geology, which throws so much new light upon the subject, is almost completely ignored.

Mr. Jukes-Browne is not a biologist, and his remarks on the structure and affinities of extinct organisms are not always happy. The anatomist will hardly agree with such statements as the following (p. 437): "Of the mammals, Coryphodon and Lophiodon resembled the recent tapir; Palaeotherium and Paloplotherium were animals from which both the rhinoceros and the horse seem to have descended; Hyracotherium was a small animal combining characters now found in the peccary and the hyrax or Syrian coney." On the same page the snout of an alligator is inverted and called the lower jaw. Our author seems not to have heard of the great paleontological discoveries of the last twenty years on this side of the Atlantic, as he mentions only the mastodon, of which a wretched figure is given, and the mammoth.

It would, however, be very unfair to leave the impression that this is a carelessly written book. It is nothing of the sort, but, on the contrary, has been compiled with painstaking accuracy, and in many respects has been admirably done. While it cannot be recommended as a text-book in this country, it will prove of great service to investigators as a book of reference and comparison, containing much valuable information in a small space.

BERGHAUS'S ATLAS OF PHYSICAL GEOGRAPHY.

THE geographical institute of Justus Perthes in Gotha is publishing a new edition of Berghaus's 'Atlas of physical geography' ('Physikalischer Atlas'). Though the editor retains the name of the old edition of 1838–48 and of 1852, this is a totally new work, not one of the old maps being used in the new edition. The most eminent authorities in the different branches of physical geography contribute to this work, each department being intrusted to a specialist. Berghaus himself is the author of the hydrographical part, and to him is due the excellent execution of the work, which comes up to the standard we are used to apply to works published by Justus Perthes. J. Hann edits the meteorology; G. Neumayer, the part on terrestrial magnetism; von Zittel, geology; O. Drude, geography of plants; G. Hartlaub and W. Marshall, the distribution of animals; and G. Gerland, the ethnological part. The names of these scientists warrant that the material will be reliable, and in every respect be kept up to date. The maps are copperplate prints, and bear the date of publication. This way of reproduction will enable the publisher to have any desirable corrections made, so that we may be sure to see the maps always corresponding to the latest state of our knowledge. The economical use of space on the single sheets is really admirable. Map 16, for instance, contains the drainage-areas of the oceans, which are represented in Lambert's equivalent projection. These maps show the limits of ice-drifts, currents, deltas, and the navigable extent of rivers. On the same sheet we find eleven detail-maps showing the different kinds of bifurcations, and two diagrams showing the extent of land in different latitudes.

The general principle of the atlas is, first, to give maps of the earth and of continents, showing the distribution of physical phenomena; and then detail-maps, which are particularly illustrative of it. On the map showing the annual rainfall (No. 37) we may observe the influence of elevation and wind on detail-maps of Jamaica, Mauritius, and New Zealand. On the map of the German Ocean (No. 23) we find the various types of coasts, — the rias of the north coast of Spain, the downs of France and Germany, and the fjords of Norway. Diagrams show the temperatures of the ocean. This atlas is an indispensable work for the student of physical geography. Its systematically selected contents and excellent execution make it a worthy companion of Stieler's 'Hand-atlas' and Spruner-Mencke's 'Historical atlas.' As the editor does not give any preference to the physical geography of Europe, it is as valuable for the American student as for the European.

A CENTURY OF ELECTRICITY.

THOSE whose curiosity is excited by the presence on every street-corner of an electric light, and in every doctor's office of a telephone, in every railway-station of a clicking telegraph instrument, and yet have been unable to find time or opportunities for understanding how these things have been brought into existence, will find in Professor Mendenhall's little book, 'A century of electricity,' a trusty guide which will lead them by easy steps from the beginnings of a science of electricity towards the end of the eighteenth century, through the discoveries of Galvani, Volta, Oersted, Faraday, and others, to the present time. Professor Mendenhall's success as a writer is too well known to need especial praise in this place. The author has endeavored to sketch the growth of the science of electricity and its principal applications. The book is not a history of the science, nor is it a scientific treatise, and the use of technical language has been avoided as far as

A century of electricity. By T. C. MENDENHALL. Boston, Houghton, 1887. 16°.

possible. The effort of the author, and it has been a successful one, was to enable the intelligent reader, unfamiliar with the nomenclature of the science, to understand the more important phases of its development, and to give him such a knowledge of its fundamental principles as will enable him to comprehend the meaning of what he sees in electrical devices with which he almost daily comes in contact. The book opens with an account of some experiments in submarine signalling, as they might well be called, made in April, 1749, by Benjamin Franklin, which pictures him as sporting with his pet sparks at a picnic-party on the banks of the *Skuylkil;* and frequently through the pages one discovers little sketches of the personalities of the investigators, which add much to the interest of the reader. We can recommend the book most highly to all those for whom it is intended, and commend the publishers for the way in which it has been brought out, and for the excellence of the illustrations, which present so few of the hackneyed cuts disfiguring the ordinary manual.

THE third part of 'A new English dictionary on historical principles' (Oxford, Clarendon press; New York, Macmillan, 1887) has been received. We reviewed at length the first two parts in *Science* of June 18, 1886. Part iii. deals with 8,765 words, from 'batter' to 'boz.' It is a characteristic of the letter B that it contains a comparatively small number of words derived from Latin or Greek, and a preponderating proportion of words of Teutonic origin: hence this section includes many of the oldest words of the language. The B-words are full of problems which have baffled the efforts of all investigators. Every one of these has received a fresh and independent investigation, in which assistance has been rendered by some of the first living philologists; and the result has been the discovery of new facts, or the elimination of old errors, in regard to many words. In addition to the words of Old English and Old French origin, this part contains an extraordinary number of words of unknown or uncertain derivation. Many of these have no kin in other languages, but stand quite alone in English, and, it cannot be doubted, are more or less recent creations of English itself. B contains many illustrations of the fact that has of late years powerfully impressed itself upon philological students, that the creative period of language, the epoch of roots, has never come to an end. The origin of language is not to be sought merely in a far-off Indo-European antiquity, or in a still earlier pre-Aryan yore-time: it is still in perennial process around us. A literary language, with its more accessible store of words already in use and sufficient for all ordinary requirements, its more permanent memories and traditions, its constant appeals to an authoritative precedent, is hostile to word creation. Such is not the case with language in its natural state, where words are estimated simply as they serve their purpose of communicating the thought or feeling of the moment. The unwritten dialects, and to some extent even slang and colloquial speech, approach in character to language in its natural state, aiming only to be expressive, and treating memory and precedent as ministers, not as masters. Some words so coined pass at length from colloquial into literary use, and are registered in the dictionary as new words, the origin of which is searched for as vainly in the word-hoard of Old English speech, or even the fullest vocabulary of Indo-European roots, as in a school-manual of Latin and Greek roots and affixes.

— Bulletin No. 31 of the U. S. geological survey, by S. H. Scudder, is a systematic review of our present knowledge of fossil insects, including myriapods and spiders. It is essentially a translation, for the benefit of English readers, of the text furnished by the author to Dr. Zittel for his 'Handbuch der Paleontologie.' The German text, however, is accompanied by more than two hundred illustrations. M. Barrois is also publishing a French version. Each section of the work is accompanied by a complete bibliography, which shows us at a glance how recently this department of paleontology has been developed, very few of the titles dating back of 1850, and how extensive and varied the author's own contributions have been. The concise descriptions of the classes, orders, and families, are accompanied by brief notes on the fossil genera and species, with the locality and geological horizon in many cases; while the stratigraphic distribution and range of each order are shown by tables giving the number of species found in the rocks of each age. No fewer than twenty-six hundred species of true insects have been found fossil up to the present time. The great majority of these, as well as of myriapods and arachnids, are from the middle tertiary. This great irregularity in the chronological distribution of the fossil forms, which is, of course, due largely to the character of the deposits, is a plain indication that important insect faunas still remain to be discovered. Thus, of the fossil spiders, thirty-one forms are known from the paleozoic strata, one from the mesozoic, and two hundred and eighty-five from the tertiary, the great majority of the tertiary forms having been found in the amber deposits of Prussia.