

and Northumberland Coalfield contain some revisions of genera, and several new forms are mentioned. May we suggest that the printing of the titles of such papers on the cover of the "Summary of Progress" would do much to bring the publication into line with the convenient bulletins of the United States Geological Survey?
G. A. J. C.

Comparative Ethnographical Studies, 5: Deductions suggested by the Geographical Distribution of some Post-Columbian Words used by the Indians of S. America. By Erland Nordenskiöld. Pp. xiv+176. (London: Oxford University Press, 1922.) 18s. 6d. net.

THE fifth volume of Baron Nordenskiöld's valuable series of Comparative Ethnographical Studies deals with the distribution of words used by the Indians for certain post-Columbian elements in their culture—the domestic fowl, horses and cattle, the banana, iron, firearms, scissors—and certain partly post-Columbian elements—European knives, needles, and fish-hooks. Of these words some are of Spanish or Portuguese derivation, others are of native invention and are onomatopœic, as sometimes for the fowl, or purely descriptive.

The author's main interest lies in the historical deductions to be drawn from the distribution of these words. It affords clear evidence, not only of the course of the diffusion of culture, but also of trade routes and of tribal migrations. In many instances, confirmation is afforded by comparison with the accounts of the early chroniclers. It is interesting to note that European culture elements had reached the Aymara and Quichua from the East before Pizarro came into contact with them from the West. This valuable contribution to the history of the Indians of South America in post-Columbian times will cause students of South American civilisation to look forward with eager anticipation to the author's promised study of pre-Columbian culture on similar lines.

The Industrial Applications of X-rays. By P. H. S. Kempton. (Pitman's Technical Primers.) Pp. xiii+112. (London: Sir Isaac Pitman and Sons, Ltd., 1922.) 2s. 6d. net.

MR. KEMPTON'S little book gives a good introduction to "radiomateriology," that is, to the examination of materials by means of X-rays. The art has made great strides since the War, and, by means of the powerful high voltage apparatus now employed, steel forgings and castings several inches thick can be satisfactorily tested. Examination by X-rays is of particular value for detecting flaws in metallic products and for examining welds and joints made by brazing or soldering. It is also specially useful for examining timber, reinforced concrete, electrical insulating materials, and precious stones. The author describes the apparatus used in industrial radiology and gives interesting radiographs. Complete installations for the X-ray examination of materials are described, and due stress is laid on the importance of protective screens and safety devices. In the table of spark-gap voltages given, it is interesting to note that for a given spark-gap the disruptive voltage increases with the size of

the spherical electrodes up to a certain value and then diminishes for larger electrodes. This is in accordance with theory.

Inca Land: Explorations in the Highlands of Peru. By Hiram Bingham. Pp. xvi+365+45 plates. (London: Constable and Co., Ltd., 1922.) 24s. net.

IN this volume Prof. Bingham describes a part of the work accomplished by the four expeditions of Yale University and the National Geographical Society to Peru between the years 1909 and 1915. Where so much is new and of absorbing interest it is difficult to select any one discovery as outstanding; although in archæology most will, no doubt, agree that the exploration of the ruins of Machu Picchu has been the most important in its results. This site, with its magnificent and, in some respects, unique architectural remains, is held by the author to be probably the Tampu Tocco to which the pre-Inca people, the Amautas, retired when the country was invaded from the south about A.D. 800, and from which the first Inca, Manco Ccapac, began to extend his Empire about A.D. 1300. Fascinating, too, is the story of the search for Uiticos, the lost stronghold of Tupac Amaru, the last of the Incas, defeated and killed by the Spaniards in 1572, and for the "white rock over a spring of water," the site of the Temple of the Sun burnt by two zealous Spanish friars in 1568. The results obtained by these expeditions were little short of remarkable, and have added enormously to our knowledge of the geography, archæology, and natural history of the country.

Laboratory Manual of Physical Chemistry. By Prof. Albert W. Davison and Prof. Henry S. van Klooster. Pp. viii+182+32 pages of sectional paper. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1923.) 10s. net.

THIS "Laboratory Manual of Physical Chemistry" covers only twenty-four experiments, but these are set out in detail with full references to the literature. An ample supply of blank pages is provided, together with ruled spaces for filling in experimental data; tables of atomic weights, densities, vapour-pressures, and refractive indices are also given, with logarithm-tables and a sufficient supply of squared and triangulated paper to provide for the whole of the experiments suggested. The manual, therefore, becomes the student's note-book as well as his text-book, and will enable him to place his own results on his bookshelf in a more orderly manner than is usual.

Causes and Consequences. By Sir Bampfylde Fuller. Pp. x+291. (London: J. Murray, 1923.) 12s. net.

THE author of this book discourses on many things, indeed, on all things which concern science and philosophy, with an easy-flowing style and irresponsible dogmatism. His description of insects as "brainless animals" has already evoked a lengthy correspondence in the Press, and he might easily be called to account for a hundred other equally confident and artlessly simple-minded statements. Thus, for example, he tells us "it seems clear that some of the theories connected with the name of Professor Einstein are based upon a confusion of time and space with rhythm."