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## HOSPITAL DIETETICS

### Chairman, Professor D. MURRAY LYON

Professor D. Murray Lyon (Clinical Medicine Department, Royal Infirmary, Edinburgh): The subject we have today is one of the greatest interest to those concerned with the running of hospitals. Diets have been of importance in medicine since the time of Hippocrates and there have been fashions from time to time, but now we hope that the subject of dietetics is on a reasonably scientific basis. Modern hospitals are a relatively recent institution. The Edinburgh Royal Infirmary started in a couple of rooms with half a dozen beds in 1729. The work gradually expanded, and was transferred to a house where by 1739 there were 34 beds. A Royal Charter was granted in 1736, and from that time there has been a gradual advance until we have the Royal Infirmary in its present state.

Some time ago we found three old hospital dietaries, and I should like to draw your attention to the first of these, dated 1742. The hospital dietary is given in detail. Breakfast remains unchanged from day to day; there are three dinners for the week. The energy values have been added.

Breakfast. For each patient 4 oz. meal and 3 gills milk for pottage (786 Cal.) or a bap (morning roll) weighing 6 oz. and 1 mutchkin (15 oz.) milk (890 Cal.).

Dinner. For each patient 1 oz. rice and a mutchkin and a half of milk (728 Cal.).
For each patient 2 oz. barley, and a mutchkin of ale, sugar for seasoning (425 Cal.).

And on the third day:
"A pudding made from 2½ lib. rice, 6 pints milk, 3½ doz. eggs, 12 oz. sugar, weighing for ordinary 26 lib. 4 oz. for 34 patients and servants" (approx. 550 Cal.).

It would be impossible to make such a pudding today; the pint referred to is the old Scottish one, which is three times larger than the present Imperial pint. The three daily meals yielded from 2000 to 2400 Calories.

By 1778 there were three classes of diet: (1) A low diet (1100 Cal.); (2) a middle diet (2000 Cal.), and (3) a full diet (2400 Cal.). The "full diet" was as follows:

Breakfast. Bread and oaten or barley meal porridge with milk or small beer.

Dinner. Broths, puddings, boiled beef or mutton, chicken.

Supper. Porridge, or bread and small beer.

"Wines will be occasionally ordered as medicine and not as part of the diet."

In addition to the food mentioned in the different diets, various fruits might be ordered, *e.g.*, apples, pears, cherries.

Then we come to the third stage in the development of hospital dietaries. In 1843, just over 100 years ago, we find the following statement from the Managers of the Hospital: "By means of the annexed Table, the Managers are satisfied that the Dietetic treatment of a very large proportion of the multifarious cases of Disease in the Hospital may be appropriately regulated without the necessity of prescribing any extra articles of food; as great pains have been taken to supply, in the different rates, combinations of articles in such variety as to suit every ordinarily supposable case. The Managers trust that the Physicians and Surgeons of the Hospital will make themselves familiar with this Diet Table; and, in particular, that they will do all in their power to avoid the practice of devising rates of Diet of their own, by selecting one article from one rate, and another from another rate in the Table."

Then follow 9 different diets to choose from: (1) Low diet (900 Cal.); (2) rice diet (1100 Cal.); (3) steak diet (2000 Cal.); (4) steak with bread instead of potatoes (1900 Cal.); (5) common diet with porridge (2000 Cal.); (6) common diet with bread (1800 Cal.); (7) full diet (2600 Cal.); (8) full diet with bread (2660 Cal.); and (9) extra diet (3000 Cal.).

The "full diet" consists of three meals:

Breakfast. Porridge 1½ pint, buttermilk 1 pint.

Dinner. Boiled meat 6 oz., potatoes 16 oz., bread 3 oz., broth 1 pint.

Supper. Potatoes 16 oz., new milk ½ pint.

Each pint of porridge to contain 3 oz. of oatmeal.

Each pint of broth to contain 1 oz. of barley, ¾ oz. vegetables, and to be made with butcher meat in the proportion of 2 oz. of butcher meat to each pint of broth.

In all the diets, the weight is to be understood as applying to the food before it is cooked. One of these diets actually gives the patient 20 oz. of potatoes at one meal!

*The Present-day Situation.* Patients in hospital differ in their requirements. Some of them cannot take all the food supplied, and febrile, anaemic and other patients require special diets. Several standard diets are arranged: (1) Milk only; (2) milk diet; (3) light diet; (4) full or ordinary diet. It might be thought that it would be easy to find out just what the patients are getting by going to the steward's office and seeing the figures there. The matter is not so simple as that. No doubt the medical officer and the sister going round the ward arrange who shall

have this or that diet, and the sister gives the patients what she finds they can take.

Because of the day-to-day variation in the needs of individual patients dietetic practice in the wards must of necessity be flexible. There are extras to be supplied besides the three standard meals, tea in the morning, and supper in the evening, and the steward's lists would give very little guide to what the patient is actually taking. If you want to find this out you must go to the patients themselves and make your inquiries there.

Soon after the war began a report was issued on the examination of patients' diet in a group of London hospitals (King Edward's Hospital Fund for London, 1943). We were invited to make a similar study in Edinburgh. A trained dietitian went to the ward, examined diets for a week and saw the service of all meals. She took servings as supplied to the patients on ordinary diet and had them measured and analysed. Careful inquiry from the patients as to the amount of food they were getting from other sources was also made. It was found that the calorie value of the food the patients were receiving was satisfactory for patients in bed, but that the patients relied for energy to the extent of one-third on their friends, who supplied eggs, fancy breads, jam and fruit.

From this investigation we learned that there were certain faults in dietary planning. In some wards there was not a sufficient supply of milk; certain foods were not taken up in the quantity available, *e.g.*, cheese, and hence the calcium intake was sometimes low; much vitamin C was lost in cooking and in the carriage of food from the kitchen to the wards.

Subsequently the Department of Health for Scotland invited us to make another similar investigation; this will be concerned with ordinary diets.

Light and milk diets need not be discussed here; they vary greatly and it is important that their vitamin content be well maintained. Besides, there are now many diseases in which special diets are required. These are supplied according to prescription and do not come within the framework of a general survey of hospital diet.

REFERENCE

King Edward's Hospital Fund for London (1943). *Memorandum on Hospital Diet.* London: Geo. Barber and Son, Ltd.

## The Development of Hospital Dietetic Departments, with Special Reference to the Royal Infirmary, Edinburgh

Miss R. Pybus (The Brick House, Wicken, Newport, Essex)

### *Hospital Dietetics Twenty-five Years Ago*

It may be of some interest to those who were not working in hospitals at the end of the first world war if I say something about the position of hospital feeding at that time. It will also help to explain how this dietetic department and certain others began.

In 1920 I was appointed sister in one of the medical wards in this hospital and at that time my nursing colleagues and I repudiated the idea of anything so new-fangled as a hospital dietitian, though these disturbing women were rapidly appearing in American hospitals. As

sisters we jealously resented any interference in the feeding of our patients, except from our "chiefs", though we had little knowledge of food values or the principles of nutrition. I can assure you, however, that we paid considerable attention to our patients' diet. Indeed, we were often over-zealous, and by blindly following such slogans as "rest the affected organ", we sometimes failed to consider the patient's general condition and so deprived him of essential dietary factors. I do not think that we differentiated sufficiently between patients who were ill only for a few days and those who had to be on special diet for a matter of weeks or months or even for a lifetime. I sometimes wonder if there is not now a tendency to force too much food during the early stages of acute disease, though we are rather less guilty than we used to be of giving deficient diets in diseases of long duration.

In the case of seriously ill patients we had a great belief in rectal feeding; it was quite common to administer every 4 hours switched eggs, peptonized milk, café-au-lait, and beef tea. We certainly did not appreciate the importance of fluid and the dangers of dehydration, and this was true in both surgical and medical wards. A regrettable feature of the diets used for peptic ulcers was that, because some special dietetic regime was in vogue, all patients might be given the same amount of food, irrespective of their requirements or inclination; in some hospitals this tendency persists to the present day. Perhaps the gravest fault of these gastric diets was the complete absence of vitamin C for many weeks. In view of this I began to include orange juice as a routine measure after a gastric patient was admitted with haematemesis which was directly due, not to peptic ulcer, but to scurvy which had developed during a prolonged stay in a hospital for chronic diseases. In those days we learned dietetics from experiences such as this rather than in the class-room.

There was a great belief in milk diets for all but the stoutest digestions and, on admission, most patients were put on milk and water and chicken tea until the doctor ordered otherwise. I soon discontinued this practice, having overheard a caustic remark of an elderly "chief" to the effect that many a patient was floated to his death on milk and chicken broth.

Some 30 years ago it was the custom to give copious fluid to water-logged patients in order to "flush the kidney". Chronic nephritics were kept for many weeks on milk and cereals in the vain hope that the albuminuria and oedema would subside. Salt-poor diets were sometimes employed in cases of oedema, but at that time the chloride was regarded as the offender and we used sodium bicarbonate freely in making special scones. Until the introduction of the Epstein diet, low protein was advocated even after the acute stage of nephritis was passed, but as physicians and nurses seldom appreciated the protein content of milk and fish, these foods were given in fairly generous amounts. Eggs were seldom permitted, because, I presume, of the association of albumin in the egg with the albuminuria!

In those bad old days we knew little of food values, of hypoproteinaemia, or of the need for minerals and vitamins. Even in the last decade some doctors and nurses have not paid enough attention to the "protective" value of the invalid diet. In teaching dietetics to medical and dietetic students and nurses this point has to be continually stressed.

Perhaps the greatest change in the past twenty-five years has been in the diabetic diet. In Britain insulin was not generally available until 1923, and it then cost about 25s. per 100 units. Before that time our only weapon was a drastic reduction in carbohydrate including, in severe cases, a period of from one to three days' starvation, when biscuits made with washed bran and gum and resembling fire-lighters, and thrice-boiled cabbage flavoured with bovril were given to the diabetic patient. These nauseating substances were washed down with copious draughts of black coffee; the grimness of the starvation days, however, was somewhat alleviated by small quantities of whisky. I well remember the smell of acetone which lurked around the diabetic's bed and permeated the whole ward. Some of you would be surprised at the degree of tolerance for carbohydrate which could be induced by the old method of starvation followed by the ladder diet. Amongst young diabetics the casualties were undoubtedly high, but the survivors were some of our most contented and hard-working patients, and when they later benefited from the blessing of insulin, some of them attended this diabetic clinic for 20 years or more.

### *The First Dietitians*

The use of insulin involved careful dietary calculations, and we were also becoming more ambitious and planned diets more in accordance with the patient's requirements.

Meantime other dietetic work in the wards was steadily increasing. Minot and Murphy had discovered the value of liver in the treatment of pernicious anaemia, and this necessitated ingenious cooking, for the patients might have to eat a pound of liver in the day. The nauseating ketogenic diet for epilepsy was then in vogue. High-calorie diets were introduced for cases of thyrotoxicosis. The Epstein diet was being tried for nephrosis. More and more researches in metabolism were being carried out, and this involved a considerable amount of special diet work, much of which I was called upon to undertake for my own and other wards.

Meantime Miss Rose Simmonds at the London Hospital was passing through similar difficulties, and we were both anxious to gain more dietetic knowledge. In 1924–25 Miss Simmonds obtained a Rockefeller Fellowship to study dietetics in America and, thanks to Professor Murray Lyon, I followed in her footsteps in 1925–26. I do not think that either of us learned much which was new from the therapeutic angle, but we had an opportunity of working in organized dietetic departments, and it was a most stimulating experience. In America I was struck by the high standard of feeding in the hospitals generally, and the part which dietitians played, not only in all branches of the hospital food service, but in public health work, in the Red Cross organization, in research work, and in commercial concerns.

### *The Dietetic Out-patient Clinic*

Eighteen months before going to America I had been appointed Sister Dietitian in this hospital. I started work in a corner of this room and my equipment was a weighing-machine, an insulin syringe, and a bunsen burner.

We had no diet kitchen in those days, and the work consisted in writing out diets for the various wards, keeping records of food intake, and consulting with ward sisters and doctors with regard to special and ordinary diets. Much time was also taken up with the care of out-patients' diets. This work led to the creation of an out-patient diabetic clinic, which gradually expanded to include patients who were on the waiting list for the treatment of gastric conditions or obesity. It was soon found that many of these patients could be treated successfully as out-patients, and in this way there was a considerable saving of hospital beds. The out-patient clinic has remained one of the chief features of our Dietetic Department, and it is now flourishing under the care of Sister Buchan. This is one of the largest dietetic clinics in the country and is open daily from 7.30 a.m. until 5 p.m. The staff consists of two qualified sister-dietitians, at least one nurse in training and several student dietitians. A physician visits the department every morning, and there is a particularly large diabetic clinic on Wednesday afternoons under the care of Professor Dunlop. There is also an evening clinic once a week for the benefit of patients who are working during the day. It is only by visiting this department that one can have any idea of the extent of the work which is carried on there. An attempt is made not only to treat a great variety of conditions by special diet, but to teach all and sundry the principles of good nutrition by means of posters, models of food, and informal talks.

In spite of an effort to return patients to the care of their family doctors as soon as possible, the number attending amounts to over 400 weekly, and there may be anything up to 20 new cases in a morning. This number would be trivial if it were only a case of handing out a diet sheet, but, besides testing urines, and weighing and instructing the patient, the dietetic students fill in a medical questionnaire which is supplemented by the doctor's findings. In this way nurses and students become familiar with the symptoms of the diseases which they are called upon to diet, and the patients are much impressed by the time and attention which is given to a history of their ailments and feeding habits.

A diet history is also taken, though it is not possible to work this out in detail in every case. All dietetic students must, however, take a considerable number of detailed diet histories and write a critical summary of their findings. Models of food are used to depict the size of servings, and any gross dietetic error in the patient's diet can be detected. These diet histories are used as a basis for teaching the student dietitians. It is an excellent method of developing a critical faculty, and I have found it of great value. In my opinion all student dietitians should spend some weeks in a large dietetic clinic as well as in a diet kitchen.

### *The Diet Kitchen*

The diet kitchen in this hospital was opened in connexion with a research ward in 1927. It was originally intended for the preparation of the 12 ward diets, but the scope of the work has steadily increased and the kitchen is now available for the serving of special diets for any ward in the hospital. The development of this side of the dietetic department is due to the indefatigable efforts of Sister Buchan.

The nurses and dietetic students working in the kitchen visit the patients

who are being served with diets, and in this way they find out about their progress and their likes and dislikes. Close contact is maintained with the ward sisters, through whom come all requests for special diets.

Another feature of the work is the care of the surgical diabetic. Urines are collected and tested, and patients are visited in the surgical wards. The diets are served from the kitchen, and the insulin dosage is regulated by the medical staff of the dietetic department if the surgeon so desires. The dietitians also undertake the dietetic teaching of the nurses in training.

### *The Maternity Pavilion*

The latest acquisition to the dietetic staff is Sister Simpson, who is the dietitian in the Maternity Pavilion. She is a trained nurse, a midwife, and a dietitian. She devotes the greater part of her time to instructing mothers in the ante-natal clinics and in the wards, and she consults with doctors and sisters regarding special diet treatment. This work is, in my opinion, one of the most important duties of a dietitian. It is work which should gradually influence the feeding in maternity hospitals, and it should have a beneficial effect on the mother and the infant. Dietitians are similarly employed in the Glasgow Maternity Hospital, and in the Hospital for Women and Children in Manchester.

### *The General Feeding in the Hospital*

I have said nothing about the general feeding in this hospital because this food service does not come under the dietetic department. Nevertheless, the help of the dietitians has been enlisted in the carrying out of hospital dietary surveys, and, in spite of present-day difficulties regarding staff, equipment and food, the hospital has recently re-organized the kitchens to ensure a well cooked and well balanced diet.

### *Dietetic Departments in other Hospitals*

It is not possible to enumerate all the hospitals where dietitians are employed. In Scotland we have dietitians in many of our large voluntary hospitals, in some of the local authority hospitals, and also in several of those under the Department of Health for Scotland. Thanks to the local meetings of the British Dietetic Association, we have often met to discuss our common difficulties and interests.

I have already referred to the pioneer work of Miss Simmonds, who was the first dietitian to be appointed in London. She started her work at the London Hospital, and has again made history at the Postgraduate Hospital at Hammersmith. Miss Simmonds was largely responsible for starting the dietetic diploma course for nurses which is carried on by the Royal College of Nursing. In addition to running a diet kitchen, Miss Simmonds attends numerous out-patient clinics in the County Council Hospitals, and this enables her to give her dietetic students good experience in out-patient work. Amongst other pioneers is Miss Broatch, who began at St. Thomas's Hospital, and whose dietetic work is well known in connexion with King Edward's Hospital Fund for London.

Miss Abrahams was the first non-nurse dietitian to go over to America to study, and she started the dietetic department at St. Bartholomew's. It was largely owing to her efforts that the British Dietetic Association was formed in 1936 to safeguard the interests of dietitians and to maintain

a uniformly high standard of training. Mrs. Averill (then Miss Marshall) organized the department at the Middlesex Hospital, and Miss Washington was in the diet kitchen of University College Hospital in the early days and is now back there as food supervisor. It is chiefly owing to Miss Washington's hard work for the British Dietetic Association that the present training for dietitians is being revised.

*The Dietetic Diploma Course*

I cannot discuss the training of dietitians this morning, but it may be known that there are comparatively few centres where a recognized training can be taken; the British Dietetic Association is most anxious to promote further courses, including a degree course in dietetics.

The existing training centres are King's College of Household and Social Science, London; the Royal Infirmary, Edinburgh; the Glasgow and West of Scotland College of Domestic Science; the Royal College of Nursing; the General Infirmary, Leeds. There is no shortage of applicants for training, but most centres can accommodate only a very limited number of dietetic students.

*Dietitian Food Supervisors*

We are concerned about training students for all types of work, including that in public health departments, school-feeding centres, industrial canteens, dietary surveys and research. But the greatest demand at the moment is for dietitian food supervisors who can take charge of the whole food service of a hospital, including the therapeutic diets. A successful dietetic department run on these lines has been set up at Leeds General Infirmary under the able supervision of Miss Mills, and several other hospitals are following suit. It will, I think, be some years before we have enough experienced dietitians to enable similar departments to be established all over the country, and it is a great mistake to expect recently qualified dietitians without good catering experience to make a success of such an undertaking. It is also most unfortunate when the diet kitchen and out-patient work are handed over to an inexperienced or partly trained person while the chief dietitian is entirely engrossed in administrative duties.

At the present time it is sometimes necessary that the dietitian with a scientific training should carry out the therapeutic work and that she should act in an advisory capacity in other dietetic matters. Nevertheless, it is of the greatest importance that the catering and cooking arrangements should be in the hands of an experienced and qualified man or woman. It is comparatively recently that hospitals have asked for dietitian-supervisors, and, until the last few years, there has been little incentive for dietitians to train for this branch of work. When they did take up such duties they were often given little scope, poor pay and long hours, while they had no proper status in the hospital. Those who have read the report of activities of the English Group of The Nutrition Society will see that the Planning Committee recommended the institution of a short course in nutrition for canteen managers and kitchen supervisors ("nutrition in relation to cookery aud catering") to be held under the auspices of the Royal Sanitary Institute, leading to an elementary certificate (Nutrition Society, 1945). Such a course should be particularly useful for men and women who have had good experience in

large-scale cookery and catering but who have not had a recent training in nutrition. It is not intended that they should regard themselves as dietitians, and it is to be hoped that neither the hospitals nor the general public will do so.

*The Present Position of Dietetic Departments*

The contemplation of the rate of development of hospital dietetic departments in this country can give rise to no feeling of complacency, for in many instances we are some 20 years behind America and Canada. There are notable exceptions, but in too many cases there is a failure to provide properly trained staff and labour-saving equipment, and there is often no provision for the serving of special diets. The monotony of hospital diet has been an accepted fact for as long as we can remember, and dietary surveys have revealed that the food may also be deficient in quality and quantity.

In view of the appalling food situation in other European countries and in Asia it would seem incongruous to use such terms as monotonous and deficient in connexion with the well laden trays which are carried three or four times a day to the patients in British hospitals. There is, of course, no question of clamouring to the Government for more food for patients or for staff, but it is essential that all hospital inmates should receive their full share of such foods as are procurable, and that the buying, cooking and serving of hospital food should be in the hands of trained men and women as soon as these are available.

At the moment, almost any hospital can find a good excuse for unsatisfactory feeding arrangements, for it can be claimed truthfully that dietitians with experience in kitchen management and large-scale cookery are almost non-existent, and even food supervisors without a dietetic diploma are hard to come by. Cooks, kitchen equipment and building materials are all in short supply. Nevertheless some hospitals, including our own, have managed to effect improvements in the face of these difficulties.

It must be admitted that an attractive and varied diet is difficult with the present supplies of food, and we have all been obliged to make up with stodgy and uninteresting dishes. The physiologists will doubtless say that I am mistaken, but I almost feel that there must be a grain of truth in a joke which appeared in a weekly paper the other day. Some cannibals were inspecting their intended victim, who was already in the pot, when one of them observed that this seemingly tasty morsel was not really worth eating because he was an Englishman and therefore chiefly composed of carbohydrate!

I am not concerned this morning with the subject of hospital food surveys, but I must refer with gratitude to the publication of those undertaken by King Edward's Hospital Fund for London (1943). In consequence of these findings many other hospitals have made similar surveys, resulting in a re-organization of the food service. It is an interesting fact that the ball was set rolling by an organization of the voluntary hospitals, and it is also perhaps significant that the first dietitians in England and in Scotland began their work in voluntary hospitals some 22 years ago. I have sometimes heard it said that it is unfortunate that this was so, for dietitians in this country have been too much concerned

with the nutrition of sick people. That may have been so in the past, but I can assure you that the hospitals do not wish to monopolize the training or the services of dietitians. The major part of the dietitian's training is concerned with a study of normal nutrition, chemistry, physiology, and cookery; and the careful training which she receives in a hospital diet kitchen is of immense value to her no matter what branch of work she takes up. Moreover, if a dietetic student learns how to feed nurses, doctors, young maids and patients of all ages with four meals a day, and night nurses in addition, she will find any other branch of catering comparatively easy.

We cannot, of course, undertake to turn out students who are biochemists and experienced canteen managers at the same time, with a smattering of medical knowledge. We can only give a good basic training, and then, like a nurse or doctor, the dietitian must get further experience in whatever branch of the work appeals to her.

During the next 5 to 10 years I think we shall see great improvements in our hospital dietetic departments, provided we can train enough dietitians on the right lines. Difficulties will pass as older women with more experience come forward to fill responsible posts, and if the importance of diet as a preventive and curative agent is more generally appreciated by the medical profession and by the hospital administrative staffs.

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## Discussion

**Professor D. Murray Lyon:** What do you consider to be the best type of training for anyone who wishes to attend a school of dietetics? We began by training those who were already trained nurses, but students of good quality might be got from the domestic science schools and perhaps from the universities.

**Dr. C. P. Stewart** (Royal Infirmary, Edinburgh): Is it the idea that food supervisors in hospitals should be trained dietitians?

**Dr. R. P. Cook** (Department of Physiology, University College, Dundee): In view of the shortage of dietitians, should not cooks be trained as dietitians?

**Miss Pybus replied:**

*To Professor Murray Lyon*: Originally I was in favour of all hospital dietitians having a nurse's training in addition to a dietetic diploma, but I now feel that a nurse's training is not necessary for the majority of dietetic posts, and that, owing to the limited supply of nurses, it would be wrong to suggest that hospital dietitians should necessarily be nurses. I am convinced, however, that a nurse's training would be valuable for dietitians who are to take charge of special diet kitchens.

*To Dr. Stewart*: Most authorities consider that the ideal arrangement is that the food supervisor should be a trained dietitian. It is essential

for the food supervisor to have an adequate number of trained assistants to look after the therapeutic diets, dietetic out-patient clinic, and so on. Owing to the scarcity of dietitian food supervisors, the catering and general diets often cannot be under the same department as the therapeutic diets. The scientifically trained dietitians should act in an advisory capacity in all hospital feeding.

*To Dr. Cook*: Those with good experience in cooking and hospital catering should be encouraged to take a dietetic diploma. The ordinary hospital cook who has not the necessary education to train as a dietitian should be encouraged to take an interest in the value of food, so that food factors are not destroyed during cooking.

## A Survey of Diets in the Maternity Wards of Scottish Hospitals

Professor E. W. H. Cruickshank (Department of Physiology, Marischal College, Aberdeen)

Several comprehensive studies of hospital feeding have been made to ascertain, as precisely as possible, the nutritive value of representative diets provided in hospitals for patients and staff.

The purpose of this survey, which was carried out at the request of the Sub-committee on Nutrition of the Department of Health for Scotland, was to determine the nutritive value of diets supplied to nursing mothers while in hospital. Fifteen hospitals were visited during the period February to August 1945; 8 were voluntary hospitals, and of these, 2 were solely maternity hospitals; 5 were local authority hospitals, and of these 4 formed parts of general hospitals; and 2 were Emergency Medical Service hospitals, both dealing with maternity cases only. Except for the north-west area of Scotland, which did not come into the field of the survey, the hospitals, urban and rural, were representative of the maternity hospital service in Scotland.

### *Methods*

Surveys were carried out throughout one week in each hospital. The ward containing the greatest number of beds was chosen, and when practicable more than one ward was included. Usually the wards contained both ante-natal and post-natal patients, but little differentiation, in most cases none at all, was found between the feeding of these two groups.

All aspects of the catering service were observed, particularly those concerning the condition of the food as it reached the patients.

#### *Hospital Meals*

During the survey an extra diet was ordered each day for the ward concerned and at every meal time a sample serving of each dish provided was chosen and the contents weighed. Bread, milk, tea and other items were averaged daily on the individual intake of 6 or more patients at separate meals; general and plate wastage was observed. Calculations of carbohydrate, protein, animal protein and fat in each day's diet were made; an estimation of mineral salts and vitamins was made from a

daily average of the total intake of the various foods contained in the week's diet as a whole. "Extras" were checked by a detailed examination of a chosen number of patients in each ward.

*"Extras"*

Six patients were chosen; in each case, a record of the weight of foodstuffs already in the possession of individual patients was kept, and of all additions that were made throughout the week. The amounts of food wasted, given away or otherwise disposed of, and also the amount which remained, were deducted at the end of the week, and a daily average intake was calculated in each case. Finally, an average of the "extras" consumed by the 6 patients was taken.

*The Basis of Calculations*

The calculations of the various nutrients were made from the Medical Research Council's (1945) *Nutritive Values of Wartime Foods*, and from *The Chemical Composition of Foods* (McCance and Widdowson, 1940). Vitamin C values were in every case the result of analyses by Dr. C. P. Stewart (Edinburgh) of foods taken at the time of serving. Made-up foods and unknown and doubtful articles of diet, such as sausages, were analysed chemically and the food values of soups and sauces were calculated from the actual quantities of the ingredients used in their preparation in the hospital kitchen.

*Standards of Comparison*

Numerous dietary standards of required nutrients have been published, *e.g.*, that suggested by the U.S.A. National Research Council (1945), but this does not necessarily give the minimum amounts compatible with

TABLE 1

COMPARISON OF DIET FOR USE IN A MATERNITY WARD, SUGGESTED AS A STANDARD, WITH ALLOWANCES RECOMMENDED BY THE U.S.A. NATIONAL RESEARCH COUNCIL (1945) FOR NURSING MOTHERS

| Nutrient | Calculated average daily consumption from the suggested diet | Recommended daily allowance, U.S.A. National Research Council (1945) |
|---|---|---|
| Calories | 2546 | 3000 |
| Carbohydrate, g. | 298 | — |
| Protein, g. | 99 | 100 |
| Animal protein, g. | 60 | — |
| Fat, g. | 108 | — |
| Calcium, g. | 1·7 | 2 |
| Iron, mg. | 13 | 15 |
| Vitamin A, I.U. | 3429 | 8000 |
| Vitamin $B_1$, mg. | 1·3 | 2·0 |
| Riboflavin, mg. | 2·4 | 3·0 |
| Nicotinic acid, mg. | 27 | 20 |
| Vitamin C, mg. | 36 | 150 |

health; indeed, it is now generally accepted that the National Research Council requirements are in most cases too high. It should also be borne in mind that these requirements are for nursing mothers who are not

confined to bed, that they are supplied by food as purchased, and that, in following them, allowance has to be made for losses in storage and preparation as well as in absorption and utilization of the foodstuff.

To arrive at a standard of comparison, a diet was devised which was regarded as possible within the existing conditions of food rationing and supply, and which would generally be accepted as good. The composition of the diet in terms of nutrients was calculated and thus a reasonable target was adopted, the attainment of which was certainly possible for every maternity hospital. It should, however, be emphasized that the target represents the *food consumed* by the subject, that allowance has been made only for unavoidable losses, and that the attainment of such a target from the foods suggested demands a higher standard of preparation and cooking than that which generally obtains. The calculated average daily consumption of nutrients from the suggested diet is shown in Table 1; this table constitutes the target, with the exception of the figure of 2500 for Calories. The following points concerning the nutrients suggested should be noted:

1. *Calories.* The number of Calories per day, 2546 or 2500 as a round number, while lower than that suggested by the National Research Council for a lactating woman, represents approximately the amount of food which can be eaten by nursing mothers who are confined to bed.

2. *Protein.* The target figure for animal protein, 60 g. per head per day, is essentially a sound requirement.

3. *Vitamins. Vitamin A.* The content of Vitamin A, 3429 I.U. per head per day, is not half the National Research Council figure. It could easily be increased, since, *e.g.*, 2 oz. of sheep's liver per week would raise the figure to the region of 6000 I.U. per day. The difficulty of obtaining liver today, however, excludes liver as a routine in such a target diet. *Vitamin* $B_1$ (*Aneurin*). The target of 1·3 mg. per head per day is regarded as ample for women living under hospital conditions. *Vitamin C.* In view of the U.S.A. National Research Council's (1945) recommended allowance of 150 mg. per head per day, the target figure, 36 mg. per head per day, may be regarded as wholly inadequate; but it must be remembered that the 36 mg. represents the amount of the vitamin actually consumed. Recent work on vitamin C requirements has enforced a revision of our ideas as to what is an adequate intake of this vitamin. Numerous dietary surveys of children and of members of the Forces have indicated that the generally accepted standard for this vitamin is probably far too high. There are no reasons why 36 mg. of vitamin C should not be secured within the range of an ordinary diet. This corresponds to about 100 mg. per day on the "as purchased" basis, since the combined wastage and cooking loss may amount to 60 per cent.

### *Total Food Consumption*

This includes food supplied by the hospital and by the relatives and friends of the patients.

#### *Calories*

The mean for all hospitals was 2284 Calories, not very far below the suggested target of 2500 Calories. The range was considerable, from

1901 Calories in a large urban hospital with over 200 maternity beds, to 2679 Calories in a rural hospital of 30 maternity beds. This cannot be regarded as indicating that rural hospitals are always better off than the city hospitals, because one rural hospital supplied 2206, a small-town hospital 2071 and a large-city hospital 2508 Calories per head per day (Table 2). With respect to total calories, of 9 large-city hospitals only one was above the target; of the small-town and rural hospitals, 2 out of 6 were above the target. Since almost all the beds in our maternity hospitals are occupied, it is of interest to note the number of patients who are supplied with a diet which in terms of energy is above or below

TABLE 2

CONTENT OF CALORIES AND PROTEIN IN DIETS IN MATERNITY WARDS OF SCOTTISH HOSPITALS

(Target: Calories 2500; protein 99 g.; animal protein 60 g. See Table 1)

| Hospital No. | Total food consumption | | | Food supplied by hospital | | | Food brought by friends |
|---|---|---|---|---|---|---|---|
| | | Protein | | | Protein | | |
| | Calories | Total | Animal | Calories | Total | Animal | Calories |
| 1 | 2508 | 88 | 46 | 1941 | 78 | 46 | 567 |
| 2 | 2114 | 79 | 39 | 1690 | 69 | 39 | 424 |
| 3 | 2321 | 79 | 40 | 1829 | 70 | 40 | 492 |
| 4 | 2054 | 68 | 34 | 1615 | 60 | 34 | 439 |
| 5 | 1901 | 78 | 43 | 1648 | 73 | 43 | 253 |
| 6 | 2357 | 70 | 28 | 1495 | 58 | 28 | 862 |
| 7 | 2110 | 84 | 48 | 1929 | 81 | 48 | 181 |
| 8 | 2625 | 107 | 54 | 2270 | 100 | 54 | 355 |
| 9 | 2363 | 81 | 42 | 2173 | 79 | 42 | 190 |
| 10 | 2435 | 86 | 47 | 1894 | 76 | 47 | 541 |
| 11 | 2212 | 80 | 36 | 1695 | 68 | 36 | 517 |
| 12 | 2071 | 76 | 42 | 1845 | 70 | 42 | 226 |
| 13 | 2310 | 84 | 45 | 2054 | 77 | 45 | 256 |
| 14 | 2679 | 93 | 50 | 2647 | 91 | 50 | 32 |
| 15 | 2206 | 79 | 38 | 1986 | 76 | 38 | 220 |
| Average | 2284 | 82·1 | 42·1 | 1914 | 75·1 | 42·1 | 370 |

the number of calories required. The number of beds in the maternity wards of the large-city hospitals was 610, in the small-town and rural hospitals 263 (see Table 3). Out of 610 patients in the large-city hospitals 68 were above, 542 below, the average in calories, *i.e.*, 11·1 and 88·9 per cent., respectively. Out of the 263 patients in small-town and rural-area hospitals, 60 were above, 203 below, the target for calories, *i.e.*, 22·8 and 77·2 per cent., respectively. Therefore, on the assumption that all the beds were occupied, out of a total of 873 patients, 745 or 85·3 per cent. were below, 128 or 14·7 per cent. were above, the calorie target.

*Protein*

The standard of comparison demands 99 g. of total protein and 60 g. of animal protein per head per day; the average figures were 82·1 g. and 42·1 g. per head per day, respectively. The range for total protein was

68 to 107 g. per day, only one hospital exceeding the target; for animal protein the range was 28 to 54 g. per head per day. The deficiency in total protein was 17 per cent., in animal protein 30 per cent.; the latter is a very serious deficit (Table 2).

TABLE 3

DISTRIBUTION OF BEDS IN HOSPITALS ACCORDING TO WHETHER THE TOTAL DIET SUPPLIED BY HOSPITAL AND PATIENTS' FRIENDS WAS ABOVE OR BELOW THE CALORIE REQUIREMENT

(Target for Calories 2500. See Table 1)

| Number of beds | | | | | |
|---|---|---|---|---|---|
| Large cities | | | Small towns and rural areas | | |
| Hospital No. | Calories above target | Calories below target | Hospital No. | Calories above target | Calories below target |
| 1 | 68 | | 7 | | 24 |
| 2 | | 40 | 8 | 30 | |
| 3 | | 90 | 12 | | 66 |
| 4 | | 60 | 13 | | 73 |
| 5 | | 205 | 14* | 30 | |
| 6 | | 30 | 15 | | 40 |
| 9 | | 38 | | | |
| 10 | | 43 | | | |
| 11 | | 36 | | | |
| | 68 | 542 | | 60 | 203 |
| Total beds | 610 | | Total beds | 263 | |
| Per cent. | 11·1 | 88·9 | Per cent. | 22·8 | 77·2 |
| Total above target .. | 128 = 14·7 per cent. | | | | |
| Total below target .. | 745 = 85·3 per cent. | | | | |

* The only hospital supplying a diet of more than 2500 Calories.

*Fat*

In this nutrient there was a 16 per cent. deficiency, which, in view of the non-active life of the nursing mother in hospital, may be less seriously regarded (Table 5).

*Carbohydrate*

This, while generally adequate, could bear some increase (Table 5).

*Calcium*

An average of 1·20 g. per day with a range from 0·97 to 1·51 g. indicates a deficiency in the diet of nursing mothers.

*Vitamins*

*Vitamin A* was seriously deficient in all diets. The average intake was 2496 I.U. per head per day; the target demands 3429 I.U. per head per day. The range was 1886 to 3750 I.U. per head per day. Only 4 hospitals could show an intake of over 3000 I.U. daily and only one hospital exceeded the target by 300 I.U.

*Vitamin* $B_1$. The target requires 1·3 mg. per head per day and the average was 1·37 mg. per head per day, with a range from 1·09 to 1·80 mg. It should be noted that the figures were satisfactory because of the use of high-extraction flour.

*Riboflavin.* The target was 2·4 mg., the average intake 2·0 mg. per head per day, with a range from 1·60 to 2·43 mg.

*Vitamin C.* The target of 36 mg. per head per day was almost attained, the average being 31·2 mg. per head per day. Three large-city hospitals and one small-town hospital were above the target; 73 per cent. of the hospitals did not reach it.

### *Food Supplied by the Hospitals*

Since the total nutrient consumption falls short of the target in almost every particular, it is obvious that the food supplied by the hospitals must do so to an even greater extent. The extent to which diets are supplemented by gifts of food varies greatly.

*Calories*

The average energy intake from food supplied by the hospitals was 1914 Calories per day (Table 2). The range was from 1495 to 2647 Calories. The range for a single day was tremendous, the highest being 3002 Calories and the lowest 1418 Calories. Out of 15 hospitals surveyed

TABLE 4

DISTRIBUTION OF BEDS IN HOSPITALS ACCORDING TO WHETHER THE AMOUNT OF ANIMAL PROTEIN IN THE DIET SUPPLIED BY THE HOSPITAL WAS ABOVE OR BELOW 40 g.

(Target for total protein 99 g.; all but one hospital below. Target for animal protein 60 g.; all below. See Table 1)

| Number of beds | | | | | | | |
|---|---|---|---|---|---|---|---|
| Large cities | | | | Small towns and rural areas | | | |
| Hospital No. | Animal protein above 40 g. | Hospital No. | Animal protein below 40 g. | Hospital No. | Animal protein above 40 g. | Hospital No. | Animal protein below 40 g. |
| 1 | 68 | 2 | 40 | 7 | 24 | 15 | 40 |
| 3 | 90 | 4 | 60 | 8 | 30 | | |
| 5 | 205 | 6 | 30 | 12 | 66 | | |
| 9 | 38 | 11 | 36 | 13 | 73 | | |
| 10 | 43 | | | 14 | 30 | | |
| | 444 | | 166 | | 223 | | 40 |
| Total beds | 610 | | | Total beds | 263 | | |
| Per cent. | 72·8 | | 27·2 | Per cent. | 84·8 | | 15·2 |
| Total above 40 g. .. 667 = 76·4 per cent. | | | | | | | |
| Total below 40 g. .. 206 = 23·6 per cent. | | | | | | | |

only one, a rural hospital of 30 beds, supplied a diet which exceeded the target for calories; 3 others gave over 2000 Calories, which means that 73 per cent. of hospitals supplied, for their maternity patients, a diet providing less than 2000 Calories (Table 2).

*Protein*

The hospitals supplied on an average 75·1 g. of total protein and 42·1 g. of animal protein per head per day, the range being for total protein 58 to 100 g., and for animal protein 28 to 54 g. (Table 2). In terms of total protein, only one hospital gave in its dietary more than 99 g. per head per day; the amount was 100 g. It has been, and still is, very difficult to obtain sufficient amounts of animal protein. That no hospital reached the requirement of 60 g. per head per day, that the average intake was 42·1 g., and the minimum 28 g., indicate not only a serious deficiency in first class protein but faulty catering in certain hospitals. This statement is supported by the observation that, in 33 per cent. of the hospitals surveyed, nursing mothers received less than 40 g. of animal protein,

TABLE 5

AVERAGE DAILY AMOUNT PER HEAD OF FAT AND CARBOHYDRATE IN DIETS OF PATIENTS IN MATERNITY HOSPITALS SUPPLIED BY THE HOSPITAL AND BY THE PATIENTS' FRIENDS

(Target for fat 108 g. Target for carbohydrate 298 g. See Table 1)

| Hospital No. | Fat, g. | | | Carbohydrate, g. | | |
|---|---|---|---|---|---|---|
| | Supplied by hospital | Supplied by patients' friends | Total | Supplied by hospital | Supplied by patients' friends | Total |
| 1 | 83 | 21 | 104 | 217 | 85 | 302 |
| 2 | 59 | 15 | 74 | 222 | 62 | 284 |
| 3 | 71 | 16 | 87 | 226 | 64 | 290 |
| 4 | 65 | 22 | 87 | 198 | 53 | 251 |
| 5 | 66 | 7 | 73 | 192 | 43 | 235 |
| 6 | 42 | 40 | 82 | 222 | 113 | 335 |
| 7 | 79 | 7 | 86 | 225 | 26 | 251 |
| 8 | 90 | 15 | 105 | 265 | 47 | 312 |
| 9 | 85 | 5 | 90 | 273 | 33 | 306 |
| 10 | 76 | 21 | 97 | 226 | 78 | 304 |
| 11 | 65 | 22 | 87 | 211 | 69 | 280 |
| 12 | 78 | 9 | 87 | 220 | 30 | 250 |
| 13 | 86 | 12 | 98 | 244 | 32 | 276 |
| 14 | 114 | 2 | 116 | 316 | 3 | 319 |
| 15 | 77 | 8 | 85 | 249 | 34 | 283 |
| Average | 75·7 | 14·8 | 90·5 | 233·7 | 51·5 | 285·2 |
| Magnitude of deficit from target, per cent. .. | 30 | — | 16 | 22 | — | 4 |
| Percentage of total .. | 84 | 16 | — | 82 | 18 | — |

and by the data in Table 4, where the number is given of possible patients in the hospitals in which the animal protein of the diet is above or below 40 g. That 27·2 per cent. of the patients in large-city, and 15·2 per cent. in small-town and rural, hospitals received less than 40 g., indicates the magnitude of the deficiency in animal protein liable to occur. Yet the target diet can be procured.

*Fat*

The amount supplied averaged 75·7 g. per head per day; the range was from 42 to 114 g.; with the exception of these two extremes the range was from 59 to 90 g. (Table 5). The 30 per cent. deficiency of fat in the hospital diet is, even for war-time conditions, too great. That patients' friends supplied 16 per cent. of the total fat would indicate that the hospital deficiency of 30 per cent. could certainly be lessened.

*Carbohydrate*

The average figure was 233·7 g. per head per day; the range was from 192 to 316 g. The deficiency in the hospital supply was 22 per cent. The deficiency in energy of the foods supplied by the hospitals is striking. None the less striking is the fact that the patients' friends and relatives supplied 16 and 18 per cent., respectively, of the total intake of fat and carbohydrate (Table 5).

*Minerals*

The average figures for calcium and iron were 1·23 g. and 10·63 mg. per head per day, respectively (Tables 6 and 7). The intake of these minerals was comparatively constant. The chief sources of calcium and iron as supplied by the hospital diets are shown in Tables 6 and 7.

TABLE 6

CALCIUM CONTENT OF CHIEF SOURCES OF CALCIUM IN DIETS SUPPLIED BY HOSPITALS

(Target 1·70 g. See Table 1)

| | Calcium, mg. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hospital No. | Milk | Cheese | Potatoes | Cabbage | Bread | Porridge | Starchy foods* | Rice and raisins | Broths and soups | Miscellaneous | Total |
| 1 | 969 | 57 | 7 | 12 | 69 | 12 | 56 | 22 | 43 | 68 | 1315 |
| 2 | 697 | 24 | 9 | 13 | 67 | 12 | 64 | 9 | 54 | 58 | 1007 |
| 3 | 950 | 49 | 5 | 12 | 88 | 13 | 60 | — | 45 | 81 | 1303 |
| 4 | 508 | — | 6 | — | 59 | 7 | 80 | 26 | 5 | 227 | 918 |
| 5 | 720 | — | 10 | — | 76 | 7 | 212 | — | 70 | 178 | 1273 |
| 6 | 812 | — | 5 | 12 | 96 | 12 | 96 | 20 | 30 | 63 | 1146 |
| 7 | 636 | 24 | 6 | 12 | 70 | 13 | 173 | — | 57 | 123 | 1114 |
| 8 | 860 | 48 | 8 | 1 | 80 | — | 172 | — | 57 | 155 | 1381 |
| 9 | 708 | 32 | 13 | 7 | 91 | 13 | 95 | 24 | 76 | 86 | 1145 |
| 10 | 1049 | 16 | 6 | 6 | 87 | 14 | 123 | — | 60 | 50 | 1411 |
| 11 | 953 | 40 | 5 | 5 | 75 | 12 | 191 | — | 69 | 31 | 1381 |
| 12 | 674 | — | 6 | 3 | 71 | 10 | 45 | — | 47 | 77 | 933 |
| 13 | 835 | 73 | 9 | 7 | 89 | 10 | 98 | — | 43 | 135 | 1299 |
| 14 | 846 | — | — | — | 127 | 16 | 111 | — | 25 | 389 | 1514 |
| 15 | 836 | 24 | 5 | 8 | 94 | 11 | 85 | — | 53 | 247 | 1363 |
| Average | 803·5 | 25·8 | 6·7 | 6·5 | 82·6 | 10·8 | 110·7 | — | 49 | — | 1233·5 |
| Percentage of total .. | 65·1 | 2·1 | 0·54 | 0·53 | 6·7 | 0·88 | 9·0 | — | 4·0 | — | — |

* Starchy foods = cornflour, cocoa, semolina, chocolate mould.

The supreme importance of milk as a source of calcium is shown in Table 6; the value of liver, eggs, National bread and potatoes as sources of iron is shown in Table 7. It is worthy of note that milk, in adequate amounts, cannot be ignored as a source of iron; two pints of milk (1150 g.) will give 1·15 mg. of iron. The best source of iron is National bread. The value of a combination of milk and cocoa should be noted.

TABLE 7

IRON CONTENT OF CHIEF SOURCES OF IRON IN DIETS SUPPLIED BY HOSPITALS

(Target 13 mg. See Table 1)

| | Iron, mg. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hospital No. | Milk | Eggs | Meat | Liver | Bread | Porridge | Potatoes | Cocoa | Broths and soups | Miscellaneous | Total |
| 1 | 0·81 | 0·42 | 0·74 | 0·70 | 1·71 | 0·90 | 0·55 | 1·71 | 2·10 | 1·83 | 11·47 |
| 2 | 0·58 | 0·42 | 0·82 | — | 1·65 | 0·89 | 0·76 | 2·00 | 1·71 | 1·77 | 10·60 |
| 3 | 0·79 | 0·36 | 1·30 | — | 2·17 | 1·01 | 0·42 | 1·29 | 1·45 | 1·54 | 10·33 |
| 4 | 0·51 | 0·82 | 0·93 | — | 1·45 | — | 0·50 | 0·72 | 0·10 | 4·00 | 9·03 |
| 5 | 0·60 | 0·92 | 0·90 | — | 1·90 | 0·50 | 0·87 | — | 3·00 | 1·11 | 9·80 |
| 6 | 0·69 | 0·21 | 0·68 | — | 2·35 | 0·88 | 0·43 | 0·17 | 1·81 | 0·48 | 7·70 |
| 7 | 0·53 | 2·02 | 1·30 | — | 1·74 | 0·99 | 0·55 | — | 1·59 | 4·28 | 13·00 |
| 8 | 0·72 | 0·59 | 0·88 | 0·97 | 2·27 | 1·82 | 0·67 | 0·57 | 2·59 | 1·92 | 13·00 |
| 9 | 0·66 | 0·95 | 0·65 | — | 2·56 | 1·00 | 1·08 | 0·29 | 2·71 | 0·90 | 10·80 |
| 10 | 0·87 | 0·90 | 1·10 | — | 2·10 | 1·05 | 0·49 | — | 2·11 | 1·42 | 10·04 |
| 11 | 0·79 | 0·80 | 0·66 | — | 1·83 | 0·88 | 0·39 | — | 2·54 | 0·72 | 8·61 |
| 12 | 0·56 | 0·21 | 0·79 | 1·11 | 1·75 | 0·73 | 0·05 | — | 1·60 | 2·52 | 9·32 |
| 13 | 0·70 | 0·21 | 0·99 | 0·83 | 2·19 | 0·75 | 0·80 | — | 1·17 | 5·58 | 13·22 |
| 14 | 0·71 | 0·22 | 1·43 | — | 3·12 | 2·49 | 0·60 | 0·72 | 0·75 | 2·46 | 12·50 |
| 15 | 0·70 | 0·54 | 0·90 | — | 2·53 | 0·84 | 0·44 | 0·57 | 1·97 | 1·93 | 10·42 |
| Average | 0·68 | 0·64 | 0·94 | — | 2·09 | 0·98 | 0·57 | — | 1·81 | — | 10·63 |
| Percentage of total .. | 6·4 | 6·1 | 8·3 | — | 19·8 | 9·2 | 5·4 | — | 17·0 | — | — |

*Vitamins*

*Vitamin A*. The target for vitamin A is 3429 I.U. per head per day. The average amount of vitamin A supplied in hospital diets was 2266 I.U. per head per day; the range was from 1621 to 3212 I.U. No hospital

TABLE 8

VITAMIN A CONTENT OF CHIEF SOURCES OF VITAMIN A IN DIETS SUPPLIED BY HOSPITALS

(Target 3429 I.U. See Table 1)

| | Vitamin A, I.U. | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hospital No. | Milk* | Margarine | Butter | Eggs | Cheese | Liver | Cabbage | Carrots | Broths and soups | Miscellaneous | Total |
| 1 | 565 | 256 | 160 | 123 | 91 | 750 | 78 | — | 39 | 84 | 2146 |
| 2 | 813 | 208 | 100 | 123 | 39 | — | 60 | — | 233 | 179 | 1755 |
| 3 | 554 | 384 | — | 118 | 78 | — | 75 | 1133 | 210 | 83 | 2635 |
| 4 | 360 | 288 | 160 | 261 | — | — | — | 363 | 53 | 226 | 1711 |
| 5 | 840 | 304 | 120 | 280 | — | — | — | 800 | 103 | 279 | 2726 |
| 6 | 678 | — | — | 62 | — | — | 48 | 533 | 147 | 153 | 1621 |
| 7 | 742 | 208 | 140 | 529 | 39 | — | 81 | — | 48 | 371 | 2158 |
| 8 | 1004 | 288 | 160 | 116 | 78 | 1050 | — | — | 142 | 374 | 3212 |
| 9 | 413 | 297 | 160 | 266 | 52 | — | 45 | — | 176 | 243 | 1652 |
| 10 | 612 | 240 | — | 263 | 26 | — | 42 | — | 190 | 508 | 1881 |
| 11 | 1112 | 224 | 80 | 264 | 65 | — | 33 | — | 167 | 227 | 2172 |
| 12 | 787 | 240 | 100 | 62 | — | 1200 | 21 | 107 | 160 | 159 | 2836 |
| 13 | 474 | 208 | 200 | 62 | 117 | 900 | 45 | — | 281 | 627 | 2914 |
| 14 | 494 | 528 | 240 | 75 | — | — | — | — | 140 | 386 | 1863 |
| 15 | 976 | 324 | 260 | 159 | 39 | — | 51 | — | 121 | 784 | 2714 |
| Average | 694·9 | 266·5 | 125·3 | 184·2 | 41·6 | — | 38·6 | 195·7 | 147·3 | — | 2266 |
| Percentage of total .. | 30·7 | 11·8 | 5·5 | 8·1 | 1·8 | — | 1·7 | 8·6 | 6·5 | — | — |

* The larger variations in the vitamin A content of milk are due to the difference between summer and winter supply.

reached the target, the largest intake in any one day being 3313 I.U., the lowest 1232 I.U. The greatest deficiencies were in the large-city hospitals, in two of which 1711 and 1621 I.U. per head per day were supplied.

The chief sources of this vitamin as supplied in hospital diets are shown in Table 8. The deficiency in vitamin A indicates the need for more milk, fats and vegetables, particularly carrots. The value of liver as a source is so important that every effort should be made to increase the amount of liver in the diets of nursing mothers.

*Vitamin* $B_1$. With an average intake of 1·25 mg., the vitamin $B_1$ position was satisfactory.

*Riboflavin*. The average intake was 1·87 mg., the range being 1·2 to 2·4 mg.

*Vitamin C*. With 23·5 mg. per head per day as the average intake, vitamin C was far short of the target requirement of 36 mg. per head per day. The amount of vitamin C was, even in terms of the target, far too low in the majority of the hospital diets examined (Table 9). Two hospitals passed the target figure, one by 2 mg., the other by 17 mg.

TABLE 9

VITAMIN C CONTENT OF CHIEF SOURCES OF VITAMIN C IN DIETS SUPPLIED BY HOSPITALS

(Target 36 mg. See Table 1)

| | Vitamin C, mg. | | | | | | |
|---|---|---|---|---|---|---|---|
| Hospital No. | Milk | Potatoes | Cabbage | Green vegetables | Broths and soups | Oranges | Total |
| 1 | 5 | 3 | 2 | 2 | 3 | — | 15 |
| 2 | 7 | 21 | 6 | 2·5 | 1·5 | — | 38 |
| 3 | 9 | 3 | — | — | 4 | — | 16 |
| 4 | 4·5 | 1 | 1 | 1·5 | 2 | — | 10 |
| 5 | 5 | 2·5 | 0·5 | 2·5 | 0·5 | — | 11 |
| 6 | 10 | 2·5 | — | 2 | 1·5 | — | 16 |
| 7 | 7·5 | 2·0 | 6 | 3·5 | 1 | — | 20 |
| 8 | 6 | 4 | 0·5 | 2 | 0·5 | 5 | 18 |
| 9 | 13 | 3 | 2 | 1·5 | 0·5 | 5 | 25 |
| 10 | 18·5 | 3·5 | 4·5 | 6·5 | 2 | — | 35 |
| 11 | 6 | 2 | 8 | 1 | 3 | — | 20 |
| 12 | 14·5 | 28 | 2·5 | 5 | 3 | — | 53 |
| 13 | 11·8 | 8 | 1 | 1·4 | 3·8 | — | 26 |
| 14 | 10 | 8 | — | — | 4 | — | 22 |
| 15 | 10·5 | 4·5 | 4 | 6 | 3 | — | 28 |
| Average .. | 9·2 | 6·4 | 2·5 | 2·5 | 2·2 | — | 23·5 |
| Percentage of total .. | 39·1 | 27·2 | 10·6 | 10·6 | 9·4 | — | — |

*Food Contributed by Patients' Relatives and Friends*

Relatives and friends of the patients contributed little protein, namely 7 g. per head per day. The number of eggs per head per week supplied by patients' friends was 2·5, that is 0·36 egg per head per day, equivalent

to 2·16 g. animal protein. This is almost the only source of animal protein supplied by friends, who did, however, supply a considerable percentage of the total fat and carbohydrate consumed; this was particularly true of the large-city hospitals (see Table 5). In terms of calories this extraneous supply varied greatly, ranging from 32 to 862 Calories per head per day, with an average of 370 Calories (Table 2). With the exception of vitamin C, which depends so much on the availability of fruit, the supply of other nutrients was of no significance.

### *Importance of Milk*

The outstanding contribution which milk makes in supplying animal protein, calcium and vitamins A, $B_1$ and riboflavin has been emphasized. Most hospitals supply one pint of milk per head per day, and it would appear that, in respect of milk, the location of the hospital plays no very significant part; 4 out of 9 large-city hospitals gave more than the rural and small-town hospitals. The average amount of milk in the hospital diets was 1·18 pint of milk per head per day (Table 10). In view of the

TABLE 10

CONSUMPTION OF MILK IN PINTS PER HEAD DAILY IN MATERNITY HOSPITALS

(Priority patients, nursing mothers, 1 pint per head daily.
Non-priority patients, 0·5 pint per head daily.
1 pint = 568 ml. = 585 g.)

| | Milk per head, daily, pints | | |
|---|---|---|---|
| Hospital No. | Large cities | Hospital No. | Small towns |
| 1 | 1·42 | 7 | 0·94 |
| 2 | 1·02 | 8 | 1·25 |
| 3 | 1·40 | 12 | 1·00 |
| 4 | 0·89 | 13 | 1·22 |
| 5 | 1·04 | | |
| 6 | 1·19 | | Rural areas |
| 9 | 1·08 | 14 | 1·24 |
| 10 | 1·40 | 15 | 1·23 |
| 11 | 1·40 | | |
| | Average .. 1·18 | | |

serious deficiency of animal protein, fat and vitamin A it is evident that nursing mothers should have, *in whatever form it may be most acceptable to them*, 2 pints of milk per day; this ought to be a dietary axiom for maternity hospitals.

### *Need for Dietitians*

To maintain a satisfactory dietary for patients in maternity wards of hospitals it is necessary to have dietitians responsible for ordering foodstuffs, framing menus, management and control of kitchens, and supervision of all diets, both general and special. Only by the appointment of dietitians in all large hospitals, and for groups of smaller hospitals, can

the principles of nutrition be adequately translated into the practice of hospital dietetics.

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## The Methods Adopted for Making the Dietary Surveys

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(Absent through indisposition. Paper summarized by Dr. C. P. Stewart, Royal Infirmary, Edinburgh)

The following is an outline of the methods employed in the dietary survey. They are standard methods and there is nothing novel about them. However, before there is any criticism, favourable or otherwise, of the results it is desirable to know what was in fact done.

In each case the survey lasted one week, and during that time Miss Adamson lived in, or near, the hospital, and was present when every meal was served in the ward chosen for survey. In some hospitals the maternity ward was necessarily chosen, in others the largest ward, though where possible more than one ward was surveyed, and in hospitals which had ante- and post-natal departments the post-natal was selected. There was little or no difference between ante-natal and post-natal patients.

Her method involved notification that the dietary survey was to be made. In every case an extra ration was ordered for the ward investigated, so that the removal of samples did not penalize the patients. She put queries to the nursing staff and to the patients as to whether any special preparations had been made for her visit. In only one case did it seem that such preparation had been made, and this was put right. Miss Adamson was satisfied that in all the others no design to improve matters for inspection had been made and that she was getting a fair sample of the food served in the hospitals. This is an important matter, since our object was to find out the actual food standards in ordinary everyday use.

All meals involving cooked dishes were sampled. Miss Adamson took an average serving of each of the foods and set it aside. Where the food was suitable for estimation from food tables its value was so estimated. Where it consisted of some made-up dish such as toad-in-the-hole, or anything else with sausages in it, or was of unusual composition and the recipe unknown, the sample was sent to me and analysed. It is remarkable how far some of the samples varied from the figures given by, *e.g.*, McCance and Widdowson (1940). This, however, was not the case for "standard" foods such as joints; even stews and meat pies gave values close to those of the food tables, and confirmed us in our confidence in using these tables.

In regard to such things as bread, butter or jam, Miss Adamson took the average amount served to the patient per day by measurement of the ward supplies, checked by observation of the amounts given to individual patients.

Milk was measured for a number of individual patients, and was also checked by measuring the total amount brought to the ward and the total left in the evening, with a deduction for odd cups of tea for the staff. Here it might be said that proper provision should be made for occasional snacks for the staff, who should not be forced to take milk or other items from the patients' ration.

In regard to vitamin C, all foods which might contain important amounts, milk, vegetables, and such fruits as were served, were sent to me for analysis. The sample was immediately put into a solution of oxalic acid, thoroughly mixed with the acid, and sent to the laboratory. By check analyses we found that this would preserve the sample for 36 hours and longer.

The food obtained by the patients from private sources was investigated in each ward, and never for less than 6 patients. At the beginning of the survey Miss Adamson questioned each patient as to the amount of food in her possession and asked her to report food brought in by friends. This report was checked by the contents of the patients' lockers. The patients were asked to report what food they ate themselves, what they gave away, and to whom they gave it, since it might be given to, and then be overlooked by, one of the others in the group. At the end of the period the amount of food was again noted and calculations were made of the amount consumed by each patient. The patients were all reasonably co-operative, and there was indirect evidence that they were speaking the truth, not hiding food or exaggerating the generosity of their friends.

Calorie calculations were done by the help of the usual food tables of McCance and Widdowson (1940) and the Medical Research Council's (1945) *Nutritive Values of Wartime Foods*, except where the figures were obtained by actual chemical analysis.

The total vitamin A content of the food was taken as the sum of the pre-formed vitamin and one-third of the carotene. More recent estimates of the vitamin A equivalent of carotene suggest that this may be too low an estimate.

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## Discussion

**Professor Murray Lyon:** These hospital dietary surveys arose as a wartime measure. It seemed important to find out whether the right foods were reaching the patients, and the maternity wards were chosen as being perhaps the most important. Out of this earlier investigation a certain amount of criticism arose against the hospitals. Women in general, and nursing mothers in particular, are somewhat capricious in appetite, and is it not possible that the food intake may be determined by taste and not by availability? We have drawn attention to the difficulty of getting sufficient cheese and milk consumed in this country. From these investigations it has been shown that while patients may be satisfied, satisfaction need not arise from taking the proper food, and constant check should be made on the foods actually consumed.

Dr. C. P. Stewart: On the question whether the supply of food is adequate, those hospitals which themselves supplied a relatively good diet, from 2300 to 2600 Calories, were those in which the patients did not draw much from their friends. Those hospitals from which the supply of food was low, from 1500 to 1700 Calories, were those in which patients' friends did supply a considerable amount of carbohydrate food. The range of variation of calories is very much less for total calories consumed than for calories supplied by the hospital. In the matter of quality as distinct from quantity, in almost all cases the food brought in from outside was overweighted with respect to carbohydrate and low in fat and protein. Patients' friends are much less inclined to give away their fat and protein foods than their carbohydrates. In any case it is contended that rations are for consumption by a given individual and ought not to be given away.

It seems to me that the hospitals ought to make sure that the patients do receive, in their hospital food, at least those building and protective foods which we regard as necessary, and not leave anything to the supply from outside, except for foods of the fuel type. The hospital diet should include a sufficiency of protein, particularly animal protein, minerals, and vitamins. If the hospital can take care of these, then the rest will take care of itself. Indeed, the hospital ought to discourage the provision of food by the patients themselves. The aim of the hospital should be to produce a diet which is so good that not only will the patient not need to supplement it, but it will be a valuable educative factor and help him or her to see how he or she ought to feed. If we cannot show patients this in hospital where we have dietitians, medical officers instructed in diet, and nurses, where can it be shown to them? The ideal should be a diet which will be perfect nutritively, perfect also from the point of view of catering, cooking and serving, and an education in itself. It is probably impossible to produce the ideal diet at present, but we should aim at it, and we surely can get within measurable distance of it.

Where the hospital organization often broke down was not in the provision of food but in the way it was served; we should demand improvement in the catering and perhaps especially in the serving of meals.

There are one or two other particular points perhaps worth emphasizing. Vitamin $B_1$ was reasonably satisfactory in most cases. The survey was obtained at a time when bread was in the "dark state" so disliked by the newspapers, *i.e.*, 85 per cent. extraction, and vitamin $B_1$ would have been decreased by some 35 per cent. had the bread been of the pre-war 70 to 75 per cent. extraction. It did in fact decrease towards the end of the period, when a lower extraction of flour was being introduced.

The vitamin C intake was rather low, but one or two hospitals showed good figures, and one, a small-town hospital where the cooking and serving were very good, reached an average of 53 mg. daily. Other hospitals serving the same kind of meal were returning figures of about 15 mg. per day. It is a matter of cooking and serving. The loss of vitamin C in cooking is probably from 25 to 50 per cent., but it sometimes reached 80 to 90 per cent. It was here that many of the hospitals failed most seriously, because of their equipment and methods of serving. Again, the amount of vitamin C derived from milk becomes important when the total vitamin C intake is small, and it is very noticeable that the figure is

generally higher in hospitals in the country; no doubt fresh milk, unpasteurized, was obtainable there.

Dr. R. P. Cook (Department of Physiology, University College, Dundee) showed a slide of data for King's Cross Hospital patients and staff. The general position was satisfactory, although the average intake of 2000 Calories was somewhat low. The vitamin A figure was noteworthy; they had their own farm, and carrots and other vegetables were got fresh from it. Milk also was supplied from the farm, giving a large amount of calcium. The vegetables were responsible for the high iron intake.

Professor Murray Lyon: Is this an average figure and does it include patients on low diets and on full diets?

Dr. Cook: The data included all patients.

Professor Cruickshank: What was the chief source of vitamin C?

Dr. Cook: Potatoes.

Dr. Stewart: Did it come from new potatoes? The survey figure in the maternity hospitals was for old potatoes from February to May.

Dr. Cook: The survey was made in late summer with new potatoes and the figure was for raw food.

Professor L. S. P. Davidson (Department of Medicine, University New Buildings, Edinburgh): I do not think the nutritional problem should be viewed entirely from the physiological and research aspect. It is also an economic and an educational problem. The matter presented shows that there is in certain hospitals a remarkable lack of organization. War-time difficulties have revealed a failure on the part of the medical profession in the instruction of physicians, doctors, nurses, caterers and boards of managers. There is nothing that Professor Cruickshank has told us on how our hospital feeding ought to be planned that we have not already known. It is clear that more education of the people dealing with patients is needed. The question of milk is of course a problem, and the reason is that we were never taught to drink it. We should try to get children to take more than a pint a day. More dried skim milk should be used in maternity wards; though the fat is lost, the protein and minerals are most valuable. I was disappointed in the iron figures. What was the bread consumption? Schoolchildren in Edinburgh are getting 20 mg. a day from eating large quantities of bread. Why don't we eat more bread? No doubt there is not a sufficient amount of jam, butter and margarine. I am not willing to accept that phytic acid and 85 per cent. extraction have had any effect on the absorption of iron. What about the pulses? Do pregnant women get an adequate quantity?

I feel that with a little education, even with the present difficulties, there would be no difficulty in improving the intake of protein, iron, and vitamins A and D.

Dr. A. Lyall (Department of Clinical Chemistry, Royal Infirmary, Aberdeen): I should like to ask if the calorie values have been considered in relation to the bodyweight of the patients. It is well known that women put on from 6 to 8 lb. weight in pregnancy and sometimes keep it. The maternity hospitals would make a good locus for nutritional education, since 50 per cent. of births are in hospital. If the calorie values of

the diets were too high we should tend to add to the obesity cases, and this is a serious matter.

Professor Cruickshank replied:

*To Professor Davidson*: The average bread consumption was 7 oz. per head per day, equivalent to 3·5 mg. of iron; the range was approximately from 5 to 10 oz. per head per day. The amount of bread eaten depends upon the type of diet generally taken and the energy requirements of the individual.

*To Dr. Lyall*: The calorie value of the diet was not related to the body-weight.

Dr. C. A. Douglas (Department of Health for Scotland, St. Andrew's House, Edinburgh): At the beginning of our work in one war-time maternity hospital we planned a diet that gave 3000 Calories. The women came from Glasgow and had to travel some time before their labour was imminent. In that waiting period of two or three weeks they ate remarkably little, but they improved in condition and the labours were very much shorter than usual, some of them not more than 6 hours.

The women rested for a day or two and were then ravenous. They were offered as much bread as they would eat, but some just would not eat bread. Great difficulty was experienced in getting extra milk taken as milk. We had to give milk with cocoa or Ovaltine to get them to drink milk between the main meals. The lactating women had Ovaltine at 10.30 at night, at 6 o'clock in the morning and in the afternoon.

The local authority hospitals I visited gave reasonably good diets, particularly where they had big gardens. It has long been an experience that in hospitals, say in the mining areas, the women at first would not take green vegetables, salads, milk or cheese; but in the last few years before the war they were beginning to take soup and some other made-up tea and supper dishes.

With regard to education I should like to point out that in maternity hospitals women have only 8 or 9 days in which to be shown what to eat.

Professor Davidson: Is it true that the basal metabolic rate is raised 25 per cent. in pregnancy? During the last 3 months of pregnancy you have this increased requirement for food and your figure of 2500 Calories is a very reasonable one.

Professor Cruickshank: It is generally accepted that normal pregnancy has little or no specific effect on the basal metabolic rate until the last 3 months when the basal metabolic needs of the mother begin to increase and at the end of pregnancy may rise to 20 per cent. above normal.

Dr. E. C. Owen (Hannah Dairy Research Institute, Kirkhill, Ayr): Regarding the iron figure, it may be that what we know as the common foods are not necessarily the chief sources of iron. How much comes from the essential constituents of the meals and how much from contamination by knives and other cooking materials? Widdowson and McCance (1943) suggest that the extensive use of aluminium cooking utensils and stainless steel knives makes a difference to the intake. Of all the constituents that make up the earth, iron is the fourth commonest, and we should not ignore inorganic sources of iron. What is the effect of

using these non-corrosive materials in preparing food? I know that they make the housework easier.

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Dr. Stewart: During the war, in the survey of the food at one or two schools, the iron figure was obtained partly by calculation from food tables and partly by estimation of the iron content of the food. In one school, where the cooking vessels were made of iron, the iron content was twice that calculated from the food tables. In the other school, where enamelled and aluminium pans were used, the figure was slightly higher than that given in the food tables. It seemed to us that the use of iron cooking vessels does contribute to the iron intake.

## Remedial Diets and their Difficulties

Dr. A. Lyall (Department of Clinical Chemistry, Royal Infirmary, Aberdeen)

The previous speakers have dealt in detail with the ordinary diets in hospital where, for the convalescent patients, those recovering from trauma or non-abdominal operations, and those with non-metabolic diseases, the diet should be ideal in service, variety and nutritive quality. In actual hospital practice a large proportion of patients has to be specially catered for during part or all of their illness from the dietetic aspect. In many large hospitals 40 per cent. of the patients are on light diet, usually a temporary regime, while 12 per cent. are on special diets or milk only. Cases of this type include acute febrile states, post-operative days especially after surgical interference with the alimentary tract, diabetes especially diabetics with surgical lesions, peptic ulcer, obesity, nephritis, steatorrhoea, osteoporosis, anorexia, hepatitis and Addison's disease. In all these conditions special dietetic arrangements are necessary, either temporarily in hospital, or continuously during hospital treatment and afterwards on discharge from hospital.

I wish first to outline the general problems which may arise in prescribing and controlling modified therapeutic diets for these types. These may be enumerated as follows:

1. Provision of the special modifications necessary in the diet to suit the individual case, *e.g.*, the growing, the fat, the thin, the pregnant, and the working diabetic case; cases of urinary lithiasis, cystine calculi and so on.
2. Conversion of this knowledge into a suitable dietetic prescription and its translation into practice.
3. Supplementation of inadequate amounts of vitamins or minerals, deficient in the type of diet prescribed.
4. The availability of foods prescribed.
5. Co-operation of the patient in taking the prescribed diet and in observing restrictions for as long as is necessary.
6. Physiological difficulties with regard to assimilation, inherent in the nature of the disease.

7. The ability of the patient, after discharge from hospital, to maintain the diet on account of cost, scarcity of foodstuffs, and lack of facilities for cooking.

I wish to elaborate these points by reference to groups of diseases and to particular cases.

We may illustrate several of these general difficulties by reference to one of the commonest diseases for which dietetic restriction is necessary, namely, diabetes mellitus. This disease is rapidly becoming a more urgent problem, since the incidence seems to be increasing, and diabetics properly cared for continue to live for long periods. Recent American statistics have shown that the incidence of diabetes in the U.S.A. is 3 per 1000, a figure likely to increase with the increasing age of the population. Figures available suggest that the diabetic population of the U.S.A. amounts to 500,000, with an annual increment of 50,000 (Spiegelman and Marks, 1946). A conservative estimate for Great Britain, based on figures with a somewhat local application, would point to a diabetic population of 120,000 with an annual increment of 1200. Local area figures for north-east Scotland confirm this estimate and emphasize the importance of the problem. Good out-patient control is of great value in saving hospital beds, and good out-patient treatment depends to a considerable extent on reasonable dietetic control.

Typical diabetic diets are modified in their carbohydrate content to figures around 150 g. and the necessary calorie value, up to 2500 Calories, is made up with protein and fat. The bulk of diets of lower calorie value is increased by the addition of vegetables of low carbohydrate content. In general, the proteins and fats are most expensive and most difficult to obtain, carbohydrates are cheaper and relatively more plentiful, while vegetables and fruits may be very scarce at certain times of the year. It is true that during the war years certain provisions have been made by the Ministry of Food for the diabetic population. Certificate 11e allows 2 extra rations of protein, including meat and bacon, 2 extra rations of fat and 12 oz. of cheese, provided the patient gives up sugar. But even with these additions, the lot of the diabetic is not a happy one, especially during periods when fish is scarce, or in districts where the supply of fish is limited even when fishing is good.

There are periods during the year when green vegetables are at a premium or nearly unobtainable, especially in Scotland. During the months of March and April, when the winter green crops are used up or destroyed by frost, very little of this type of food is to be had. The towns, paradoxical though it may seem, are more fortunate in this respect than the country villages, where vegetable shops are few and where green foods in the gardens, including Brussels sprouts, savoys, kale and leeks, are completely used up by March. Imported cauliflower and early forced lettuce are becoming available, but these are expensive and can hardly be classed as foods in the quantities purchased.

These difficulties are more acute in industrial districts where there is no opportunity of obtaining additional eggs or fish. Figures from the Ministry of Food illustrate this point. In Aberdeen City in 1945, 183 diabetic patients had applied for, and received, the additional food supplies under certificate 11e, while amongst country patients only 11 patients

had applied. At this time 305 city patients were receiving insulin through panel or municipal sources, and 90 country patients, which would indicate that the country patients in general find less difficulty in maintaining a diet, probably because more eggs and milk are to be obtained.

Attempts have been made to provide exchanges or substitutes for the scarcer foods, using peasemeal or rissoles from split peas to replace proteins; and bacon, tongue, sardines, tinned salmon to replace eggs or to replace equivalents in chops, pork, veal, poultry, liver, tripe, sweetbreads, white fish, salmon, herring roe or corned beef. Some of these foods are obtainable some of the time. But the instructions in one standard work on dietetics merely show how war restrictions have added to the difficulties of dietetic treatment: "For 1 ounce of meat the diabetic may substitute one egg, and butter may be replaced by margarine, olive oil, cream or bacon. One orange may be replaced by ½ grapefruit, 1 pear, 1½ peaches, 1 apple, ½ cantaloup, 2 slices pineapple, 13 cherries."

I think I have laboured the point sufficiently to show excuse for the diabetic for breaking away from dietetic restriction, even apart from any craving he may have for the forbidden concentrated carbohydrates. But I would emphasize that the position is worse for persons living alone or in lodgings or in a small household, or in sub-lets where cooking facilities are scanty.

The diabetic patient who happens to be the victim of a surgical disease, acute abdomen, acute mastoid, perforated gastric ulcer, gangrene or cellulitis becomes a very difficult problem from the dietetic aspect. I do not wish to enter into details of treatment here, but only to point to this as another type of acute disturbance of nutrition conditioned by the disease concerned.

The same difficulties occur in the treatment of obesity by reducing-diets. It is of very little use to prescribe diets for this purpose during the late winter and early spring months, on account of the seasonal dearth of vegetables. The time to start reducing-diets is the early summer, when these foods and some fruits are to hand. Otherwise it is rather a mockery to give a diet of 900 to 1000 Calories, with carbohydrates reduced to 80 g. and helpings of lettuce, spinach, cress, cauliflower, and fruit, especially since many obese people are fundamentally carbohydrate eaters. In a series of cases where previous diets were carefully estimated, many had consumed up to 60 per cent. of their calories as concentrated carbohydrates. Failure to achieve good results on many occasions was common in the treatment of any large series of cases of obesity even when suitable diets were available or could be provided by public assistance; it becomes much more common if suitable foods are not available.

To obtain co-operation on the part of the patient may prove a difficult problem in the nutritional treatment of certain diseases. *Anorexia nervosa* is a good example of this difficulty. There is often some psychological background for the aversion to food and for the limitation of intake, which may lead to actual inability to ingest meals satisfactory in bulk and in quality, and to vitamin deficiencies and endocrine hypofunction. It usually requires frequent feeds on a graduated scale, well served and presented by a persuasive nursing staff with firm handling of the patient to achieve satisfactory results. Replacement of depleted vitamin stores is also important. The help of the psychologist may be of much value both in

the early and the later stages in removing the causes which interfere with the return of appetite.

In some cases the difficulties are aggravated by failure of intestinal digestion, absorption and assimilation after periods of partial starvation. In a case recently under investigation, with a long history of loss of weight, epigastric discomfort, lassitude and hypotension, repeated periods in hospital had failed to bring about improvement in the general nutritional state. A prepyloric ulcer of the stomach had developed and remained chronically present. Diagnosis of Addison's disease and Simmonds' disease were suggested but not supported by the investigations. At no time could the food intake be raised above the basal expenditure of 1100 Calories. An experiment was tried with addition of casein hydrolysate. In the control period, the nitrogen intake was 6·08 g. and urinary excretion 5·59 g. In a period of 10 days on 50 g. casein hydrolysate daily, with a total nitrogen intake of 12·03 g., the urinary nitrogen was 11·28 g., *i.e.*, there was almost no retention. In a further period of 10 days with 50 g. glucose in addition, retention of nitrogen amounted to 0·5 g. daily, and in 10 days with 200 g. lactose in addition, retention of nitrogen amounted to 1·89 g. daily. The Calorie values of the diets were 1190, 1300, 1500, 2000. Until the addition of large amounts of lactose no significant retention of easily absorbable nitrogen occurred.

The same difficulty in digestion and absorption occurs in patients suffering from steatorrhoea, whether of the idiopathic type or that due to pancreatic failure. The primary disturbance is in digestion and absorption of fat, and this interferes secondarily with digestion and absorption of protein. The diet should be low in fat and adequate in easily assimilable carbohydrate and protein. If, however, the disease has progressed so far that satisfactory nitrogen equilibrium cannot be achieved by these means, then there is progressive loss of weight and wasting. In such cases the prognosis is bad. The Food Rationing (Special Diets) Advisory Committee allows 4 extra rations of protein during the acute stages of the disease and 2 extra rations of protein during the quiescent phases but does not grant additional easily absorbable carbohydrate, which may be necessary to maintain bodyweight and ensure nitrogen equilibrium.

In the last group for consideration, the foods necessary for remedial dietetic treatment are not available either in the classification of the Ministry of Food, or upon direct individual application with medical certification to the Food Rationing Advisory Committee responsible for the allocation of special diets. I refer to the group of cases known as senile osteoporosis, one of the commoner generalized nutritional diseases of bone. The condition occurs usually in the sixth decade but may appear earlier (Burrows and Graham, 1945). In many cases the diet has been habitually deficient in calcium, with resultant resorption of the bone. The vertebral bodies are early involved, and collapse of the lower thoracic and lumbar vertebrae is common. The diagnosis may be made only after exclusion by careful clinical, biochemical and radiological methods of other bone diseases, including Paget's disease, hyperparathyroidism, malignant metastases and myelomatosis, all of which may show some similarity in symptoms.

After the diagnosis is certain the physician may be in the position of having to say that the character of the disease is clear but that the

treatment is largely dietetic and that the necessary diet is not available. There is good evidence that in this condition additional food calcium is absorbed and utilized, but the evidence is much less convincing that the alternative method of giving medicinal calcium is effective.

Some of the factors concerned in the difficulties of maintaining diets are associated with the human factors of likes and dislikes, frailty and perversity. Others are the direct result of insufficiency or bad distribution of food. It is fully realized that the general food situation is precarious at the moment and that it may be economically bad to weigh the claims of the sick against starvation of the healthy. But the function of the medical man, apart from the public-health and preventive aspect, is to promote the interests of the sick in his care and it is essential to advocate their needs. The time has come to direct all energies to providing sufficient of the staple foods as well as of protective foods, so that the restrictive regulations will disappear.

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## Discussion

Professor Davidson: With regard to Dr. Lyall's remarks about the Food Rationing (Special Diets) Advisory Committee, one must remember that this Committee was set to work with the object of seeing that the people of the country who were going to win this war had a reasonable prospect of doing so, and the first priority was to those in heavy work. We were well warned by Sir Robert Hutchison in 1938 of what would happen if we did not deal with food distribution in terms of human requirements. The Committee took strict measures to give food on scientific grounds. Had this not been done, priorities would have defeated the food policy of the country. At the present moment 55 per cent. of total milk consumption is on priority.

Dr. Lyall: Countless citizens seem to have a high priority, while the average person has to do with 2 pints of milk per week for 6 months of the year. Surely a priority for such cases as osteomalacia should be given.

Professor Davidson: The demands for priority made to the Committee are tremendous and the most outrageous requests in letters are received. Regarding priority for osteomalacia, the difficulty is whether the doctor is competent to prove that the condition is in fact due to a dietetic deficiency. Thousands of doctors might then claim priority for extra milk for, say, a mild degree of osteoporosis. The same thing might happen for all the arthritic conditions. Of course in my view vitamin D and chalk would give the same result as one pint of milk.

Regarding sugar, it is said that the steatorrhoea patient should have 2 oz. sugar and 2 oz. jam. It is difficult to understand how the carbohydrate from sugar or jam would differ from that from bread and other foods. I can only defend the Committee by saying that most people think we have been very generous!

Dr. Lyall: With regard to the question of calcium absorption from food sources or medicinal sources, I have evidence that calcium is absorbed

when given as a food. There is no evidence that calcium salts are in fact adequate in these cases.

Dr. Cook: Cannot you try acid calcium phosphate?

Dr. Lyall: Usually the lactate is the best form to give.

Regarding the Food Rationing (Special Diets) Advisory Committee, in many circumstances it has been too generous in regard to milk, and there is no method of control as to whether the patient requires the milk or not.

Professor Davidson: For three years running only 3 per cent. was given to invalids, but this fraction has risen to just over 5 per cent.

Dr. I. Leitch (Imperial Bureau of Animal Nutrition, Bucksburn, Aberdeen): If the invalid priorities are so low, the minute fraction that osteomalacia would add would be neither here nor there.

Professor Davidson: Osteomalacia is but one instance; soon all cases of parathyroid disturbance, thyrotoxicosis, rheumatoid arthritis and all related cases would come in, and there would be hundreds of thousands seeking priorities.

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THIRTY-FIFTH SCIENTIFIC MEETING

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE,
JULY 5TH TO 8TH, 1946

## EUROPEAN CONFERENCE OF THE NUTRITION SOCIETY

The report of this meeting will appear in No. 4 of this volume.

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THIRTY-SIXTH SCIENTIFIC MEETING—NINETEENTH ENGLISH MEETING

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE,
SEPTEMBER 21ST, 1946

## THE WORK AND AIMS OF THE FOOD AND AGRICULTURE ORGANIZATION

The text of the papers read at this meeting could not be obtained for publication.