

## PROCEEDINGS OF THE NUTRITION SOCIETY

*The Two Hundred and Forty-second Scientific Meeting (Ninety-sixth Scottish Meeting) was held at the Hannah Research Institute, Ayr, on 10 March 1972*

### SYMPOSIUM ON 'MANIPULATION OF RUMEN FERMENTATION'

#### Chairman's introduction

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The last symposium on digestion in the rumen organized by the Nutrition Society was held in 1959 (*Proc. Nutr. Soc.* (1959), **18**, 97). At that time the major pathways and the main products of fermentation in the rumen had been characterized. There was an awareness of the probable complexity of the inter-relationships between diet, rumen microbial population and fermentation products, and it was recognized that the distinctive features of digestion of the ruminant could have important implications for its metabolism.

The considerable advances within the last decade in our knowledge of the ruminant, and especially of its mammary gland, have been presented at recent scientific meetings. The Nutrition Society in 1968 organized a symposium on 'Digestion in the abomasum and intestine of the ruminant' (*Proc. Nutr. Soc.* (1969), **28**, 110), and a comprehensive survey of recent work on the 'Physiology of Digestion and Metabolism in the Ruminant' was presented at the Third International Symposium held in Cambridge in 1969 (Phillipson, 1970). This was followed in 1970 by an 'International Symposium on Lactation' held as the Seventeenth Easter School in Agricultural Science of the University of Nottingham (Falconer, 1971), which considered the biochemistry and nutrient utilization of the mammary gland and the nutrient requirements for lactation. The picture now emerging is that the pattern of microbial fermentation in the rumen determines not only the composition of materials absorbed from the rumen but also the nature and extent of digestion in the intestine, and that the composition of materials absorbed from the gut profoundly affects metabolism within the physiological body. This has raised the prospect that through manipulation of rumen fermentation it may prove possible to control metabolism and to improve efficiency of food utilization.

The protection of dietary constituents against fermentation has already been widely explored, and ways of specifically inhibiting the production of methane *in vivo* are currently receiving much attention. Both of these topics will be reviewed in the present symposium. A recent observation of especial interest, however, is that of Eadie, Hyldgaard-Jensen, Mann, Reid & Whitelaw (1970). They found that with cattle receiving a diet of barley cubes, when the diet was offered at 80% of the limit of appetite, there was a high proportion of butyric acid in the rumen liquor

and this was associated with a large population of ciliate protozoa. When the diet was given *ad lib.* there was a high proportion of propionic acid associated with a reduction in the number of ciliates and an increase in the bacteroides-type rods and certain curved Gram-negative rods. These observations serve to emphasize the limitations of our present knowledge of events that take place within the rumen and the scope that there may be for inducing a change in microbial population and hence in the nature and extent of fermentation. It is, therefore, timely that the Society should again be holding a symposium on the rumen. Out of today's contributions and discussions may come the stimulus for a much needed, detailed reinvestigation of the complex relationship between diet, rumen flora and fauna, and fermentation products; and for a comprehensive study of the manipulation of rumen fermentation and the metabolic consequences.

## REFERENCES

- Eadie, J. M., Hyldgaard-Jensen, J., Mann, S. O., Reid, R. S. & Whitelaw, F. G. (1970). *Br. J. Nutr.* **24**, 157.
- Falconer, I. R. (editor) (1971). *Lactation*. London: Butterworths.
- Phillipson, A. T. (editor) (1970). *Physiology of Digestion and Metabolism in the Ruminant*. Newcastle upon Tyne: Oriel Press Ltd.