TWO HUNDRED AND EIGHTH SCIENTIFIC MEETING
JOINT SYMPOSIUM WITH THE BIOCHEMICAL SOCIETY
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BIOCHEMICAL ASSESSMENT OF PROTEIN NEEDS

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Chairman's opening remarks

By W. F. J. CUTHBERTSON, *Glaxo Research Ltd, Greenford, Middlesex*

An international group (Advisory Committee on the Application of Science and Technology to Development, 1968) has stated that 'The protein gap in the nutrition of the population of our planet is becoming a most important scientific, technological and health problem and a national and international policy issue. The Governments of developing countries should make every effort feasible to supply their populations as quickly as possible with sufficient high quality food and to develop and apply the necessary supporting science and technology in the fields of nutrition, food science and technology'.

Most would agree with this statement though there may be divergence in views as to the actual magnitude of the problem and the best ways in which it may be solved in those parts of the world where the difficulties are most acute. However this may be, the problem cannot be met until the populations, or sectors of populations, actually suffering or at risk from protein deficiency can be identified and their needs quantitatively assessed. Next, these groups, or their parents or protectors, must be made aware of their needs and enabled to satisfy them.

The assessment of the quantity of protein necessary for growth and maintenance has proved most difficult, even though this is essential for the description let alone the solution of the protein problem. Balance studies alone cannot suffice, not only because of the effects of energy intake on nitrogen loss or gain, but also because N balance can be achieved over a wide range of dietary N intakes, total body N can be changed by variation in N intake, and N balance may be achieved at different body N levels. There are several different body N pools and these as well as the various tissues and organs may lose or gain N at different rates when dietary intakes are lowered or raised. Thus even in a state of N balance there may be differences in the total amount and activity of the various nitrogenous compounds in the body. The question of how to estimate protein needs can thus be seen to require knowledge not only of absorption and balance studies but also of other aspects of amino acid and protein metabolism and its regulation as affected by changes in the intake of nutrients and by other circumstances.

This meeting has been planned to bring together investigators deeply concerned with protein utilization at various levels so that it may be possible better to comprehend the absorption, catabolism and anabolism of dietary protein in relation to the

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regulation of enzyme activity and synthesis together with tissue synthesis and repair within the body. A deeper understanding of these topics and, in particular of the control mechanisms operating on the primary biochemical pathways, would appear to be necessary for more precise definition of protein and amino acid needs. At present estimates vary by a factor of two, or more. Closer evaluations are clearly desirable, the more so when calculations are made of the quantities of food, and consequent effort, needed to satisfy demand for whole populations. Provision of only 1 g of $N \times 6{\cdot}25$ per day to each of a population of 50 million people for instance would entail production of about 2×10^5 tons of cereal, 1×10^5 tons of legume, 5×10^4 tons of skim-milk solids or 6×10^7 broiler fowls per year—all requiring a considerable investment in land, labour and materials.

This example indicates the magnitude of the supplies that may be needed and hints at the economic and social problems that must be overcome if such quantities of extra food are to be produced and if the populations at risk are to be provided with the funds to pay for it. Sources of protein other than the traditional foods might well significantly contribute to man's needs. For this reason, therefore, we are fortunate to be able to hear at this meeting of the ways in which protein resources could be greatly increased, by the improvement of some and the better use of others, together with development of entirely novel products.

REFERENCE

Advisory Committee on the Application of Science and Technology to Development (1968). In *International Action to Avert the Impending Protein Crisis*, p. 40. New York: United Nations Organization.

The absorption of protein from the intestine

By K. J. CARPENTER, *School of Agriculture, University of Cambridge*

This paper was prepared at very short notice and no written version will be published.

Adaptation of mammalian protein metabolism to amino acid supply

By HAMISH N. MUNRO, *Physiological Chemistry Laboratories, Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts*

Introduction

The metabolism of the animal is equipped to adapt to changes in both the internal and the external environment. Among internal factors are activity versus rest and sleep, and the menstrual cycle in the case of the female. Metabolism must also respond to variations in the external environment, such as heat and cold, and notably