more generous use of italics. Mr. Rutherford is apt to express himself with no uncertain sound against the interminable drawl of less gifted investigators. Nevertheless, the subject of radioactivity, which is now in the glare of the footlights, may not be there indefinitely, and a more liberal variegation of the text for the benefit of the lazy reader, may not in any case be an unreasonable condescension.

To have produced a fresh book, broad in scope and accurate in its statements, on a subject which has now for years been the chief topic of animated discussion in the physical and other magazines, is Mr. Rutherford's great merit in this work, quite apart from its character as a summary of original investigation.

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Die Ernahrung der landwirtschaftlichen Nutztiere. Von Dr. O. Kellner, Geh. Hofrat und Professor, Vorstand der Kgl. landw. Versuchstation Möckern. Berlin, Paul Parey. 1905. 8vo. Pp. viii + 594. Cloth. Price 13 Marks.

Notwithstanding the vast amount of investigation upon stock-feeding problems which has been carried on during the last forty years in the experiment stations of Germany and later of the United States as well as to a certain extent elsewhere, it is unfortunately true that the theoretical basis of the subject has shown relatively little advancement since Henneberg's earlier researches in the sixties. We still, as then, reckon largely with the so-called 'digestible nutrients' (protein, carbohydrates and fat) and still assume that their amount measures, at least approximately, the nutritive value of feeding stuffs. True, we have had an uneasy consciousness for some time that this was far from being strictly correct, but in the absence of any better method of comparison we have rather blinked the fact and each writer has followed in the footsteps of his predecessor with, perhaps, the addition, of late years, of some more or less critical statements regarding energy values.

Dr. Kellner's book marks a new departure in the literature of the subject. Its well-known author was the first to suggest, in the year 1880, in connection with investigations upon the nutrition of working horses, that the values of different feeding stuffs might be compared upon the basis of their content of potential energy. Within a comparatively few years thereafter the study of the food as a source of energy to the animal organism was systematically taken up by Rubner and the foundations of the subject were laid. Since then a large amount of investigation upon the nutrition of carnivorous animals and of man has been executed in which Rubner's work has furnished the guiding idea. As regards the nutrition of domestic herbivorous animals, however, scarcely any investigations had been made from this standpoint when, in 1893, Dr. Kellner was called to the directorship of the Möckern Experiment Station. There he at once took up the subject, his first results and an outline of his methods being published in 1896. Since that time the work has been carried forward vigorously under his direction and most important results have been secured.

The present book embodies the results of Kellner's investigations, including many that have as yet been published only in abstract, but covers a much broader field than a mere compendium of this work and is an attempt to treat the subject of stock feeding systematically from the new standpoint. The book is divided into three parts. Part I. treats of the composition, digestibility and utilization of feeding stuffs, containing chapters upon the constituents of feeding stuffs, the digestibility of the feed, the utilization of the digested materials in the animal body, the metabolism of matter and energy under various conditions and the influence of muscular work on metabolism. Part II. treats of feeding stuffs, covering such subjects as methods of harvesting and preserving, the preparation of feeding stuffs and a somewhat detailed description of the different feeds. Part III. treats of the feeding of farm animals under the conditions of agricultural practise, including maintenance feeding, the fattening of mature animals, the feeding of working animals, the feeding of

growing animals and the feeding of milking animals.

Part I., and especially the chapters upon metabolism, will be of much interest to the student of nutrition in general, but the special value of the book is found in Part III., in which is made the first serious attempt to apply the more recent knowledge regarding the energy relations of feeding stuffs to practical use. It abandons definitely the assumption which has underlain nearly all previous works of this character that the digestible nutrients, so-called, of a feeding stuff are a measure of its value. In place of this, Kellner puts the actual productive value as worked out by his own investigations and which is shown to differ very widely in many cases from the indications given by the digestible nutrients. While he does not fail to point out that the basis for an undertaking of this sort is still somewhat narrow, yet he believes that the time is ripe for a beginning. He has accordingly, in the appendix, given a series of tables in which the productive value of feeding stuffs is estimated, largely upon the basis of his own results, while the so-called feeding standards are also expressed upon the same basis.

While it is, perhaps, to be regretted that the author has expressed his feeding values in the form of starch equivalents instead of boldly adopting the terminology of energy, and while it can not be denied that his tables are based to a considerable degree upon estimates, nevertheless the book promises to mark a distinct stage of development in the theory of stock feeding and will be welcomed by the large number of those who have become dissatisfied with the present conventional methods in this subject.

H. P. ARMSBY.

SCIENTIFIC JOURNALS AND ARTICLES.

THE contents of the *American Journal of Mathematics* are as follows:

ALEXANDER CHESSIN: 'On a Class of Differential Equations.'

L. P. EISENHART: 'Surfaces with the Same Spherical Representation of their Lines of Curvature as Pseudospherical Surfaces.'

VIRGIL SNYDER: 'On the Forms of Sextic Scrolls having no Rectilinear Directrix.'

LEONARD EUGENE DICKSON: 'Determination of the Ternary Modular Groups.'

THE April issue of the *Journal of Nervous and Mental Disease* opens with a paper by Dr. William P. Spratling and Dr. Roswell Park, on 'Bilateral Sympathectomy for the Relief of Epilepsy,' with report of three cases, and notes on the physiologic effects of cutting the sympathetic, and on the histologic changes found in the cases in question. The microscopical findings are illustrated by two plates. Dr. F. W. Langdon follows with a paper on myelomalacia, with especial reference to diagnosis and treatment, illustrated by charts, and Dr. Arthur Conklin Brush discusses the medico-legal aspects of traumatic epilepsy. The Society Proceedings reported this month include the meeting of the Boston Society of Psychiatry and Neurology held November 17, 1904, and that of the Chicago Neurological Society of the same date.

SOCIETIES AND ACADEMIES.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

THE 166th meeting was held on March 22. The regular program included:

The Coal Measures of Brazil: Dr. I. C. WHITE.

Dr. White discussed the character and distribution of the coal-bearing beds of southern Brazil. The series consists of coarse conglomerates, and gray sandstones at the base, alternating with blue and gray shales up to 350 to 400 feet above the granite upon which the measures rest in the states of Santa Catharina and Rio Grande do Sul, where his principal studies were prosecuted during the past year. Above these basal sandstones, the coal beds occur three to four in number through a thickness of 200–250 feet of alternating gray sandstones, clays and shales. There are two principal coals, the 'Bonita' bed at the base, and the 'Barro Branco' near the top of the coal series. The coal is high in both ash and sulphur, but can be used successfully for locomotives, stationary boilers, etc., in a region where imported coal costs not less than $10 per ton at the seacoast.