considerably lower record, more than a third lower, belonged to another institution.

It seems only fair to Bowdoin College, and especially to its professor of biology, to publish this correction of an unfortunate oversight. W. LECONTE STEVENS

LEXINGTON, VA.,
January 31, 1914

SCIENTIFIC BOOKS

Chippewa Music. II. By FRANCES DENSMORE. Smithsonian Institution. Bureau of American Ethnology. Bulletin 53. 1913. Pp. 314. 51 illustrations. 180 songs. 14 tables giving "melodic analysis of 340 songs." 7 tables of "rhythmic analysis" and a table giving "comparison of metric unit of voice and drum."

Bulletin 53 together with bulletin 47 (1910) are devoted to Miss Densmore's study of Chippewa music begun in 1907 and brought to a close in the present volume. In this bulletin the author presents the results of six years of labor, gathering songs from the Chippewa in their native environment and making careful studies of the songs themselves. By these means she has sought to answer three questions: What do the Chippewas sing? How do they sing? Why do they sing? The answers to the first two are presented in a clear, painstaking manner and in such form as to make them conveniently serviceable for comparative study. The third question is concerned with the psychological aspects of Indian song and consequently its answer could not easily be formulated in the same manner as those relating to the other two questions, nevertheless the author has recorded her observations on this point among the Chippewa. Truthfulness and earnestness of purpose characterize this book as well as an appreciation of the people from whom the material was secured. The work has a special value to the student of musical development and presents points of interest to the ethnologist. The Bureau of American Ethnology is to be congratulated upon its entrance into an important field and particularly upon its selection of so able and scholarly an investigator as Miss Densmore to conduct this difficult line of research.

An ample index adds to the usefulness and pleasure of the book. ALICE C. FLETCHER

Fosseis Devonianos Do Paraná. Pelo DR. JOHN M. CLARKE. Monographias do Servico Geologico E Mineralogico do Brasil. Vol. I., Rio de Janeiro. 1913. Pp. xx + 353; pl. I.–XXVII.

A monograph upon the Devonian of the state of Paraná, Brazil, which has been published recently by the Geological Survey of that country, constitutes a notable contribution to our knowledge of the geology of South America. The author of the work is Dr. John M. Clarke, the accomplished state geologist of New York. Long an investigator of the Devonian of that state, he has recently issued a number of monographs upon strata of the same age in both North and South America, including works upon the Lower Devonian of the Gaspé region, Canada, and upon the Devonian of the State of Pará, Brazil. To these he has now added this important monograph upon the Devonian of Paraná.

The volume consists of two parts. The first part comprises a discussion of the character and significance of the Devonian faunas of the region studied, while the second is devoted to a description of the species, with critical comments upon their relations to those of other areas.

The Devonian of America presents two broadly conceived types: a northern or boreal, confined chiefly to North America and the region north of the Amazon, and a southern or austral type. Dr. Clarke shows that the Devonian sediments found in South America, from central Brazil southward, contain an austral fauna. The latter, which differs from the boreal fauna in many respects, is a unit throughout its range, having definite and recognizable characteristics wherever found.

While the work before us is entitled a discussion of the Devonian Fossils of Paraná it is in reality a monograph upon the austral Devonian of the whole of South America. The author gives a critical discussion of the

strata and fauna of this facies not only in Paraná, but also in the state of Matto Grosso, Brazil, Bolivia, Argentina and the Falkland Islands. The work hence possesses a wide scope.

The stratigraphic succession in Paraná is as follows, in descending order: Tibagy sandstone, Ponta Grossa shales, Furnas sandstone. The strata are underlain by an ancient, crystalline complex, and are overlain by Permo-Carboniferous deposits containing glacial till. A very interesting member of this series is the barren, basal Furnas sandstone, which appears to be paralleled by a similar sandstone situated at the base of the Devonian in Bolivia and Argentina. It overlies, at different places, ancient crystallines, Cambrian and Silurian strata, and hence seems to indicate a widespread transgression of the sea in South America at the beginning of Devonian time.

The austral fauna is believed by Dr. Clarke to be of Lower Devonian age, and is considered by him to have sprung from a boreal Silurian ancestry, owing its peculiarities to its development in isolation in southern waters.

One of the most notable aspects of the discussion is the fact, brought out with great clearness, that the American austral Devonian fauna finds its nearest relative in the Bokkeveld fauna of the same age in South Africa. Indeed the species of the Falkland Islands are more closely akin to those of South Africa than they are to those of the state of Paraná.

These relations lead to an interesting reconstruction of the lands and continents of Devonian time. The existence of a more or less intimate connection between Africa and South America had been foreshadowed with greater or less clearness by various writers. The author suggests that an Antarctic continent existed at that time, whose strand stretched from South Africa to the Falkland Islands and thence north into Chile and Argentina, along which the austral species migrated. A large island situated near the present state of Paraná was separated from the Antarctic continent by a comparatively narrow waterway.

A northern land mass embraced the northern part of South America and a large area on the site of the present North American continent. A land bridge is believed to have extended across the north Atlantic ocean, uniting North America and Europe, its existence being indicated by the close relation of the early Devonian faunas of Maine to those of the Coblentz district on the Rhine. It is thought probable that the center of dispersion of the austral species was located in central Africa. The division of the Lower Devonian faunas into a boreal and austral facies and their geographic distribution are explained by these facts.

The larger part of the monograph is devoted to a description and critical discussion of the species constituting the austral Devonian fauna of South America and a consideration of their relations to those of South Africa.

Illuminating comments are made upon the distinguishing characteristics of the austral types in connection with the discussion of the leading groups, the treatment of the characteristics of the trilobites being especially valuable.

The work is published in the English and Spanish languages in parallel columns. Its illustrations are of a high order of excellence. The monograph is a notable contribution to our knowledge of the geology of South America and is a credit both to the author and to the Geological Survey of Brazil.

Charles K. Swartz

Baltimore, Md.

Special Articles

A New Cytological Staining Method

During the course of an investigation on spireme formation and chromosome number in the pollen-mother cells of various species of *Lilium* and *Nicotiana,* considerable time was expended in testing and experimenting with stains and staining processes. In plants such as *Nicotiana,* where the chromosomes are small and the characteristic number is large (48) (24), it is desirable, especially in certain phases of the maturation phenomena, to have a stain combination which will differentiate