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# Energy Metabolism of Farm Animals

*Edited by*

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# Energy Metabolism of Farm Animals

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## PREFACE

Symposia on energy metabolism in animals have been initiated and sponsored by the European Association for Animal Production. They mark the recent revival of interest and research in a field of physiology, which, after a fruitful period of development about the turn of the century, for several decades was at a standstill. An ignorance of the cellular processes accounting for phenomena and a lack of means for their elucidation were the reasons for poor progress at that time. The brilliant development of biochemistry has now enabled a linking together of classical observations of energy exchanges in animals and molecular reactions at the cellular level.

The first symposium was held in Copenhagen, Denmark, in 1958. It was followed in 1961 by the second in Wageningen, Netherlands, and in 1964 by the third in Troon, Scotland. The proceedings of the fourth symposium, which assembled in September 1967 at Jablonna, Poland, are presented in this volume. All symposia were organized jointly by the local Society of Animal Production and the Research Institute or Laboratory at which the meeting took place. Accordingly the fourth symposium was organized by the Polish Zootechnic Society and the Institute of Animal Physiology and Nutrition, Jablonna.

Problems of methods and techniques of measuring energy exchanges, to which the first symposium was almost entirely devoted, have been considered at all the following ones. Gradually, however, more and more time has been given to the presentation and discussion of new experimental results. Simultaneously the scope of interest has widened, and now ranges from biochemical aspects of energy metabolism to problems of practical feed evaluation. In addition more species of domesticated and even of wild animals, exposed to a variety of conditions and environments have been considered.

Though the symposia were initiated in Europe, efforts have been made throughout the series to include those interested from all parts of the world. In this respect the fourth symposium was particularly successful. It assembled representatives of practically all the centres of research in the subject from five continents and the gathering certainly promoted mutual understanding on a world scale.

At the opening ceremony of the fourth symposium speeches of welcome were made by Professor A. Listowski, Vice-President of the Polish Academy of Sciences and by Professor A. M. Leroy, Honorary President of the European Association. Afterwards a Divertimento by Mozart was played by a string quartette. The following five days were devoted to the presentation of papers and to keen discussions held in a most friend-

ly atmosphere, which after the closing session, continued during excursions to the Mammals Research Institute and the virgin forest at the Polish National Park in Bialowieza.

The papers and the discussions were given in English, French, German and Russian. These have all been translated into English. We are grateful to Mrs. M. Bannerman for editorial assistance.

K.L.B.      J.K.      G.T.

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**Opening statement on the Progress of Studies of Energy Metabolism in Farm Animals in Western Countries and in Comecon countries by Dr. K. L. Blaxter, and Professor K. Nehring's reply.**

**K. L. BLAXTER :**

Some participants at the symposium might think that the views expressed by Professor Nehring and his colleagues from Rostock in pre-circulated papers are diametrically opposed to those we in the United Kingdom have proposed. I would like to clarify this situation. *There is no basic or fundamental difference between the views of the workers in East Germany and those in the West. Indeed there is a basic commonness of approach and finding and I would like to emphasize these common views.* We both recognize that rations for ruminant animals must be evaluated as wholes, that net energy is not a simple additive quantity and that biochemical interpretation of the energy exchanges we observe is possible and profitable. We both recognize that food utilization for maintenance is qualitatively different to that for production and we agree completely that the relationship between energy intake as metabolizable energy and energy retention is linear, a conclusion contrary to much earlier opinion.

There are many other points on which there is absolute agreement and identical points of view. Indeed it can be stated that with the whole of the logical framework of the net energy system which I published in 1962 there is complete agreement. Differences between us lie solely in the realm of practical application. We state:

*That practical application of the net energy principle should take place within this same logical framework of ideas, recognizing that by so doing some simplicity in application may be lost.*

The Rostock workers state:

*That while accepting the logical framework, simplicity of practical approach should have priority particularly because practical people are loth to change. This entails making certain empirical adjustments to the Kellner system, which they recognize to be empirical.*

It would be a great disservice to the whole of the animal industry if it was thought that the Eastern European countries and those in the West were in conflict over matters of scientific and ascertainable fact. It would be a very great service to our many friends in the field of practical agriculture if at this meeting we should emphasize how our very different approaches have converged, that we agree on all the major issues and that any differences between us concern how best to put the information which we have so hardly won to practical use.