

# PROCEEDINGS OF THE NUTRITION SOCIETY

ONE HUNDRED AND EIGHTY-SIXTH SCIENTIFIC MEETING  
SEVENTY-SIXTH SCOTTISH MEETING  
EDINBURGH SCHOOL OF AGRICULTURE, KING'S BUILDINGS,  
WEST MAINS ROAD, EDINBURGH 9

24 FEBRUARY 1967

## THE INFLUENCE OF FEEDING PATTERNS ON NUTRIENT UTILIZATION

*Chairman* : SIR DAVID CUTHBERTSON, CBE, MD, DSc, LLD, FRCPE, FRSE,  
*Department of Pathological Biochemistry, Royal Infirmary, Glasgow*

**Feeding patterns and nutrient utilization: Chairman's remarks**  
By D. P. CUTHBERTSON, *Department of Pathological Biochemistry, The University and  
Royal Infirmary of Glasgow*

Man chooses foods not nutrients and much of his dietary pattern is thus built up from the fruits of a colossal experience over centuries and not from the newer knowledge of nutrition; much is also based on prejudice, religious observance, taboo and superstition.

The winds of change are stirring these dietary patterns of developing peoples. In the change-over to more Western or European customs some protective facets of the old common pot may be lost before full compensation to the newer regime takes place.

Settlement, soil tillage and domestication of animals have changed the feeding patterns of those who previously hunted or were nomadic. With increasing numbers to feed the primary demand has been for energy-yielding foods, cereals in particular.

The body tends to keep its energy balance sheet automatically by biochemical means and there is only one form in which any amount of surplus energy can be stored, namely as fat. A low level of 'effective' blood sugar is a stimulus to feeding and an important contribution to the theory of the chemical control of appetite. In the long run the hypothalamus modifies the general level of food intake and bodily activity in response to changes in body fat.

The substitution of mechanical power for muscular effort might be considered to reduce the demand for calories and hence alter the kinds of food eaten and the nature, and possibly frequency, of meals taken. The increasing demand for women in factory and office must exert a very direct effect on food habits. Overtime and the serving of a continuous output by expensive machinery must surely affect dietary patterns. The distribution of nutrients, or at least the foods providing them, may well differ as between day and night work.

In most African households the person having first choice of food is the husband

or father. He is followed by the other productive members of the family, i.e. the elder sons and younger brothers. Other older children come next and often the mothers and toddlers are last to be considered. Obviously a programme aimed at the toddler will fail if the type of food it receives is acceptable to the other members of the family, unless there is enough for all.

The animal husbandman is being faced with rising costs all round and a shorter working week. He generally tries to find cheap sources of energy and protein and dietary regimes which will give a considerable concentration of these per unit dry weight. He also wishes to cash in on the most efficient periods of growth and other productions in respect of nutrient utilization. He tries to find labour-saving devices—including changes in dietary pattern—particularly at weekends, but you will hear more about all this from the experts who are with us today.

### **Adaptation to the pattern of food intake: some mechanisms and consequences**

By P. FÁBRY and T. BRAUN, *Physiology Department, Institute of Human Nutrition, Prague 4, Czechoslovakia*

Man and animals are able to adapt themselves within a relatively wide range to a certain dietary pattern, if at least the indispensable supply of essential nutrients is ensured. It is a sad reflection of nutritional problems in the world that most knowledge on nutritional adaptation was assembled in connexion with starvation and caloric deficiency (Keys, Brožek, Henschel, Mickelsen & Taylor, 1950; Grande, 1964). It is, however, obvious that from the physiological aspect nutritional adaptation is a much wider problem. Thus for the more fortunate half of mankind, adaptation to an excessive calorie intake is very relevant to the problem of homeostasis, which is now being studied in more detail (cf. Miller & Mumford, 1966; Strong & Passmore, 1967).

Another aspect is adaptation to a changed composition of the diet. Biochemical and enzymic changes in tissues, as a result of a different proportion of the major dietary constituents, are so marked and typical that they are frequently used by biochemists investigating enzyme adaptations and their mechanisms, as a valuable model.

Fig. 1 shows a hypothetical scheme of metabolic adaptation to an increase of one of the main nutrients in the diet. The first changes pertain to the gastro-intestinal tract. We know that the activity of digestive enzymes in the pancreas and intestine changes in favour of those which break down the nutrient prevailing in the diet (Grossman, Greengard & Ivy, 1943, 1944; Howard & Yudkin, 1963; Ben Abdeljlil & Desnuelle, 1964; and others). The absorptive function also becomes adapted, obviously as a result of adaptation of systems involved in the active transport of nutrients through the intestine (Long, 1953; Lawrie & Yudkin, 1949; and others).