When the numbers are high during a big battle, you may imagine the alarm in high places, the increase in diagnosis of "cowardice" by administrative staffs, and the reluctance to recognize the problem as a psychiatric one. At these times all the slack in senior super-egos is taken in, and some of the wrath falls of course on the patients and occasionally even on their therapist. That is in the day's work. One popular view at such times—popular in rear areas at least—is that access to the psychiatrist will discourage the fighting men who are sticking it out. This may be so, but I have yet to meet a regimental medical officer who knows of a single instance of a good man being discouraged by the knowledge that if he became a casualty of any sort he would get looked after.

The "chronic" cases seen in quiet periods are a mixed bag. Some of them are chronic neurotics, but many are men with persistent symptoms from earlier battles, particularly of guilt and depression about comrade-loss or with anxiety which has not resolved spontaneously after rest. The home worries, too, mount as a campaign goes on and become increasingly a source of military inefficiency. The prognosis with the cases that appear during quiet periods is not as good as with the acute cases, and hospital treatment and re-allocation are needed.

The forward psychiatrist has made himself a familiar figure in the war, and has proved his value in every theatre since 1940. He cannot work miracles, but by persistently plying his craft, keeping his head amid the shifting moral attitudes towards his patients, and remaining, in so far as his own situation allows, objective and unsentimental, honest about his failures and modest about his successes, he can serve the men of his formation in a way granted to few medical men. Such a result, however, is achieved not by heroics, but by good psychiatry.

[*December* 11, 1945]

DISCUSSION ON THE IMPORTANCE OF DIET IN MENTAL ILLNESS

Dr. W. Rees Thomas: For many years pellagra has occurred in this country, arising as occasional cases in the community and among patients in mental hospitals. In the early days, before the cause of pellagra was known, we described a dermatitis of the hands and face resulting from the administration of drugs such as sulphonal and trional. We know now that this was pellagra and it arose not only from a deficient intake of vitamins of the B group, but also from a failure of the body mechanism to absorb it or, if absorbed, to use it for its proper purposes. To-day we know of occasional cases of pellagra arising in mental hospitals, though most of the cases reported were admitted suffering from the disease. I am not proposing, however, to deal with specific diseases arising from food deficiencies but with the more general relationship between health and food, and in particular its effect on patients undergoing treatment for mental illness. How far this may have an influence on accelerating or retarding recovery in mental illness is a matter which we could discuss without forming a definite conclusion. It can, however, be said that subnormal food must lead to subnormal health. The outstanding example is the effect of vitamin C on the healing of wounds, and I feel sure there would be general agreement that in the treatment of any form of mental illness a factor of importance is the quantity and relative sufficiency of the food; the caloric value is important for patients who are not confined to bed or who exhibit considerable physical activity as part of the illness.

Shortly after the outbreak of war in 1939 most of us discovered that we were losing weight. A similar phenomenon occurred in mental hospitals. The change was so obvious that in 1941 an investigation was made to determine whether gains and losses of weight differed from changes occurring in the same patients during the two years before the outbreak.

In seventeen hospitals the weight records between September 1937 and September 1941 were examined. The figures indicated that the loss of weight in the period 1939-41 had been very considerable and affected quite three-quarters of the patients who had been in the hospital during the whole period. This is not quite so bad as it sounds; the peace-time figures show that normally 45 to 50% of the patients tend to lose weight over a period of two years. This is a selected group consisting entirely of those whose illness is prolonged.

The hospitals were divided into two groups, depending on whether or not they were overcrowded. Comparison of the records of loss of weight showed that the degree of

overcrowding existing at the time made no difference to the proportion of patients who lost weight.

At a later date a further investigation was carried out by Dr. Nicole at the Winwick Mental Hospital. The results indicated that from 1942 onwards the position gave no cause for anxiety. The proportion losing weight had greatly diminished and did not differ widely from the figures for the period 1937-39. It is difficult to say just why this change took place but in 1942 we became more food conscious and everybody did a good deal to improve the variety, the quantity, and the balance of the diets, and hospitals were now able, without much trouble to themselves, to have the diets analysed and the quantity of vitamins and minerals estimated as a daily average over a period of one month.

I will now refer to the general food situation during the war up to 1943 as related in "Food Consumption Levels (1944)". The daily caloric value of the food supplied to the people of this country before the war was about 3,000. In 1939-41 there was a sharp fall in the meat, visible fats, sugar and fruit which greatly reduced the palatability, as well as the nutritional, value of food. At the period of greatest shortage in the first half of 1941 calories fell to 2,680 and it appears that there were indications that the diet was inadequate. In 1942 the figures showed an improvement and from then onwards have remained almost constant at a caloric value of about 2,800, though fats and animal proteins remain considerably below pre-war level. The importance of this for my present purpose is to indicate that in 1941 the food was not sufficient and in 1942 and onwards it can therefore have only been slightly above the level of sufficiency. These figures do not represent the actual intake of food but of food issued for consumption.

A comparison of these two events, that is the loss of weight and the standard of food issues, suggests that the reduction of food supplies showed itself in a loss of weight amongst the hospital population—at least that part of it represented by patients undergoing prolonged treatment. The recovery from 1942 onwards is parallel to a better food situation and a time of greater attention to the minerals and vitamins as well as the caloric value of the foods supplied. There are, however, many other factors to be taken into account, though none of them can easily account for the initial loss of weight to the end of 1941 and the subsequent recovery.

I go on now to consider the effect food may have on the death-rate in hospitals. We have lived through two great wars and an examination of the death-rates in hospitals during these periods may show that diet in one war affected the death-rate. The mean death-rate in mental hospitals for the five-year period 1910-14 was 96 per thousand, and the death-rate during the years 1915-21 given in the table below might be compared with this pre-war figure. The table also indicates similar data for the years around the war 1939-44.

TABLE I.—DEATHS PER THOUSAND.

	General population	Mental hospitals		General population	Mental hospitals
1910-14	13·8	96	1935-39	12·1	68·5
1915	15·7	121	1940	14·4	82·6
1916	14·3	126	1941	13·15	91·7
1917	14·2	176	1942	12·3	79·9
1918	17·3	203	1943	13·0	69·8
1919	14·0	129	1944	12·7	69·0
1920	12·4	87			
1921	12·1	84			

A comparison between the two sets of figures shows very marked differences. During the period 1915-18 there was a progressive rise in the mental hospital death-rate throughout.

The abrupt fall in the death-rate in 1919 and the further reduction in 1920 to a figure well below the 1910-14 rate shows that conditions improved rapidly after the war, and that within a year they were normal again.

During the recent war, the death-rate increased in 1941 to a rate which was 33% higher than the pre-war average, and thereafter slowly fell to a figure which in 1944 was only slightly above the rate for 1935-39, i.e. 69 compared with 68·5.

The figures for men and women are given separately in the second table; they show that for women the rate fell in 1943 to 64, which, excepting for the years 1930 (60·6) and 1938 (61·8), is the lowest ever recorded.

TABLE II.—PROPORTION PER CENT. OF DEATHS TO AVERAGE NUMBER RESIDENT.

	Male	Female	Total
1937	7·09	6·94	7·0
1938	6·82	6·18	6·47*
1939	7·65	6·86	7·21
1940	8·66	7·94	8·26
1941	10·40	8·21	9·17
1942	8·81	7·36	7·99
1943	7·74	6·40	6·98
1944	7·49	6·46	6·90

* Lowest ever recorded.

It is noteworthy that this occurred at a period when the shortage of female nurses was greater than at any time during the century.

If we consider for a moment the factors which might have affected the death-rates during these wars we find that during both periods there were certain common stresses and strains.

Overcrowding occurred in both periods in the early war years. In the first war, however, the death-rate was so high that overcrowding was much reduced in the later years. Black-out restrictions were much more severe in the recent war, resulting in a low standard of ventilation in dormitories and bedrooms.

Changes in the ages and types of patients admitted would be similar in both wars.

If shortage of staff had been an important factor in determining the death-rate it would have showed results on the women's side of our mental hospitals during the past three years. Though I am unable to quote exact figures for the period 1914-18 I am assured that at no time during the 1914-18 war was the staff shortage on the female side as acute as it has become during this period when so much woman-labour was diverted to factories producing munitions of war.

Enemy action and the disturbance to patients caused by "alerts" undoubtedly produced abnormal conditions, but we can agree that on the whole the stress during 1940-41, particularly in certain areas in the East and South, was greater than that caused by Zeppelin raids.

On the whole, then, it would seem that the stresses in the recent war were more severe, due to equal, if not greater, overcrowding, stricter black-out regulations, inferior ventilation at night, greater shortage of both male and female staff, and much mental and physical strain arising from enemy air action by night. The causes of the high death-rate in the 1914-18 period were the subject of an investigation by the Board of Control. They concluded that the unavoidable reduction in quantity and deterioration in quality of the food supplied to patients (especially in regard to flour) were the main factors in determining the increase in sickness and corresponding increase in death-rates among patients in institutions for the insane and defective; but that, had the diet been normal, there would still have been a considerable rise over pre-war rates due to other war conditions. The conditions referred to were the lower physical condition and greater age of patients admitted, the impairment of staff efficiency, transfer of patients from one mental hospital to another, and overcrowding combined with bad ventilation. I think it is reasonable to assume that the difference between the records in the two wars shows something of the advance in knowledge of food and feeding.

An analysis of the dietaries of some two-thirds of the hundred or so mental hospitals in this country was carried out during the recent war. Each hospital publishes an official dietary with menus running a three or four weeks' rota. We found that these dietaries gave an incorrect and exceptionally rosy picture of the situation; consequently the analysis was made on the basis of the actual issues of food to the kitchen, taken from the records in the weekly issue books in the stores department. There were certain difficulties in carrying out the analysis because the extra food given to certain patients known as "workers" had to be excluded from the general issue and naturally diet given to sick patients had to be left out of account. The number of working patients given extra food varied within wide limits; of the 83,000 patients concerned some 27% of them received an average caloric value of 290 per day as an extra. An additional 10% of the patients were in receipt either of sick diet or of some extra to ordinary diet. The remaining 63% received the ordinary diet with nothing extra: the mean caloric value of the ordinary diet was 2,360, ranging from 1,956 to 2,731 calories a day. Vitamin A was 2,110 international units, and vitamin C 85 mg. per person each day.

It is not easy to say what should be the caloric value of a diet issued to a group of adult patients many of whom are quite old and many physically as well as mentally ill.

The average figure of 2,360 indicates that the patients of about half the hospitals receive less than this amount. The present evidence indicates that the food is sufficient providing that the distribution between wards takes account of the type and activity of the patients in their classified groups.

In considering whether a diet is adequate we base our views on the relation of the quantities to standards which have been set up by the National Research Council of the U.S.A., which has approved a minimum standard applicable only to short term periods but which provides mineral and vitamin allowances approximately 70% of the ordinary standard. In 1943 a special committee of the Joint Food Board, as quoted in "Food Consumption Levels, 1944", thought that the diet in this country, with the exception perhaps of vitamin A and ascorbic acid, and possibly also of riboflavin and thiamin, was adequate to meet the intake requirements based on the full National Research Council standards. Diets in mental hospitals provide a sufficiency of calcium, iron and vitamins of the B group.

There is an important difference between the food issued to the general population and that supplied in a mental hospital. The maintenance of a satisfactory level of calories and vitamins in the United Kingdom diets has involved a substantial increase in the use of cereals and potatoes. In 1943 this contributed 43% of the total caloric supply compared with 34% before the war. For the mental hospital, however, the present figure is between 50% and 60% and consequently the supply of potatoes ensures, at least in the summer time, an adequate ration of ascorbic acid. Even throughout the winter months the supply of vitamin C has exceeded 58 mg. per head per day, largely through the use of leafy, yellow and green vegetables. As the losses during cooking and preparation are considerable the intake in winter would not exceed an average of 30 mg. of ascorbic acid.

The supply of vitamin A is obtained largely from fats, milk, growing vegetables, eggs, and carrots. The ordinary diet in most mental hospitals provides about half the supply from carrots, the remainder coming from miscellaneous items of food. The mean figure of 2,110 I.U. per day showed that in most hospitals the supply of vitamin A was below the optimum level. The deficiency can be made good by the use of about half a pound of carrots per patient per week. Carrot is not available in every week of the year, but as vitamin A is stored for considerable periods in the liver, irregularity of supply is not a matter of vital importance.

The average mental hospital has one advantage over the many other hospitals. There are farms from which the supply of milk for patients comes daily to the hospital. The quantity available for the ordinary diet has usually been ample, and in this respect they have been more fortunate than the general population.

The suggestion that diet can be maintained at a satisfactory level without great difficulty does not affect the much more difficult question of cooking and presentation. The common complaint is lack of variety and though we, as members of the population, complain of the same thing we do not suffer in the same degree. Repetition in the presentation of the same items of food makes food unpalatable and the patients' inability to take an occasional meal outside the hospital tends to lower appetite. All this leads to waste and a lowering of the caloric value of the food intake. The patient suffering from mental illness is often too busy to bother about food or too depressed to want it. Thus with a supply of food that is adequate though little above the minimum it behoves us in every case of mental illness to pay the closest attention to the details of presentation and variety as well as to the quantity and content of the food taken. Our scientists teach us that even in a time of plenty a diet cannot be taken for granted even when the patient makes no complaint.

Dr. H. E. Magee: The Ministry of Food is advised regarding diet for invalids by the Special Diets Committee of the Medical Research Council on which the Ministry of Health is represented. This Committee gives medical advice as to whether patients suffering from any particular disease should have special allowances of rationed or other foods. The various allowances for different types of invalids are set out in the special leaflet, Med. 2, which has been sent to every medical practitioner. The Committee has not recommended any special priorities for mental patients as such. Mental patients, suffering from non-mental complaints such as diabetes or tuberculosis, are entitled to the prescribed allowances of rationed or other foods. Mental hospitals, like all others, can also obtain a priority allowance of 2 lb. fish weekly for every patient requiring a "light

diet". Apart from this allowance of fish mental hospitals are rationed like an ordinary institution for healthy people.

The requirements of the individual mental patient will vary with the amount of muscular exercise he performs. If he is doing farm work daily in the open air he would require a diet providing about 3,500 calories or more daily, but if he is quiet and confined indoors he might only require 2,400 calories or less. Other things being equal the needs of mental patients vary with their complaints. The melancholic or paranoic type might require only about 2,000 calories a day or less, whereas the excitable type with exaggerated reflexes, lack of co-ordination, continual unrest and insomnia might well require 4,000 calories a day. If the demands of such a person are not fully met it would seem from general principles that he would tend to become more rather than less excitable, at any rate for a time. The experiences of most people during air raids, particularly the V1 bombardment, supports this deduction. The severe mental and physical strain with few interruptions, which most normal people experienced, were unquestionably reduced by taking small snacks in between the ordinary meals. It will be recalled that the Radio Doctor at this time advised people to eat often and to be sure to eat enough. I have no doubt that very many people derived much comfort from this advice.

Balancing up the needs of the various patients in a given mental hospital it is probable that the average gross requirement for the adult male is round about 3,000 calories per head daily and for women probably about 2,200. Within this average there will of course be wide fluctuations, but the allowances of food permitted and the mode of serving should be sufficiently elastic to permit of these needs being fully supplied. If the diet includes all the rations and points foods and if bread, potatoes, oatmeal and fresh vegetables are given to satisfaction, there need be no fear of any deficiency whether in regard to energy, proteins, minerals or vitamins. Table I shows how a 3,000 calorie diet could be constructed from the rationed and unrationed foods. Rationed foods, providing a sensible choice is made of the points, will supply about 1,040 calories and about 30 grammes protein most of which is of animal origin. The remaining 2,000 calories would have to be made up mainly from bread and flour which provide about 1,100 calories, or more than one-third of the total day's needs, and from potatoes and oatmeal, each of which provide about 220 calories or about one-thirteenth of the day's needs. The remaining calories would have to come from things like sausages, fish, and offal, when they can be obtained.

The unrationed foods provide about 72 grammes of protein, over twice that provided by the rationed foods. Bread and flour alone give as much as 41 grammes daily, whereas rationed meat only provides seven. It is true that animal protein is of higher biological value than any kind of vegetable protein, but vegetable proteins are also valuable. It is stated from time to time that the requirements of animal protein are so many grammes daily. There is no experimental evidence which enables us to place the requirements of animal protein at a given figure. Indeed we cannot say that the human body *requires* (in an indispensable sense) animal protein, at any rate after the stage of childhood has passed. In childhood there is, of course, a definite requirement, but for adults, all we can say is that it is very desirable that a proportion, which we cannot define, of the total protein should be of animal origin.

We often hear complaints that certain people, particularly hospital patients and staff, are not getting enough protein, that their diets are too starchy and therefore unsuitable. If you consider Table I you will find that this cannot happen, provided the people are getting all or the bulk of their rationed foods and provided the total diet gives them sufficient calories. To obtain a diet of sufficient calories which would be at the same time too low in protein, would not be easy; indeed with present rations it would be impossible. The calories would have to come from bacon, fats, sugar, jam and vegetables and fruit. The first four of these would provide only about 500 calories a day, and vegetables and fruit could certainly not provide the rest. It can be taken as a broad general rule that if a person of ordinary tastes consumes sufficient calories from the foods available he can scarcely avoid having enough protein, minerals and vitamins. In fact, the wartime food policy was so planned as to make this possible.

Table II shows the standard intakes of nutrients recommended by the Commission on Nutrition of the League of Nations as applied to the population of Great Britain. I have only given the figures for the adult man and woman because it is with these that we are mainly concerned. The calorie level for the average man is 3,000 and the protein 70 grammes a day. This is much lower than the 101 grammes which can be obtained from a 3,000 calorie diet under present rations. There is another scale of standard

requirements in considerable vogue to-day, namely, that of the National Research Council of the U.S.A. It was drawn up in 1941 by the Americans but it has not received international approval. In regard to calories, proteins and minerals it is not substantially different from the scale of the League of Nations, but the scale for vitamins is far in excess of that of the League of Nations. Take vitamin C as an example. The N.R.C. recommends for children 5 to 14 years 50 to 75 mg. of vitamin C daily. Bransby and Wagner (*Brit. med. J.*, 1945 (ii), 682) found by dietary surveys that 426 school children in

TABLE I.

Rationed Foods : Weekly Amounts

	Amount	Protein (grammes)	Calories
Milk, 2 pints	40 oz.	36·0	680
Dried milk	1 „	10·2	97
Bacon	3 „	8·4	336
Butter	3 „	0·3	633
Margarine	3 „	—	654
Cooking fat	2 „	—	506
Cheese	3 „	21·3	351
Meat : Beef	7 „	25·2	518
Mutton	7 „	21·7	546
Sugar	8 „	—	864
Preserves	4 „	0.4	284
Eggs	1	6·2	78
Dried eggs	0·63 oz.	8·2	103
Dried fruit	1 oz.	0·7	56
Breakfast cereals	8 „	28·0	776
Pilchards	5 „	22·5	285
Rice, &c.	4 „	7·2	396
Canned meats	2 „	8·6	142
Per day		29·3	1,044

Unrationed Foods: Weekly Amounts

Bread	84 oz.	201·6	5,880
Potatoes	84 „	33·6	1,344
Green veg.	20 „	12·0	100
Root veg.	20 „	4·0	100
Flour	20 „	68·0	1,960
Sausage	8 „	26·4	488
Liver	4 „	19·2	160
Cocoa	2 „	11·6	250
White fish	8 „	24·0	104
Fat fish	8 „	24·0	296
Oatmeal	16 „	54·4	1,776
Semolina	8 „	24·0	768
Per day		71·8	1,889

Rationed and Unrationed Foods : Daily

Total per day	101·1	2,933

TABLE II.—STANDARDS FOR ADEQUATE DIET PER DAY.

	League of Nations Commission		*National Research Council* Moderately Active	
	Male	Female	Male	Female
	21+	21+	21+	21+
Calories	3,000	2,400	3,000	2,500
Protein grammes	70	60	70	60
Calcium grammes	0·8	0·8	0·8	0·8
Iron mg.	10	10	12	12
Vitamin A I.U.	3,000	3,000	5,000	5,000
Vitamin B_1 mg.	1	0·85	1·8	1·5
Vitamin C mg.	30	30	75	70

Stoke-on-Trent and Salford were consuming for most of the year an average of about 20 to 25 mg. of vitamin C daily. The school meals were analysed for vitamin C and they were found to contain only from 2 to 19 mg. per meal. The school meal for many children is the main, if not the only, source of vitamin C. These children were very carefully examined 3 or 4 times during the course of the year but no evidence of any sort was found suggestive of deficiency of vitamin C. There is other and more convincing evidence not yet published indicating that the recommended allowances of vitamins A and C of the N.R.C. are far too high, at any rate for the inhabitants of this island.

One of the most striking things that have come to light from liberated Europe is that frank deficiency disease, particularly vitamin deficiency, has been rarely observed whatever the degree or duration of the shortage of food. Nutritional œdema, loss of weight, diarrhœa and more rarely anæmia have been observed at various times and in various places, but very rarely pellagra, beri-beri, night blindness or other well-defined deficiency condition. What have always been observed however, whatever the degree or duration

of the starvation, were progressive asthenia, apathy, listlessness, lack of attention to personal hygiene, indifference to personal or communal welfare, until finally the sufferers became almost indifferent to their fate.

Without the will to live the treatment of a diseased person is a very up-hill and, may be, an impossible task. Insufficient food tends to blunt the desire to live. Adequate feeding tends to restore and to sharpen it. Good feeding besides building up the diseased body also enables the mind, which controls the body, to function properly.

In conclusion here are some observations made in 1942-43 in the (male) mental hospital of St. Anne in Paris by Randoin (*Bull. Acad. Méd.*, 1943, **127**, 559). Before the war the average calorie intake was about 2,877 daily and the death-rate 10%; in 1941-42 the average calorie intake was about 1,750 and the death-rate 21%. On this level of diet the patients lost up to 5 kg. per head in six months, but when in 1943 the diet was increased all round by about 25% most of the losses in weight were restored in six months. This interesting paper has only recently come to my notice.

Dr. S. W. Hardwick said that he was not complacent about the question of diet and mental disorder. He believed that mental disorders associated with vitamin deficiencies were by no means uncommon. He had described in 1943 12 cases of pellagra complicating chronic mental disease and most of these were seen by Professor Sydenstricker during his visit to this country. Dr. Hardwick had encountered additional cases of pellagra in his mental hospital since then. He said that when Professor Sydenstricker with Dr. Rees Thomas had only seen one case of pellagra during their visit to a certain mental hospital—this did not necessarily mean that there was only one pellagrin in the population of that hospital at that time. There may have been cases showing no overt signs of pellagra at that time.

No mention had been made of acute vitamin deficiency. This was disappointing because it seemed that here was a field where the interests of the dietetic expert and the psychiatrist intersected. He referred for example to acute nicotinic acid (niacin) deficiency, a condition which had been described by Sydenstricker and Cleckley, and others. There was evidence, in Dr. Hardwick's opinion, that niacin deficiency, probably secondary to dietetic deficiency, was an important causative factor in some cases of mental illness.

In conclusion Dr. Hardwick mentioned that he had been associated with Professor Ellinger of the Lister Institute and Mr. R. Benesch in certain problems arising from vitamin deficiency. A nicotinamide saturation test had been devised, and this might lead the way to simpler and quicker methods of biochemical diagnosis.