the composition of the food consumed and of caloric expenditure. These inferences follow from the fact (*a*) that ketonuria occurred in troops during the testing of a wide variety of rations and (*b*) that ketonuria occurred both when the troops performed hard work and when they did not (as in trials on survival rations). These observations further suggest that depletion of liver glycogen did not occur. What, then, may have been the cause of the ketonuric phenomena? The hypothesis is offered that the curve of per cent ketonuria is an expression of the general adaptation syndrome—i.e., that it represents adaptation to systemic stress (*10*). That cold is the principal stress involved is suggested by the observation that ketonuria is more frequent in cold than in warm climates. Muscular exercise may be a stress involved in some of the trials, for the reduction in ketonuria on exposure to successive trials in which the subjects did work suggests the development of resistance through training. Winkler and Hebeler (*9*) have shown that trained athletes do not develop exercise ketosis. It is also possible that the curve of per cent ketonuria represents the development of a state of crossed resistance (*10*); i.e., adaptation to cold facilitates adaptation to muscular exercise, and vice versa. Furthermore, Selye (*10*) has found that fasting intensifies the alarm reaction produced by many stresses. It may be, therefore, that the inverse relationship between time to maximum per cent ketonuria and caloric balance is an expression of such intensification.

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# *Book Reviews*

***Dating the Past: An Introduction to Geochronology.*** 2nd ed. Frederick E. Zeuner. New York: Longmans, Green, 1951. 474 pp. and 24 plates. $5.50.

This important work, first published by Methuen in 1946, is now available in a new edition, printed in England but bearing an American imprint. Virtually identical with the first edition in number of pages and illustrations, it nevertheless deserves to be called a second edition, for it has been revised with some thoroughness. Several completely new sections (e.g., on radioactive dating of deep-sea cores) have been added; others (such as the paleolithic archaeology of South Africa) have been completely rewritten, and new illustrations and correlation tables substituted for many old ones. It is clear, however, that the revision was accomplished as cheaply as possible—by extensive reprinting from type of the original edition, and by sacrificing perfectly good illustrations in favor of newer but not necessarily better ones. The tempo of research in the subject is partly responsible, along with considerations of economy, for a somewhat scattered treatment: much last-minute information (on radiocarbon dating, the fluorine method, etc.) is included in the Notes rather than in the body of the text, but some of the Notes are reprinted without essential change from the first edition, and others constitute notes on the Notes.

Owners of the first edition will probably not need to buy the new one, but this edition is nevertheless welcome. For those who will now make the book's acquaintance for the first time, a brief appraisal may be necessary. It is, beyond any doubt, an exceedingly useful, interesting work. Professor Zeuner is a tireless bibliographer, and he has covered in a creditable manner the whole enormous range of geochronologic measurement—from tree-ring and varve counting through Pleistocene stratigraphy (with emphasis on paleolithic archaeology) to radioactive estimates of the age of the earth and of the universe. As a sort of annotated bibliography it is invaluable. Even though it does not pretend to be exhaustive, in the field the reviewer knows best (the Pleistocene) there are few references that are pertinent, and hardly any that are significant, that cannot be found by means of this book and the sources it cites.

In other respects, however, the book is not entirely satisfactory. Complete objectivity in reporting so large and controversial a field is probably not attainable, or even desirable, for, where facts are subject to diametrically opposed interpretations, impartiality can mean only dullness and lack of critical acumen. Zeuner's treatment is by no means impartial, but the reviewer is aware that his dislike of some things in the book arises less from its partisanship than from a belief that the partisanship is mistaken. Hence, while *Dating the Past,* like its companion volume *The Pleistocene Period* (London: Bernard Quaritch [1945]), is full of special pleading, it seems a little unfair to condemn it, as an earlier reviewer did, as "a sustained exercise in special pleading." Our knowledge of Pleistocene stratigraphy is so wretchedly inadequate that any attempt to organize it into a con-

sistent picture is bound to look like special pleading to people on the opposite side of the fence.

The uninformed reader may wonder what this is all about. Briefly, Zeuner is an avowed partisan of the "radiation curve" of Milankovitch as a basis for dating Pleistocene events. This curve purports to be a calculation, for any time in the past 600,000 years, of the intensity of solar radiation reaching the upper atmosphere at particular latitudes; its basis is purely astronomic, i.e., the cyclic variations in the relation between earth and sun. The effect on the earth's climate of variations in solar radiation is almost entirely unknown—there are theories aplenty, but few facts. The only empirical evidence that the Pleistocene ice sheets waxed and waned, and that deserts were alternately moist and dry, in rhythm with Milankovitch's curve, is the sequence that Zeuner and a few others think they discern in Pleistocene deposits, particularly river terraces in central Europe. This is a sequence implying not only four glacial ages, recognized by nearly all geologists, but a bipartite character for the first three and a tripartite division of the last glacial age. Evidence for the nine-part, as opposed to the four-part sequence, is totally inadequate, and the radiation curve in Professor Zeuner's hands bears all the signs of a bed of Procrustes.

It would not be profitable, however, to list the many instances in which Professor Zeuner has obviously selected the facts to fit his theory. All of us in science ride our hobbies to some extent, and if he has done so more than most, he has also produced a book that is more than usually interesting, and whose reference value is immense. With a *caveat emptor* that its chief users will probably find unnecessary, *Dating the Past* is warmly recommended.

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***Die Theoretischen Grundlagen der Analytischen Chemie.*** Gunnar Hägg; German translation by Hans Baumann. Basel, Switz.: Verlag Birkhäuser, 1950. 197 pp. Sw. fr. 18. paper; 22. bound.

Gunnar Hägg, professor of chemistry at the University of Upsala, discusses in this small, lucid book some theoretical aspects of analytical chemistry from an elementary viewpoint. As stated in the preface, the book was designed to fill the gap in the Swedish textbook literature in introductory courses in analytical chemistry. This translation is based on the fourth Swedish edition, which, according to the author, differs only little from the first edition of 1940. The book is by no means as comprehensive as its title implies, almost half of it being devoted to acid-base equilibria discussed from the Brønsted point of view. The remainder of the text deals primarily with precipitation reactions (including a chapter on colloids, adsorption, and ion exchange) and oxidation-reduction reactions. Such modern favorites as colorimetry, spectrophotometry, and polarography are not mentioned.

This reviewer found it particularly interesting that the author made special mention of his reliance on the Brønsted acid-base theory and that he found the use of these concepts pedagogically advantageous—a conclusion with which many of his American colleagues will agree. The consistent use of this concept is partly responsible for the unusual clarity and coherence of the book. Some mention should also be made of the log-log diagrams which are liberally used to demonstrate clearly the properties and meanings of mass action equations. The text has been carefully edited and well translated, and is relatively free from errors. The most serious one is probably the statement (p. 27) that ammonia is more strongly held by ion-dipole forces than water.

The book is reminiscent of a number of American texts on the freshman and sophomore level, particularly those dealing with principles of chemistry, although it is more elaborate than most with respect to acid base equilibria. Typically, analytical problems are discussed only in the last few chapters and there primarily for the purpose of illustrating principles.

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# *Scientific Book Register*

***Fossil Mammals of Africa: The Miocene Hominoidea of East Africa,*** No. 1. W. E. Le Gros Clark and L. S. B. Leakey. London: British Museum (Natural History), 1951. 117 pp. and 9 plates. £1 15/s.

***Organization and Pathology of Thought: Selected Sources.*** Trans. and commentary by David Rapaport. New York: Columbia Univ. Press, 1951. 786 pp. $10.00.

***Culture Worlds.*** Richard Joel Russell and Fred Bowerman Kniffen. New York: Macmillan, 1951. 620 pp. $6.00.

***Bernhard Eduard Fernow: A Story of North American Forestry.*** Andrew Denny Rodgers III. Princeton, N. J.: Princeton Univ. Press, 1951. 623 pp. $7.50.

***The Origin of the Earth.*** W. M. Smart. New York: Cambridge Univ. Press, 1951. 239 pp. $2.75.

***The Structure of Human Abilities.*** Philip E. Vernon. London: Methuen; New York: Wiley, 1950. 160 pp. $2.75.

***Silicate Melt Equilibria.*** Rev. ed. Wilhelm Eitel; translated from the German by J. G. Phillips and T. G. Madgwick with collaboration of R. B. Sosman. New Brunswick, N. J.: Rutgers Univ. Press, 1951. 159 pp. $5.00.

***The New Physics: Talks on Aspects of Science.*** Sir C. V. Raman. New York: Philosophical Library, 1951. 144 pp. $3.75.

***A Source Book in Animal Biology.*** Thomas S. Hall. New York-London: McGraw-Hill, 1951. 716 pp. $10.00

***Ruwenzori Expedition 1934–5: Muscidae,*** Vol. II, No. 6. F. I. Van Emden. London, England: British Museum (Natural History), 1951. Pp. 325–710, 10 plates. £2 5/s.

***Is Another World Watching?—The Riddle of the Flying Saucers.*** Gerald Heard. New York: Harper, 1951. 183 pp. $2.75.