

oms, is to the west of Manzanilla Bay; a third, to the southeast of Acapulco, has about the same depth, and a fourth, with 2,500 fathoms, is off San Jose, Guatemala. Our last sounding off Acapulco about 29 miles south of the lighthouse, in 2,494 fathoms, showed the western extension of one of these deep holes to the east of Acapulco. These basins off the west coast, close to the shore at the foot of a steep continental slope, are in great contrast to the wide continental shelves which characterize the east coast of Central America and the east coast of the United States.

The collections made during the present expedition will give ample material for extensive monographs on the holothurians, the siliceous sponges, the cephalopods, the jelly-fishes, the pelagic crustaceans, worms and fishes of the eastern Pacific, as well as on the bottom deposits and on the radiolarians and dinoflagellates, diatoms, and other protozoans collected by the tow nets. Small collections of plants were made at Easter Island and Manga Reva which may throw some light on the origin and distribution of the flora of the eastern Pacific.

SCIENTIFIC BOOKS.

Radioactivity. By E. RUTHERFORD, D.Sc., F.R.S., R.R.S.C., MacDonald Professor of Physics, McGill University, Montreal; Cambridge Physical Series. Cambridge, University Press, 1904.

Within recent years books dealing specifically with radioactivity or the cathode rays have naturally not been infrequent. Beginning with the pioneering treatise of Stark ('*Elektricität in Gasen*,' 1902), Madam Curie's account of radioactive substances, Villard's '*rayons cathodiques*,' G. C. Schmidt's '*Kathodenstrahlen*' (1904), Besson and D'Arsonval's '*Le radium*' (1904), Blondlot's '*rayons N*' (1904) and others, have followed in quick succession. But Mr. Rutherford's book is on quite a different scale from most of these, and written in a way that betrays consummate

mastery of the subject. One would have been grateful if he had given us merely a systematic account of his own researches. The book before us does much more than this, presenting a readable and most painstaking digest of the subject as a whole, or at least of that splendid part of it which owes its development chiefly to English genius.

In the introductory part separate chapters are devoted to radioactive substances, to the theory of ionization, and to methods of measurement. Then comes a long account of the nature of the radiations. The sharply articulated descriptions which follow, and the suggestions lavishly offered for the completion of most of them, are a feature of the book here and in succeeding chapters. The short account of the rate of emission of energy is absorbingly interesting, and would be startling if our expectation were not blunted by the expressions of astonishment so much in vogue in connection with this subject. In the chapter on radioactive matter, Mr. Rutherford develops the important principle that the activity of a product at any time is proportional to the number of atoms which remain unchanged at that time, a subject to which he has himself so prolifically contributed. This is supplemented by a long chapter on radioactive emanations, giving a succinct account of the work for which the Rumford medal of the Royal Society was recently awarded.

The interesting phenomenon of excited radioactivity, of which Rutherford shares the honor of discovery with the Curies, is next discussed in detail and leads naturally to the final résumé on radioactive processes, in which the full theory of atomic disintegration is developed. The consequences of this theory have been brilliantly substantiated, even in the more recent papers which Rutherford contributed to the congress at St. Louis and elsewhere. At the end of the chapter is a summary of the present state of our knowledge of the age of the sun and of the earth. The book closes with an account of the radioactivity of ordinary materials.

We have noticed but few misprints: p. 55, *m* for *u*; p. 265, *t* for *n*; p. 336, omission of *dt*. We should have been grateful, however, for a

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 concession.

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 Ernährung 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