

The third chapter is an illuminating discussion of the skeleton of reptiles, in which the principal elements are not only fully described, but illustrated by the author's drawings.

The chapter on the Age of Reptiles contains a chart showing the range in time of the various reptilian suborders, beginning with the Carboniferous. Each important horizon is taken up in turn and the character of the sedimentation and location of the chief exposures discussed. This section is illustrated by Williston's restorations of various Permian-Carboniferous reptiles.

All this is by way of preparation for the main theme of the book—that of the adaptation of reptiles to aquatic life—and the fifth chapter discusses the problem in general, with the principal structural changes which water-living brings about, comparing the reptiles in their modification with other important aquatic types. Then in regular sequence the water-inhabiting orders are discussed: the *Sauropterygia*, *Lystrisaurus* among the *Anomodontia*, the *Ichthyosauria* in which the summit of aquatic adaptation is reached, *Mesosaurus* of the *Proganosauria*, *Pleurosaurus* of the *Protosauria*, many of the *Squamata*, especially the marine iguana *Amblyrhynchus* of the Galapagos Islands, and the *Agailosaurs* and *Mosasurs*, our knowledge of the last named being largely due to the author's own researches.

Another chapter treats of the *Thalattosauria* recently described by Dr. J. C. Merriam, while the *Rhynchocephalia* are represented by *Champsosaurus*. Crocodile-like forms are included under two orders, *Parasuchia* and *Crocodylia*, *Geosaurus*, an Upper Jurassic crocodile, going to the extreme and developing an ichthyosaur-like tail for swimming. The final chapter treats of the *Chelonia*, the most sharply distinguished order of reptiles and the one which had the most uniformly continuous and uneventful history from the Triassic to the present time.

This book is a thoughtful exposition of the entire subject from a master hand, and while necessarily technical in part, is written in

such a style as to be eminently readable. It departs from the great majority of popular books of "ancient monsters" because it is written by one who has a world-wide reputation as an authority on the subject of which he treats.

In view of the success of the present volume and of the preceding "*American Permian Vertebrates*," Williston's announced volume on the evolution of the reptiles is anxiously awaited.

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Festschrift Max Bauer zum siebzigsten Geburtstag gewidmet. Edited by R. BRAUNS. Stuttgart, E. Schweizerbartsche Verlagsbuchhandlung, 1914. Pp. viii + 568, portrait, 32 plates and 47 text-figures; *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*, Beilage Band XXXIX.

As a richly deserved and most fitting tribute of regard and esteem to a scientist of distinguished merit, the recent issue of a supplementary volume of the "*Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*," in honor of the seventieth anniversary of the birth of Herrn Geheimrath Professor Dr. Max Bauer, founder of the Mineralogical Institute of the University of Marburg, enlists the sympathies of all interested in scientific progress, more especially in the domain of mineralogy. This handsome octavo volume extends to nearly 600 pages, and is embellished with an excellent likeness of Professor Bauer, as well as with 32 well-executed plates and 47 text-figures illustrating the subject-matter of the various articles. The dedication from his friends, co-workers and students gives warm expression to their appreciation of his services in the cause of science.

Of the many valuable papers in this testimonial "*Festschrift*" we can do little more than cite the titles or indicate the subject-matter. Professor Alfred Bergeot, of Königsberg, treats of the structure of the manganese deposits at Meggen-an-der-Lenne, and emphasizes their value in a determination of the geological formation of this region (pp. 1-63);

Dr. R. Brauns studies the scapolite-bearing eruptive rocks in the lake region of Laach (pp. 79-125). A full and interesting paper on the discovery of a small crystal-grotto in pegmatitic granite of Wildenau, Saxon Vogtland (pp. 126-185, 5 plates and 4 figs.), is contributed by Dr. Ross Bruno. A study, with analyses of the basalts of Marburg, is offered by Professor Arthur Schwantke (pp. 531-567, 8 plates and 5 figs.), and one on the origin of talc deposits by Professor C. Doelter of Vienna (pp. 521-530). Much interesting information as to the nephrite of Harzburg is supplied by Dr. J. Uhlig, of Bonn.

There is also a paper on the monazite of Dattas, Diamantina, State of Minas Geraes, Brazil, by Dr. K. Busz (pp. 482-499); the methods employed for investigating the molecular structure of silicate solutions are treated of by Dr. H. E. Boeke (pp. 64-78) and a brief account of a polishing apparatus for crystal planes is given by Dr. Victor Goldschmidt, of Heidelberg (pp. 186-192). This is followed by a paper on an instance of the deposition of sodium in contact-metamorphism at Lange-sundsfjord, Norway, by V. M. Goldschmidt, of Kristiania (pp. 193-224), and a study of certain aspects of monohydrate lithium-sulphates, by Dr. A. Johnsen (pp. 500-520). The *elæolite*-*syenite*-*laccolite* of the Sierra de Monachique in southern Portugal is the subject chosen by Dr. Erich Keiser, of Giessen (pp. 225-267, with geological sketch map on Plate XII); Dr. Eduard Raphael Liesegang treats of *pseudoclas*e (pp. 268-276); the nomenclature of crystal forms is studied by Dr. L. Milch (pp. 277-289), and a paper on the *granites* of the Carpathians is contributed by Dr. J. Morozewicz (pp. 290-345).

In his account of the tin deposits of Tasmania (pp. 346-387) Dr. Fritz Noething expresses the opinion that these deposits are either entirely or in great part of marine, not of fluvial origin. This paper is followed by one on colloidal silicates by Dr. F. Rinne (pp. 388-414). Besides his study of the nephrite of Harzburg, Dr. J. Uhlig reports on a diopside with manganese from the same region (pp. 446-449). Less strictly scientific, but extremely interesting as a contribution to

the historic description of a celebrated volcano, is the paper by Dr. K. Sapper on the "Hell of Masaya," presenting a synopsis of the accounts of this Nicaraguan volcano given by the early Spanish visitors to this region, several of whom ascended to the mouth of the crater, beginning with the ascent made in 1529 by Gonzalo Fernandez de Oviedo y Valdés.

The mere recital of the many subjects treated of in this volume is a sufficient indication of its wide range and of the variety and value of its contents, rendering it an important contribution to mineralogical science.

The birthplace of Professor Bauer was the village of Gnadenthal, near Schwabisch-Hall, in Wurtemberg; at the date of his birth, September 13, 1844, his father was the pastor of the community. Two years later, Pastor Bauer was transferred to Aalau and then to Kunzelsau and Weinberg; in this last-named place he was acting as "superintendent" at the time of his death in 1872.¹

Max Hermann Bauer was the eldest of eight children, six of whom still survive. In 1859, when fifteen years old, he entered the Polytechnic school in Stuttgart, where he devoted himself to the study of mining engineering and metallurgy, his interest in this latter branch having been awakened by frequent visits to the large iron foundries and mines of Wasseraufingen quite near Aalau, with whose officials his parents were well acquainted. However, the question soon arose whether this field would offer sufficient guarantees for the future in the case of one without private fortune. Of the extremely conservative ideas prevailing in his immediate neighborhood Dr. Bauer writes: "In my native place at that time people usually felt themselves confined to the narrow limits of their birthplace; the idea of seeking elsewhere the more favorable opportunities lacking there, was regarded as eccentric."

Hence the young student, after successfully passing his examination in the Stuttgart Polytechnicum in 1862, turned his attention more especially to mathematics and the natural sciences, which he pursued from 1863 to 1865 at

¹ These autobiographical details were very kindly furnished to me by Professor Bauer.

the University of Tübingen, with the intention of qualifying himself for instruction. When this course was completed, he became an instructor, successively, in several Realschulen in Wurtemberg. His services in this capacity were so highly appreciated that the government sent him to Paris in 1867 to perfect himself in the French language.

However, his growing interest in mineralogy and geology gradually induced him to devote more and more of his time to these studies, and the doctor's degree was awarded him by Tübingen University for a dissertation entitled: "Die Braunsteingänge von Neuenberg." Another period of study in Tübingen in 1868 enabled him to profit by the instruction of Professor Eduard Reusch, an authority on crystallography, and for a time Dr. Bauer confined himself essentially to this science, while not neglecting geology and paleontology. Some of the results of his crystallographic investigations were presented in his first treatise, on mica, issued in 1869, while a number of articles on geology and paleontology as well as his participation for a score of years in the preparation of the special geological map of Prussia, on a scale of 1:25,000, showed his proficiency in these sciences.

The autumn of 1868 found Dr. Bauer in Berlin pursuing a course of study in the mineralogical institute there under the direction of Gustav Rose. The outbreak of the Franco-Prussian War in July, 1870, interrupted these studies, as Dr. Bauer volunteered in defence of his Fatherland. After the termination of this war he was active for a time in Munich and then again in Tübingen, proceeding thence to Göttingen, where he became privat docent of mineralogy and geology. In 1872 he occupied a similar position in Berlin University, also becoming first assistant in the mineralogical institute. From Berlin, in 1875, he was called to the University of Königsberg as ordinary professor of mineralogy and geology. These studies had for a time been somewhat neglected in this university, and there was a sad lack of instruments, books and specimens; not a single fossil was to be seen. This condition of things was entirely changed by Professor Bauer during the one and a half

years of his stay. While his lectures embraced the entire field of mineralogy, geology and paleontology, his own personal studies were especially concerned with crystallography and crystallographico-physical investigations. It was toward the close of this residence in Königsberg that he issued his "Lehrbuch der Mineralogie" (1st ed., 1886; 2d ed., 1904).

In the autumn of 1884 Professor Bauer transferred his activities to the University of Marburg, where he has been professor of mineralogy and petrography for the past thirty years. During this period he has devoted special attention to the diabases of Hesse and Nassau and to the basaltic region of Hesse, formations which theretofore had been little studied.

At the time of Professor Bauer's removal to Marburg, he succeeded to C. Klein as editor of the mineralogical section of the *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie* and has carried on this task up to the present time. During this long period more than fifty regular volumes of the *Jahrbuch* and thirty-eight supplementary volumes have been issued, and also more than a dozen volumes of the *Centralblatt für Mineralogie, Geologie und Paläontologie*, a publication connected with the *Jahrbuch*, so that the editorial supervision of Professor Bauer has covered some one hundred volumes of these journals.

The valuable researches and publications of Professor Bauer on precious stones also belong to this period, visits to the famous gem-cutting establishments of Idar-Oberstein and to the diamond-cutters of Hanau having aroused his interest in this direction. A more definite direction to his activity was, however, provided by the plan of a German publishing house to bring out a translation of the present writer's "Gems and Precious Stones of North America." The task of translating and adapting this book was entrusted to Professor Bauer. As the publishers wished to enlarge the scope of the work while retaining its rich embellishment of colored plates, the enterprise resulted in the production of the "Edelsteinkunde" (1st ed., 1896; 2d ed., 1909), an English version of which was published by Dr. L. F.

Spencer, director of the mineralogical department of the British Museum, in 1904.

GEORGE F. KUNZ

Optic Projection. Principles, Installation and Use of the Magic Lantern, Projection Microscope, Reflecting Lantern and Moving Picture Machine. By SIMON HENRY GAGE and HENRY PHELPS GAGE. The Comstock Press, Ithaca. 1914. Pp. 731. \$3.00.

Professor Gage and his son, Dr. Gage, have written a timely and compendious treatment of optical projection that will be heartily welcomed by all who are interested in the subject. Such recent developments of the art of projection as cinematography and opaque projection are discussed at length, while the older ordinary forms of projection are not neglected.

The titles of the fifteen chapters are, in order: Magic Lantern with Direct Circuit; Magic Lantern with Alternating Current; Magic Lantern for Use on the House Electric Lighting System; Magic Lantern with the Lime Light; Magic Lantern with Petroleum Lamp, with Gas, Acetylene and Alcohol Lamps; Magic Lantern with Sunlight, Heliostats; Projection of Images of Opaque Objects; Preparation of Lantern Slides; The Projection Microscope; Drawing and Photography with Projection Apparatus; Moving Pictures; Projection Rooms and Screens; Electric Currents and their Measurement, Arc Lamps, Wiring and Control, Candle Power of Arc Lamps for Projection; Optics of Projection; Uses of Projection in Physics, Normal and Defective Vision. In addition there is given a historical outline of the origin and development of projection apparatus, a list of manufacturers of and dealers in projection apparatus, a bibliography and an index of both names and subjects. There are 413 cuts and diagrams.

The authors state that their aim has been to explain the underlying principles upon which the art of projection depends and to give such simple and explicit directions that any intelligent person can succeed in all the fields of projection. The point of view throughout is that of the skilled amateur. To the professional operator the treatment will appear academic, to the theorist it will appear very prac-

tical, but all will agree that it covers the middle ground clearly and exhaustively.

P. G. NUTTING

THE METEOROLOGY OF ADELIE LAND, ANTARCTICA

THE climatic facts set forth by Sir Douglas Mawson in his interesting volumes, "The Home of the Blizzard," reviewed last week in SCIENCE, justify his claim that it is the stormiest spot on the face of the earth. Although the data as to the weather are desultory and incomplete, except as to the winds, yet a brief survey of this newly discovered land is of scientific interest. Fortunately the expedition was equipped with recording instruments for barometer, sunshine, temperature, wind, etc., so that data exist for full and satisfactory discussion of local meteorology in the promised scientific volumes. Observations were made at the main base, Commonwealth Bay, 67° S., 133° E., and by the sledging parties through King George Land.

No table of monthly means of any kind are given, but it is stated that the mean temperature for the first year was slightly above zero. This is an exceedingly low temperature for the latitude, 67° S. It is, however, not a local cold of radiation, but a cold of translation through the continuous and violent downflow of air from the elevated plateaus of Antarctica, 11,000 feet or more above sea level. The sharp pitch of the land is shown by the rise of 1,900 feet in fourteen and a half miles from the sea. The temperatures were never exceeding low, but were steadily maintained. The minimum temperature at the seacoast was only -28°, and the lowest observed on the ice-cap of the hinterland during the spring sledging was -35°; on September 18, 1912.

From a shaft excavated in the névé of the hinterland, at an elevation of 2,900 feet, Bage calculated that the mean temperature of the snow, which would be higher than the air, for the year was approximately -16°. It would not be unreasonable from these data to place the mean annual temperature of the south-polar plateau at -40°. The contrast between temperatures during high winds and in pe-