(3) or it may result from the variation of the static magnetic field at the earth, that other energy derived from the electro-magnetic field is more or less readily absorbed in the atmosphere than it would otherwise be. Whatever the mechanism is, there is a synchronous dependence of terrestrial elements upon the solar energy to be accounted for in the solution of the cosmical problem.

FRANK H. BIGELOW.

WASHINGTON, D. C.

SCIENTIFIC LITERATURE.

A GENERAL HAND-BOOK OF BUTTERFLIES.

A Hand-book to the Order Lepidoptera. Part I. *Butterflies.* By W. F. KIRBY. 2 Vols. London, W. H. Allen & Co. 1894, 1896. (Allen's Naturalists' Library, edited by R. Bowdler Sharpe.)

This work is a rewriting of Duncan's two volumes on British and Foreign Butterflies in the old issue of Jardine's Naturalists' Library of sixty years ago, the principal point common to the two being the sixty odd plates, the coloring of which, we regret to say, is far inferior in the present issue. A few new plates are added, and the British species are very fully illustrated, for woodcuts from Newman's work are also introduced.

The plan of the new edition is, however, very much better, for the old British and Foreign volumes are combined in one series and make a systematic presentation of the subject to which the old series did not aspire. The introduction is largely rewritten, the memoirs of Lamarck and Werner (!) omitted, and the body of the work has a continuity which is much more evident than in the old and actually forms a hand-book to our present knowledge. It is, however, too formal to be as useful as it might be, and quite too much space is given to synonomy, which in a work of this sort is quite out of place or should be reduced to its lowest possible terms. The affinities of the different groups are not made evident as they should be in a hand-book, so that it is a guide to a knowledge of names rather than to a knowledge of structure. The early stages are not neglected, but are dealt with in too general terms to make the work of any value as to them; and what might have been a seductive guide to the study of butterflies savors too strongly of the Catalogue.

Mr. Kirby has, in fact, rather missed an excellent chance; notwithstanding which he has produced a useful book for the museum and cabinet, which reflects prevalent views of the classification of butterflies and presents the whole in a systematic and orderly fashion. The first volume contains the Introduction and the Nymphalidæ, the second the remaining families, excepting the Hesperidæ, which did not appear at all in Jardine's series, and which are here relegated to a third volume, with the higher moths yet to appear. The whole series of the Lepidoptera is contemplated to occupy five volumes. The printing is very unequal and in some places execrable, though the type is good.

SAMUEL H. SCUDDER.

The University Geological Survey of Kansas. Conducted under authority of the Board of Regents of the University of Kansas. By ERASMUS HAWORTH and assistants. Vol. I., 1896. pp. xii + 320, text figures 11, plates XXXI. Topeka, Kansas.

During the last few years the State University of Kansas, under the liberal and progressive administration of Chancellor Snow, and through the zeal of its geological professors, has begun a geological survey of the State. The above work is the first volume of this survey, in which is described the stratigraphy of the Coal Measures and Permian of Kansas.

To a large extent this is pioneer work covering the eastern third of the State, and is the first accurate detailed report of the geology of this region that has ever been published. It is stated that a companion volume will describe 'the stratigraphy of the Cretaceous and the Tertiary in a similar manner.'

The men associated with Professsor Haworth as assistants for the present volume are Rev. John Bennett, Prof. E. B. Knerr and Messrs. M. Z. Kirk, George I. Adams and John G. Hall. Of the fifteen chapters composing the work, seven are credited to the assistants, one is by Prof. Haworth and Mr. Bennett, and the remaining by Prof. Haworth.

The first eight chapters are devoted to de-

tailed descriptions of geologic sections crossing different parts of the region and have been prepared largely by the assistants. In chapter IX. Prof. Haworth gives a 'Résumé of the Stratigraphy and Correlations of the Carboniferous Formations.' This chapter of fifty pages contains an excellent account of the survey's classification of the Carboniferous system and will probably prove the most interesting to the general geologist. Prof. Haworth divides the Carboniferous system into three series, the Mississippian, Coal Measures and Permian. The Mississippian only covers about thirty square miles in the southeastern part of the State; but it contains the rich deposits of lead and zinc, and belongs in the 'Keokuk group' of Keyes' Augusta formation.

The next series is divided into the Lower Coal Measures with a thickness of 800 feet, and the Upper Coal Measures with a thickness of 1,950 feet, making the total thickness of the Coal Measures 2,750 feet. It is stated that they 'cover an area of approximately 20,000 square miles.' The names of the subdivisions of the Lower Coal Measures in ascending order are Cherokee shales, Oswego limestone, Pawnee limestone and Pleasanton shales. The Cherokee shales 'are exceedingly rich in coal, producing at the present time more than two-thirds of the whole amount mined within the State,' the well known Pittsburg and Weir City coal being in this formation. The line of division between the Lower and Upper Coal Measures is drawn at the top of the Pleasanton shales, and the basis of division is stated to be 'principally paleontologic and dependent upon the disappearance of the species of the brachiopod fossil *Chonetes mesoloba*, and upon the first appearance of different species in the Erie limestone above, but also partially dependent upon the great physical change which marks the line between the two extensive and characteristic formations, the Pleasanton shales and the Erie limestone.' The subdivisions of the Upper Coal Measures are the Erie limestone, Thayer shales, Iola limestone, Carlyle limestone, Lane shales, Garnett limestones, Lawrence shales, Oread limestone, Osage City and Burlingame shales, above which are the Wabaunsee and Cottonwood formations of Prosser. The Osage coal, which is the most important coal stratum in the Upper Coal Measures, lies at the top of the Osage City shales and is extensively mined from Osage City and Scranton to Topeka. The Cottonwood limestone, which forms the lower part of the Cottonwood formation, is a massive limestone from five to ten feet thick and is the most valuable dimension stone in the State, extending from north to south across Kansas.

In the discussion of the Permian series Prof. Haworth states that he follows the classification of Prosser, who drew the dividing line between the Upper Coal Measures and the Permian at the top of the Cottonwood formation, since in the overlying rocks the Permian species of Lamellibranchs first appear in any considerable number. The series consists of the three following formations: Neosho, Chase and Marion. This classification applies to the central part of the State, where the Permian has a thickness of 800 feet, and does not include the 'Red-beds,' of doubtful age, in the southern central part of the State.

The Chase formation contains massive limestone strata in which are thick layers of flint, alternating with shales. This alternation of hard and soft strata has produced a marked topographic feature for the region—a country broken by streams lined by steep bluffs—known as the 'Flint Hills.'

The Marion formation contains the rock salt, varying from 75 to 250 feet in thickness in the wells and mines. Large quantities of salt are produced from this deposit, Kansas ranking in 1894 as the third State in the production of salt.

Next follows an interesting chapter by Prof. Haworth on the 'Physiographic features of the Carboniferous;' while the two following chapters, by the same author, on the 'Coal Fields,' and 'Oil and Gas in Kansas' are of particular interest to the economic geologist. The oil and gas are found in the geologic formations, ranging from 'the Mississippian upward to the Lane shales,' and the area covers about 8,500 square miles in the southeastern part of the State. Prof. Haworth concludes: "It is evident that the oil and gas are more uniformly disseminated in Kansas than in any other territory yet developed in America. * * * * With our

present knowledge of the case, it would seem that there is considerable encouragement for any village or city within the productive area to drill wells, expecting to obtain gas in sufficient quantity to be of great importance for domestic purposes."

'A preliminary catalogue of the Invertebrate Paleontology of the Carboniferous of Kansas,' by Mr. Bennett, based on university and survey collections, with additions from the reports of Beede and Prosser, finishes the text.

The large number of sections, 'all drawn to an exact scale,' add greatly to the clearness of the presentation of the subject. The physiographic features are well illustrated by a number of half-tones, and the final plate is a preliminary geologic map of Kansas.

Finally, it might be mentioned, that the publication of these investigations, which were conducted almost entirely by Prof. Haworth and students of the university, indicates very clearly the advanced nature of the instruction given by the Geological Department of the University of Kansas.

CHARLES S. PROSSER.

SCIENTIFIC JOURNALS.

THE JOURNAL OF COMPARATIVE NEUROLOGY, VOL. VI., NO. 2, JUNE, 1896.

The Comparative Anatomy of the Insula: By TRACY EARL CLARK. The importance of the insular region in the human brain, and in particular its supposed relation to the speech centers, have led to a thorough investigation of the morphological relations of this area in all groups of the mammals. The insula is present in the Primates, Carnivora, Proboscidia, Ungulata and Cetacea, though with great variation in size and fissuration. The insula and the claustrum may be considered as parts of the same cortical area; the claustrum may be present without the insula; both may be present or both may be absent. The primitive insula, if such exists, is a somewhat elevated area of greater or less size surrounded by a circuminsular fissure and located in the Sylvian fossa or in the fissure, if the fissure is continuous with the rhinal. The paper is illustrated by five plates.

Review of the Golgi Method: By OLIVER S. STRONG. In this paper Dr. Strong undertakes a critical review from the technical side of the method of Golgi and its subsequent modifications. The writer speaks with authority born of long and successful experience with the method. The 28 pages which constitute this instalment of the paper are devoted chiefly to a full translation of the technological portions of Golgi's original memoir.

Two author's abstracts by Prof. B. G. Wilder: *The Dorsal Sack, the Aulix and the Diencephalic Flexure* and *The Ectal Relations of the Right and Left Parietal and Paroccipital Fissures*, a brief editorial on the recent action of the American Neurological Association concerning Anatomical Nomenclature and the usual book reviews complete the number.

SOCIETIES AND ACADEMIES.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, JUNE 16, 1896.

THE following papers were presented for publication: 'On a collection of fishes obtained in Swatow, China, by Miss Adele M. Fielde,' by Cloudesley Rutter. 'On a collection of fishes made by the Rev. Jos. Seed Roberts, in Kingston, Jamaica,' by David Starr Jordan and Cloudesley Rutter.

Prof. Edw. D. Cope continued his report on the vertebrate remains from the Port Kennedy Bone Fissure. Among the Mustellidæ were five new species of the genera *Lutra*, *Mephitis*, *Osmotherium* and *Putorius*. They were represented by at least forty individuals and were described and named. Remains of the largest known tortoise from this section of the country were described as belonging to a new species of *Clemmys*. *C. insculpta* was also represented, together with a new box tortoise belonging to the genus *Loxaspis*. A close ally of the black snake, genus *Zamænis*, was also described.

JUNE 23, 1896.

REV. H. C. MCCOOK, D. D., reported a series of observations of the California Trap-door Spider, *Cteniza Californica*, made by Dr. Davidson, who had been able to determine the time required for the construction of the burrow in confinement, and other matters connected with the life history of the animal. It