

## Book Reviews

### NUTRITION OF RUMINANTS

*Alimentation des Ruminants. Principes de la Nutrition des Ruminants; Besoins Alimentaires des Animaux, Valeur Nutritive des Aliments.* INRA Publications, Versailles, 1978, 598 pp., 156 tables, 12 photographs in colour, 62 figures of which 4 in colour, FF 140.00, ISBN 340-193-6.

This voluminous book (600 pages) is a thorough compilation by a group of French I.N.R.A. research workers and university teachers, converting results of intensive research into an up-to-date handbook on nutrient requirements and voluntary feed intake in ruminants, and on nutritive value of feed-stuffs. It presents new systems for expressing energy and protein value and requirements, and for quantifying ingestibility of forages. The book also gives a detailed and critical evaluation of the background of these systems, and their transposition into concepts, systems and units that could be used directly for practical purposes. This makes the book of interest to various people: scientists, teachers, and technical staff dealing with ruminant feeding. For use in practice, a small size version is available, containing the main tables and a brief explanation.

The book is written in French, but its accessibility for English reading persons has been facilitated by a separate introduction of 23 pages in that language. It explains the basic principles and derivations, and gives a key to the many tables. This is appropriate, for the documented book is of a high scientific standard and certainly of considerable international interest.

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### TRACE ELEMENT METABOLISM

*Trace Element Metabolism in Man and Animals — 3. Proceedings of the 3rd International Symposium, Freising, Federal Republic of Germany, July 1977.* M. Kirchgessner (General Editor). Institut für Ernährungsphysiologie, Technische Universität München, Freising-Weihestephan, 1978, 678 pp., 220 tables, 135 figs., DM 80.00 (in F.R.G. + 6% M.W.S.T.).

This book consists of the texts of papers presented at the symposium. Contrary to both foregoing symposia, T.E.M.A.-3 was extended to include also the metabolism of trace elements in man. The following topics, each consisting of a number of papers, were presented: biochemical functions, absorption and excretion, distribution, storage and interactions, deficiency and physiological consequences, progress in research with newer trace elements, nutritional and medi-

cal problems in man, genetic disorders, gravidity and lactation, animal nutrition, toxicity and future aspects.

In the introductory paper by Kirchgessner, attention is drawn to the latent suboptimum supply, which is hard to identify.

Though the number of reports directly concerned with the trace element nutrition of farm animals becomes increasingly smaller, the search for different, less expensive, food sources for these animals offers new problems in maintaining a good supply of minerals and preventing deficiencies.

Of particular importance are the papers dealing with future aspects of trace elements. Improved analytical quality control is necessary, together with standardization of methods. Investigations have to be done to determine if some of the 'suspicious' elements are really essential or not. New hazards of toxic elements have to be studied. International and national recommendations and legislation about environmental levels of many elements as well as organic materials will be necessary.

Underwood discussed the future aspects of trace elements research in animal production. Particular attention has to be given to (1) early detection and diagnosis of dietary trace element deficiencies, toxicities and imbalances; (2) chemical forms and biological availability to animals of the trace elements in feeds and forages; (3) quantitative significance of metabolic interactions among the trace elements; (4) nutritional physiology of the newer trace elements such as chromium and arsenic in ruminant animals.

The book gives a lot of information, covering nearly every aspect of trace elements. The latest developments are presented, and already known facts are amplified.

Most of the papers are very clearly written and read well. The addresses of the authors are mentioned in the papers, which gives the possibility of contacting them for more information. As may be expected, details of methods etc. are often lacking, but are mentioned in the references. Results are given in more detail. A list of participants at the symposium and an extended subject index are added.

Nobody will be covering all the subjects mentioned in this book, but, on the other hand, a lot of people working on trace elements will obtain varying amounts of information from one or more of the papers. The book may be recommended, therefore, to everybody working in the field of trace elements — physicians, veterinarians, biochemists, physiologists and livestock scientists.

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