Health for Scotland, gave an address to the Royal Philosophical Society of Glasgow on Jan. 14. "Health," said Sir Andrew, "is something more than not being ill. A man cannot enjoy life to its fullest capacity if his diet is inadequate. Medical research will establish dietetic needs. He will be emotionally unhealthy if his work is too exacting or insufficiently varied—industrial psychology can play a part here—and he cannot enjoy optimum mental health if he is worried by economic insecurity and the constant dread of unemployment." He said that sickness cost the nation some 7% of its total annual income; that even before the war the work lost through illness reduced our national income by some £100 millions a year, and the cost of treatment amounted to a figure of a dimension of £185 millions. At present the expenditure on prevention of disease was only 4½% of the total cost of sickness. Therefore, while sickness was a misery to the individual it was also a considerable loss to the State, both in production and in finance. As a nation we were becoming at once more health-minded and broader in our outlook on social health, Sir Andrew concluded. Instead of crying, "Can we afford some new service?" we were now tending to realize that we could not afford ill-health and the resulting loss of productive work. We were beginning to realize that expenditure on preventive services and on health research paid an enormous dividend.

GENERALIZED INFECTION WITH THE VIRUS OF HERPES SIMPLEX

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Our knowledge of infection with the virus of herpes simplex has been greatly increased by observations made within recent years. Dodd, Johnson, and Buddingh (1938) showed that stomatitis in children was often a herpetic infection, and this work was confirmed and extended by Burnet and Williams (1939), by Scott, Steigman, and Convey (1941), and by Black (1942). Herpetic stomatitis is usually a primary infection occurring during the first six years of life, and antibodies to the virus of herpes simplex appear during convalescence (Burnet and Williams, 1939; Scott *et al.*, 1941). These primary infections are often associated with fever and some general constitutional disturbance, and groups of cases may occur in families (Scott *et al.*, 1941). After the primary infection in childhood persons seem to carry the virus for years and may suffer from recurrent attacks of labial herpes, although these subsequent manifestations are milder and are associated with relatively trivial symptoms. Primary infection in adults appears to be relatively uncommon, and while those who are liable to recurrent attacks of labial herpes invariably have a high titre of antibodies to the virus in their serum, those who have no history of herpetic infection possess no such antibody (Burnet, 1946).

Although the virus of herpes simplex has become so adapted to parasitism in the human host that it causes a relatively mild illness in the primary infection and for the most part remains latent in the host thereafter, primary infection is occasionally more severe. Fatal encephalitis due to the virus of herpes simplex has been recorded in an infant 1 month old (Smith, Lennette and Reames, 1941) and in three adults (Zarafonitis *et al.*, 1944; Whitman, Wall, and Warren, 1946). In these instances the virus was recovered from the brain at necropsy. Armstrong (1943) isolated the virus of herpes simplex from the cerebrospinal fluid of a 14-year-old negro boy who was suffering from meningo-encephalitis; an increase of herpetic antibody was demonstrated in the boy's serum during convalescence. Symptoms of meningo-encephalitis were also noted by Warren, Carpenter, and Boak (1940) in a group of patients who suffered from herpetic infection following fever therapy induced by physical methods.

Primary generalized herpetic infection in adults associated with severe constitutional symptoms would, however, seem to be very rare, and the following case is reported because it presented an unusual problem in clinical diagnosis.

Case Record

N., a motor engineer aged 37, a subject of plethoric build but of the type that never ails anything, made a business trip to Denmark and Sweden in August and September, 1946, and returned to this country on Oct. 3. On Oct. 15 he felt unwell, an event so unusual that he stayed at home from his work. On the 18th he sought medical advice because of backache, which distressed him more than his dirty foul tongue and throat and repeated vomiting. He was sweating profusely, with a temperature of 102.6° F. (39.2° C.) and pulse 120. There were no physical signs in the chest and nothing in the abdomen to warrant surgical intervention. The urine was not examined. Tentatively a diagnosis of virus influenza was made and he was given garg. pot. chlor. cum phenol for the mouth and throat