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The Teaching of Nutrition to Medical Students

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Although nearly 20 years have elapsed since I first organized a course of instruction for final-year medical students in Aberdeen on the physiology of nutrition and the practical application of dietetics for the prevention and treatment of disease, it is only within the past month that I have realized the necessity of viewing this educational problem from a much broader angle. Instruction in matters pertaining to nutrition is given in many departments of the faculty of medicine, and the best results will only be obtained if the curriculum in each department is fitted into a carefully thought-out and co-ordinated plan. Before such a co-ordinated course can be planned it is necessary

to know to what extent and in what way the teaching of nutrition is being undertaken in the different departments at the present time. To obtain this information I visited many of my professorial colleagues and discussed this educational problem with them. The suggestions which I now put forward for your consideration are the result of such deliberations.

The final objective to be achieved in medical training in nutrition is the production of family doctors who are competent to give sound advice to their patients on the role of food in the maintenance of health and in the treatment of disease. The course of instruction should not be a single intensive continuous course occupying one or more hours daily for several weeks or months, but should begin in the student's first year, when he joins the botany class, and should continue at appropriate intervals in the different departments of the faculty of medicine throughout the whole 5 years of undergraduate work.

First year: botany

The medical student should be introduced to the problems of nutrition when he begins his course of botany. The position of botany in the medical curriculum was originally due to the fact that the practising physician collected his medicines from the hedgerows and fields. A knowledge of systematic botany was therefore an essential practical part of a physician's technical training. To-day the greater part of our *materia medica* comes from the industrial chemist and only an ever-decreasing fraction from the herbalist. Thus the original technical reason for the place of botany in the medical curriculum has largely vanished. It is, however, still retained as part of a general introduction to medicine and as a means of training both hand and mind. There are, however, additional reasons for its retention. All recent public-health work stresses the importance of the relation between agriculture and health. In particular, the nutrition of a people is bound up with their agricultural system. It would be a valuable aid to a medical student's subsequent understanding of many health problems if in the course of a general introduction to botany he learned in the broadest outline how the essential nutrient components of the different plants are built up and how in a sound system of agriculture the different crops are dovetailed to produce a balanced human dietary.

I believe that in the teaching of botany to medical students less time should be devoted to the classification, identification and anatomy of large numbers of plants belonging to different species, and more time should be given to the study of the physiology of plant nutrition than is usually given in medical schools. In other words, a considerable part of the course of botany should be devoted to agricultural botany. This fascinating subject is excellently illustrated by Alexander Nelson's (1946) recently published book. A simple account of how plants obtain the necessary ingredients for the synthesis of carbohydrate, protein and fat, and the mechanism underlying these syntheses, is an essential introduction to the study of animal and human nutrition, since animals can only change the character of the material on which they feed, but cannot carry out the primary syntheses.

A brief review of mineral metabolism in plant nutrition is also justified by its

importance to man. The practical importance of a knowledge of plant nutrition to medical students should be illustrated by the exhibition of lantern slides showing the effect of deficiency of elements, both 'essential' and 'trace', on the growth of plants and on the life of animals which consume such plants. The vital importance of cereals to the welfare of mankind clearly indicates the need of a lecture on this subject. The anatomy and morphology of the wheat berry should be demonstrated to indicate the site and composition of its essential food factors. The ill effects of refined white flour and polished rice on the health of human beings should be referred to in broad outline.

Second year: physiology

A course of agricultural botany on the above lines, supplemented by the teaching of organic chemistry in the university department of medical chemistry, will prepare the student for the course of human physiology which continues during his second year of academic life. In Edinburgh some twenty-four lectures, supplemented by practical instruction in biochemistry, are devoted to the physiology of the alimentary tract, and to the digestion, absorption and fate of carbohydrate, protein, fat, minerals and vitamins. Taking into consideration the large amount of physiology which has to be taught in a given period, this allocation to the physiology of nutrition seems adequate. It would be a real advantage if the lecturer responsible for this task were a medical graduate with an interest in nutritional research and a practical knowledge of deficiency diseases in man. When such a man is not available the teacher should have had practical experience of the effects of nutritional deficiency in animals. Without such experience there is a real danger of the course becoming one of physiological chemistry. Experience has shown that the medical student's interest in fundamental principles is secured most effectively if the principles are illustrated by reference to practical medical problems and interesting medical discoveries. Thus when dealing with calcium metabolism or the physiology of the vitamins the lecturer should reinforce his physiological and chemical instruction with historical anecdotes and lantern slides dealing with clinical problems, such as rickets, beriberi, and scurvy. A heavy responsibility rests on the department of physiology, since a well-planned course of instruction on the physiology of nutrition is the only sound foundation on which can be based the medical student's subsequent instruction on the prevention and treatment of disease by diet.

Third year: medicine

The Edinburgh student first comes in contact with the sick person in his third year at the university. He receives a course of some 100 systematic lectures on the diagnosis, clinical features and treatment of disease. This is reinforced by daily clinical training in the hospital wards. I would suggest that at least five of the systematic lectures should be devoted to nutritional problems. The first lecture should deal with the nutritional requirements for growth and health, and the foodstuffs of particular value for supplying the principal nutrients. The second lecture should deal with the difficult subject of the clinical and chemical effects arising from minor degrees of nutritional deficiency. The last three lectures should cover the fully developed deficiency syn-

dromes of man, e.g. scurvy, beriberi, pellagra. Brief mention should be made of those deficiency states, such as rickets and nutritional anaemia, which are best dealt with in detail by the lecturers in paediatrics and haematology.

During their course of instruction in clinical medicine in the third year and subsequently, medical students should receive practical instruction in the prescribing of diets for the treatment of established diseases.

Fourth year: surgery

The medical student in Edinburgh begins his instruction in systematic and clinical surgery in his fourth year. At least two surgery lectures should be devoted to the value of diet in surgical conditions. Examples of the type of information which should be imparted are the importance of proteins and carbohydrates in the prevention of anaesthetic catastrophes and hepatic failure, and the value of first-class proteins and vitamin C in the promotion of healing of wounds and burns and the reduction of the period of post-operative convalescence.

Fourth and fifth years: obstetrics and paediatrics

During the fourth and fifth years the student in Edinburgh begins the study of obstetrics, child life and health, and diseases of children. The pregnant and lactating woman and the growing infant and child are of particular interest to the nutritionist. Accordingly, at least one lecture in each course should be devoted to the physiological principles involved and to the giving of practical instructions for meeting their special needs. In addition, instruction in the dietetic treatment of established diseases, e.g. toxæmia of pregnancy, rickets, nutritional anaemia, must be given in the systematic lectures and in the hospital wards.

Public health

During his fourth or fifth year the medical student has a course of instruction on public health and social medicine. I am indebted to Dr Passmore, who gives the lectures on nutrition in the Department of Public Health, for the following notes on the scope and function of the course of instruction which he proposes.

Formal instruction in this course in Edinburgh consists of some fifty lectures, and of these five are devoted to nutrition. The subject is considered only as it affects large population groups; problems of individual physiological needs, pathological and clinical findings, and dietetics are not discussed. Diets consumed by various large groups are described. These include rural and urban sections of the population, institutions such as schools, hostels and prisons, the armed services, and tropical peoples. Each diet is discussed in relation to the environmental condition of the people, and possible methods of improvement are considered in relation to economic status, local agricultural conditions, popular and religious prejudices and educational levels. The close connexion between agriculture and nutrition is emphasized, and the broad principles on which both national and international agriculture should be adjusted to human nutritional requirements are indicated. The importance of food commodities in national and world trade is mentioned. The main aims and functions

of national nutrition advisory committees and the Food and Agricultural Organization of the United Nations are given. A brief outline of the principles and practice of rationing is included. Nutrition as one of the primary environmental factors pertaining to the general health of a population is considered with special reference to the physique and virility of the people, their expectation of life, the infantile and maternal mortalities and the incidence of tuberculosis and other infectious diseases. The nutritional needs of special sections of the population, such as infants and mothers, schoolchildren and industrial workers, and methods of supplying these needs, are discussed. A brief account is given of the role of the medical profession, especially general practitioners, in the education of the public in the right use of food and in healthy food habits.

Fifth year: therapeutics

In the fifth year in Edinburgh the Professor of Therapeutics gives a course of thirty lectures on the treatment of established diseases by all suitable measures, including the use of special diets. My experience in Aberdeen suggests that systematic lectures on dietotherapy should be supplemented by practical demonstrations. These should illustrate visually by the use of models the type and quantity of food in the diets recommended for the prevention and treatment of disease. It is hoped to begin in the near future such a course of lecture demonstrations for final year medical students in Edinburgh.

A co-ordinated plan of instruction on the lines discussed above should ensure that a knowledge of the physiology of nutrition and the prevention and treatment of diseases by diet is gradually accumulated by the medical student throughout his 5 years of undergraduate training. My experience as a member of the Food Rationing (Special Diets) Advisory Committee and as the medical referee for priority rations in Scotland clearly indicates that many doctors in practice at the present time have insufficient knowledge of the science of nutrition and the practice of dietetics. Since the family doctor is the man above all who can best advise the people on nutritional matters, it is essential that all universities should give careful thought as to how future generations of doctors can be made more competent in this respect than those in practice at the present time. In most universities it is the business of no particular person to undertake the work of co-ordinating the courses of instruction in nutrition. In the future I would submit that this task must be undertaken by the professor of medicine or the professor of therapeutics if he is interested in this work and qualified to undertake it, or, alternatively, by a senior lecturer in nutrition specially appointed to carry out this duty. Such an appointment has now been made in my department in Edinburgh, and the lecturer's services will be made available to all professors in the Faculty of Medicine who feel that his knowledge and experience will be of value to them in their course of instruction. The other duties of the lecturer in nutrition may be summarized as follows:

(1) Teaching the physiology of nutrition and practical dietetics to undergraduate and post-graduate students and dietitians.

(2) Acting as assistant physician to the Dietetic Department of the Royal Infirmary, Edinburgh.

(3) Carrying out clinical and laboratory research in nutrition.

In Edinburgh it is hoped that a co-ordinating committee will be set up to ensure that the students receive a thorough training in all aspects of nutrition. The successful completion of this reorganized plan of teaching should ensure that our future medical graduates can take their full share in the building of a better and healthier nation.

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