by whom more than one geographical article of advanced grade, based on original observation and study, has been published.

3. The independence of the union thus constituted of all other geographical societies.

Although we can not adduce any existing geographical society in this country as a witness competent to prove that geography has sufficient unity and coherence to tempt geographers to form such a union as is here contemplated, a careful review of the problem convinces me that a sufficient unity and coherence really exist in the science as I have treated it; and I, therefore, believe that the formation of an American geographers' union is feasible as well as desirable.

It has been my object in this address to describe briefly the status of mature geography in our country, and to suggest several steps that might be taken for its improvement. Certain branches of the subject have reached a high development, but the subject as a whole does not thrive with us. The reason for its relative failure is not, I believe, to be found in the very varied nature of its different parts, but rather in the failure to place sufficient emphasis on those relationships by which, more than by anything else, geography is to be distinguished from other sciences, and by which, more than by anything else, geographers may come to be united. Among the great number of persons—many thousands in all—whose attention is given primarily to subjects that are closely related to geography as here defined, there must certainly be many—probably several hundred—with whom mature geography is a first interest. It is upon these persons, geographers by first intention, that the future development of sound and thorough, mature and scientific, geography among us primarily depends. To these geographers, in particular, I would urge the importance of developing the systematic aspects of the science, and of constantly associating the special branch that they cultivate with the subject as a whole. Observation will not suffice for the full development of geography; critical methods of investigation, in which deduction has a large place, must be employed; for only by the aid of careful theorizing can an understanding of many parts of the subject be gained. With the progress of systematic geography we may expect to see a parallel progress of local or regional geography. As the science is thus developed, societies of mature geographical experts will be formed, and scientific geography will thrive; but whether thus developed into a thriving science or not, I hope that another long term of years may not pass without a representative of geography in this vice-presidential chair.

W. M. Davis.

Harvard University.

KARL ALFRED VON ZITTEL.

In the death of Karl Alfred von Zittel paleontology has lost one of its most distinguished advocates. Although a German by birth, Professor von Zittel belonged to every country, and through his remarkable work 'Handbuch der Palæontologie' his influence extended everywhere. It is probably not an exaggeration to say that he did more for the promotion and diffusion of paleontology than any other single man who lived during the nineteenth century. While not gifted with genius, he possessed extraordinary judgment, critical capacity and untiring industry.

The first volume of his great work bears the date 1876–1880, covering the extinct Protozoa, Cœlenterata, Echinodermata and Molluscoidea; the second volume, covering the Mollusca and Arthropoda, bears the date 1881–1885; the third volume, beginning the Vertebrata, was issued between 1887 and 1890, and covers the Pisces, Am-

phibia, Reptilia and Aves; the fourth volume, issued between 1891–1893, is devoted to the fossil mammalia. Under his editorship appeared also the second part of the great 'Handbuch,' including the 'Palæophytologie' begun by Schimper and continued and concluded by Schenk, and issued in 1890.

These volumes, which together number 4,315 pages, are richly illustrated and admirably indexed, and constitute a veritable encyclopedia of paleontology.

Immediately after the completion of this work the author began the preparation of a condensed treatise upon the whole subject; entitled 'Grundzüge der Palæontologie,' which was issued in 1895, consisting of 950 pages. A second revised edition has just appeared (1903).

We mention this monumental work first, because it was chiefly through this that the influence of von Zittel was exerted. The prodigious progress of paleontology in the nineteenth century was scattered through thousands of monographs and special papers, a hopeless labyrinth to the student, and an extremely difficult field even to the expert investigator; it had ceased to be possible to gain a perspective view of the whole subject, not to speak of the difficulty of mastering the details. With remarkable clearness and fullness, with impartial justice to workers in every country, with especially warm appreciation of the work done in America, von Zittel devoted himself for twenty years to this great task. I had the privilege of studying with him in Munich while he was engaged on the volume on the mammalia, and I was greatly struck with his extremely effective and comprehensive methods of work, which he carried on while giving a full and delightful course of lectures on the same subject.

This, however, was only one form in which von Zittel's influence was exerted. He established a great historical collection in the Alte Akademie of Munich, in which he gathered from all parts of the world collections illustrating the evolution of plants and of invertebrate and vertebrate animals. Here are to be found not only fossils from all parts of Germany, but rare collections from Pikermi and Samos, from the French Tertiaries, especially the phosphorites, from North America, including especially a remarkable collection of Cretaceous fossils made for him by Charles H. Sternberg, as well as a valuable collection of Permian fossils made by Dr. Broili, Mr. Sternberg and others. In addition to these there are remarkably fine specimens secured by exchange and purchase from the Tertiaries of North America, from the Oligocene. The same clear judgment which was displayed in the 'Palæontologie' is evidenced in the arrangement of this vast collection, so that nowhere else in the world can a student follow with equal ease the whole story of the evolution of life.

It is small wonder that Munich became the Mecca of paleontologists, young and old. Professor von Zittel had an exceptionally charming and magnetic personality. His face was full of keen intelligence and enthusiasm. He took the deepest interest in the original researches of young men who came to him from various parts of the world, and was unusually generous in placing in their hands much of his rarest material; in fact, the memoirs which were published under his supervision far outnumber those which he was able to publish himself, because of his long-continued devotion to his preparation of the 'Handbuch.' He occupied a position in paleontology similar to that occupied by the lamented Gegenbaur in comparative anatomy. Among his pupils may be numbered, with a few exceptions, all the younger American, most of the German, and many of the younger French and Austrian paleontologists. All bear him in

most grateful remembrance and will sadly mourn his loss.

The following details of his life are taken from one of the newspaper notices of his death. He was a son of Karl Zittel, the leader of the Clerical Liberals in Baden, and was born at Bahlingen, near Freiburg, on September 25, 1839. He studied at Heidelberg, Paris and Vienna. After serving as assistant in the Hofmineralien-Kabinet in Vienna, he was appointed professor of mineralogy at Karlsruhe, and in 1866 he assumed the same professorship in Munich, where he also became director of the Paleontological Staatsmuseum. The great scientific value of the Rohlf expedition to the Libyan desert in 1873–74 was owing chiefly to his participation in it. He wrote a book on the expedition; another on the Sahara, and many treatises on geological and paleontological subjects. In 1899 he published his 'Geschichte der Geologie und Palæontologie'—an important work carrying the subjects to the end of the nineteenth century. He was editor of the periodical *Palæontographica*. He was present at the opening of the Northern Pacific Railroad in August and September, 1883. It may be added that he had been in delicate health for some years. His death was unfortunately hastened by his being struck by a bicyclist, causing a serious injury to his knee and a long and debilitating confinement.

He traveled extensively. Aside from the special journey to the United States in connection with the Northern Pacific Railroad, he came here again in connection with the meeting of the International Geological Congress, visiting all the American museums and studying the great collections with most intense interest. At the meeting of the Geological Congress in Paris in 1900, Professor von Zittel received the honors to which he was so richly entitled, frequently presiding over the paleontological and geological sections.

Henry Fairfield Osborn.

SCIENTIFIC BOOKS.

The Moth Book. A Popular Guide to a Knowledge of the Moths of North America. By W. J. Holland. New York, Doubleday, Page & Company, 1903. Pp. xxiv + 479. Forty-eight plates in color photography and numerous illustrations in the text.

All persons interested in the study of Lepidoptera, including hundreds of amateur collectors, have anxiously been awaiting the publication of Dr. Holland's 'Moth Book,' which was promised five years ago in the introduction to his well-known and very useful 'Butterfly Book.' The volume has now appeared, and will be a delight to collectors and will greatly facilitate their attempts to determine their specimens, and will no doubt induce many others to take up the study of these beautiful and interesting insects. In his 'Butterfly Book' Dr. Holland had a restricted group of comparatively few species, and was able to illustrate or describe practically every species known to occur within the limits of the United States. The task of producing a serviceable moth book has been much more difficult. To illustrate and describe all of the thousands of species of moths of this country would require the publication of several volumes. Therefore, an effort has been made to select those species which adequately represent the various families and the commoner and more important genera, thus providing a work which will serve as an introduction to the study. The selection has been admirable. The 48 colored plates illustrate with beautiful accuracy more than 1,500 species, and all through the text are illustrated other species to the number of more than 250. Dr. Holland adopts in the main the classification of Sir George Hampson, and uses 43 family names. In nomenclature he wisely follows, for the most part, Dr. Dyar's list of the Lepidoptera of the United States, and has conformed the text of his volume to Dr. Dyar's serial arrangement. Dr. Holland differs, as he says, from Dr. Dyar