fodder, but the technology of this process is intricate. The product may not, therefore, reach those most in need, but the enterprise that is being shown should promote interest in the growth of micro-organisms on low-protein crops and on by-products such as molasses and straws.

Work on the production of novel proteins is hampered by the indifference or even hostility of

national and international bodies responsible for our food supplies. It will be still further frustrated unless serious effort is put into studies on the presentation and popularization of novel forms of food. This work will call for skill, tact and a broad-minded recognition of the diversity and irrationality of traditional human tastes. It is this aspect of the problem that is now in most need of support.

COMMUNICATIONS*

The Fatty Acid Composition of Adipose and Muscle Tissue in Domestic and Free-Living Ruminants

By M. M. GALE, M. A. CRAWFORD and M. WOODFORD. (*Nuffield Institute of Comparative Medicine, The Zoological Society of London, London N.W.1 and Nuffield Unit of Tropical Animal Ecology, P.O. Queen Elizabeth Park, Lake Katwe, Mweya, Uganda*)

The fatty acid composition of muscle tissue from free-ranging (*Syncerus caffer*) and domestic bovids (*Bos taurus*) differs considerably. In the free-ranging bovids there is a small amount of intramuscular fat, which contains a high proportion of polyenoic fatty acids compared with domestic bovids (Crawford, 1968). We have examined the fatty acid composition of adipose and muscle tissue of samples from free-ranging and domestic ruminants and in both cases the degree of polyunsaturation was greater in muscle than in adipose tissue.

In adipose tissue from domestic bovids the monounsaturated fatty acids dominated, accompanied by small amounts (0.2–2%) of polyenoic fatty acids. In associated muscle tissue there was a greater amount of polyenoic fatty acids, including eicosatetraenoic acid; the total proportion of polyenoic fatty acid was 0.8–6% and, as in the adipose tissue, the monounsaturated fatty acids predominated, in agreement with the findings of Hubbard & Pocklington (1968).

The adipose tissue of the free-ranging ruminant contained about 2–6% of polyenoic fatty acids including octadecadienoate and octadecatrienoate; the saturated and monounsaturated fatty acids predominated. In contrast, the muscle tissue of the free-ranging ruminants contained about 20–40% of polyenoic fatty acids including octadecadienoate, octadecatrienoate, eicosatetraenoate, eicosapentaenoate, docosapentaenoate and docosahexaenoate. The fact that in neither case did the adipose tissue contain significant amounts of polyenoic fatty acids higher than C_{18:3} suggests that the composition of adipose tissue may not reflect the proportions that are available in other tissues.

* Other communications are published in the Proceedings of the Nutrition Society (1969) **28**, No 2.

The wide difference in the adipose- and muscle-tissue fatty acid composition in the free-living animal suggests an efficient separating mechanism for structural lipids (predominantly phospholipid) and adipose depots for energy stores (predominantly triglyceride). The smaller differences between adipose and muscle tissue of domestic animals might be explained on the basis of infiltration of adipose fat, which may represent a biologically abnormal state.

Crawford, M. A. (1968). *Lancet*, i, 1329.

Hubbard, A. W. & Pocklington, W. D. (1968). *J. Sci. Fd Agric.* **19**, 571.

Immunoglobulins in Sow Mammary Secretions throughout Lactation and their significance as Anti-(*Escherichia coli*) Antibodies to the Young Pig

By P. PORTER and D. E. NOAKES. (*Unilever Research Laboratory, Colworth House, Sharnbrook, Bedford*)

Under normal conditions piglets cease to absorb immunoglobulins from the colostrum after the first 24–36 hr. of life (Lecce & Morgan, 1962). The animal does not synthesize any appreciable amount of antibody before the age of 3–4 weeks (Brown, Speer, Quinn, Hays & Catron, 1961; Miller *et al.* 1962) and passively acquired antibody falls to very small amounts in the period 2–3 weeks (Sharpe, 1965; Arbuckle, 1968). It has often been suggested that antibodies in milk play an important role in protecting the young animal against enterobacteria. The protein composition of porcine milk changes rapidly in the early part of lactation (Morgan & Lecce, 1964), but nothing is known of the changes in specific immunoglobulins or their role as antibodies in the alimentary tract of the young pig.

Immunoglobulins G, A and M (IgG, IgA and IgM) were isolated from porcine serum and colostrum and antisera were prepared in rabbits for use as specific reagents for detection and quantitative measurement. The immunoglobulins account for more than