reducing diet. He measured the activity of the soluble NAD-linked α -glycerophosphate dehydrogenase and the mitochondrial cytochrome *c*-linked α -glycerophosphate dehydrogenase in homogenates of the fat. The mean activity of both enzymes had declined significantly to almost half the original activity after 10–15 days on the reducing diet. The two glycerophosphate enzymes working together can shuttle electrons from NAD to cytochrome *c* with a net energy yield of 2 molecules of ATP rather than the 3 molecules of ATP produced by the normal re-oxidation of NADH. Glycerophosphate activity is known to be increased in conditions which favour heat production. This decline in activity on dieting means that the cell will be working more efficiently, producing more ATP from molecules metabolized. This change in adipose tissue in response to diet is in the direction suggested by Kekwick and Palan's hypothesis, and suggests that further investigation of the factors controlling adipose tissue metabolism would help in understanding weight control.

NUTRITION

Many Problems Ahead

from a Correspondent

THE eighth international congress on nutrition was held in Prague between August 28 and September 5. It was the first congress since the formation of the International Union of Nutritional Sciences, and was organized by the union in conjunction with the J. E. Purkyne Czechoslovak Medical Society.

It seems clear that the control of food intake still has to be properly explained. J. Mayer (Harvard School of Public Health), in his paper on the ventromedial glucoreceptor system, gave an account of the recent work of his school on the functioning of the satiety centre in the hypothalamus, including the nature of the lesions caused by gold thioglucose. This research, which may elucidate the role of glucose, was extended further by A. F. Debons (State University of New York, Brooklyn) to try to indicate the function of insulin.

A revealing paper by A. Stunkard, H. Levine and S. Fox (University of Pennsylvania, Philadelphia) reported a study of the activities of the self help group "TOPS" (take off pounds sensibly) which has been so successful in weight control in the United States. TOPS has over 250,000 members, almost all women, organized into 10,000 chapters. A detailed study of twenty-two chapters in one area of Philadelphia revealed that the organization was rather more efficient in securing weight reduction than the outpatient medical centres. The technique of weekly meetings and detailed weight record keeping seems to match the best medical results, but it has not yet been possible to isolate the factors which make the best chapters so effective.

There appears to be increasing evidence that malnutrition in the first few months of life may lead to permanent damage to the brain, primarily due to a reduction in brain cell division. M. Winnick (Cornell Medical School) outlined the evidence for this and others reinforced his position. Population movement to the towns in developing countries leads to a reduction in breast feeding, thus removing the protection

from malnutrition which this affords to babies in the critical period. The implications of this work for aid programmes clearly need careful examination.

The congress showed a tendency to take the term "nutrition" to include the whole of the agricultural sciences and food science and technology as well. One area which was given rather full coverage was communal catering, but the general level of the papers revealed the primitive state of most scientific work connected with catering.

MOLECULAR BIOLOGY

DNA and Polylysine

from our Molecular Biology Correspondent

IN 1966 Leng and Felsenfeld noted that under appropriate conditions poly-L-lysine, which forms complexes with DNA, can discriminate between species rich in AT and those rich in GC, the first being preferentially precipitated out of mixtures. Considering that polyacid-polybase associations are of necessity predominantly coulombic in character, depending as they do on pairing of the charges, this was a remarkable finding, the basis of which was quite obscure. Its importance in terms of interactions between nucleic acid and proteins is evident enough, and its potential application to the fractionation of nucleic acids has also attracted attention. A weighty study of the DNA-polylysine system has now appeared (Shapiro, Leng and Felsenfeld, *Biochemistry*, **8**, 3219; 1969) which sets out to answer some of the questions raised by the earlier work.

Specificity is achieved only at relatively high salt concentrations, at which the interaction is not too strong. Under these circumstances, the interaction is highly cooperative, so that when the DNA is in excess the mixture contains stoichiometric complex and free DNA. Shapiro *et al.* show that effectively complete separation of DNA species of 62 per cent and 42 per cent AT content is easily achieved. The complex sediments rapidly in the centrifuge, and light scattering studies indicate that the particles are of remarkably uniform size, averaging 1700 Å in radius. Moreover, calculations of the mass per particle indicate that they contain some 95 per cent of water. They have no birefringence, and may be visualized as regular coacervates, or micelles.

Complexes form less readily with poly-D,L-lysine than with either the D-polymer or the L-polymer, and this, as well as the optical rotatory properties, argues for a highly ordered structure. The first Cotton effect of the complexes is of opposite sign to that of free DNA, and up to two orders of magnitude bigger. In terms of what is known about the optical activity of the nucleic acids, the most convincing though by no means the only explanation is that the formation of the complex imposes a considerable distortion on the geometry of the DNA helix, involving a change in the tilt of the bases. Here indeed is a possible explanation for the recognition mechanism; whereas the results of X-ray analysis indicate that the structure of helical nucleic acids is essentially independent of composition, it is entirely possible that the energy required to deform the helix is less when the GC content is low. The possibility that the specificity arises in some manner from the relatively accessible methyl groups of thymine