from a single locality, and are of questionable validity. They have, however, to be recognized in a work like this, and in the want of positive evidence to exclude them; and it remains for future students to determine their true status.

Late European authorities are here followed in separating the anomalous genera Sphagnum and Andreaea as distinct orders; while in the Bryaceae, or mosses proper, Schimper's arrangement is in general adopted, with an occasional consolidation of his too numerous tribes and genera, — notably in the case of the genus Hypnum, which, under twenty-eight subgenera, is made to include nearly a fourth of all the species. By several artificial and analytical keys the student is aided in referring his plants to their proper tribes and genera, the characters of which, as well as of the species, are given with sufficient fulness and detail. The synonymy and citation of authorities, while not numerous, are such as to be of service to the student capable of benefiting by them. The habitat and range within our limits is given under each species, but not always with sufficient definiteness; and it is rarely that there is any indication that a species is also exotic, except as it may be inferred from the citation of Bruch and Schimper's figures in the 'Bryologia Europaea.' The nomenclature, too often a weak point with bryologists, is, on the whole, to be commended as in conformity with accepted rules, though subject to criticism in some cases; as where the generic names, Ulota, Tetraphis, and Atrichum, are retained in place of the earlier Weissia, Georgia, and Catharinea of Ehrhart. The views of Mueller, Mitten, and Lindberg, when not followed, are in many cases given in the synonymy.

The publishers have made the book attractive by large, clear type and good paper. Many would doubtless have preferred a somewhat smaller type and thinner paper, by which the bulk of the volume might have been reduced at least one-half. Publishers should remember that the convenience of a 'handbook' is inversely as its size. S. W.

GEOLOGY OF SOUTH-EASTERN PENNSYLVANIA.

Thèses présentées à la Faculté des sciences de Lille université de France pour obtenir le grade de docteur ès-sciences naturelles. Par PERSIFOR FRAZER, A.M. Lille, 1882. [6]+179 p, 4 pl. 4°.

THIS work is based upon the author's labors as a member of the second geological survey of Pennsylvania during the seven years from 1874 to 1881, being essentially a synopsis of his published reports (C^1, C^2, C^3, C^4) on Adams, York, Lancaster, and Chester counties. These counties, with the addition of Delaware and Philadelphia counties, which are geologically but an extension of Chester county, include all that part of Pennsylvania south of the belt of triassic sandstone, stretching from the Delaware to the Susquehanna, and east of South Mountain.

Professor Frazer recognizes, in the rocks of this limited area, representatives of the four principal divisions of geological time, — the cenozoic, mesozoic, paleozoic, and eozoic eras. The tertiary beds, however, are of no commercial or structural importance, being restricted to a few small isolated patches of marl and lignite. The mesozoic or secondary rocks are, of course, the triassic sandstones, shales, and trap, concerning the limits and age of which geologists are generally agreed. With these exceptions, this is essentially a region of crystalline rocks; and the interest of this memoir undoubtedly centres in the chronological disposition of these stratified crystallines made by our author, who evinces an appreciation of the difficulties attending any solution of this vexed problem in citing the singular fact that those sections of the United States which are the seats of the densest population and the oldest civilization are precisely those where the opinions of geologists concerning the age of the rocks present the greatest divergence.

These rocks, and their extension in other states of the Atlantic seaboard, have been the principal battle-ground of American geologists for the last forty years. In all regions the chief difficulties which they present are their structural complexity, and the general absence of organic remains. But to these we have added, in the district in question, a topography affording few reliable outcrops of the rocks. The Susquehanna forms a remarkable natural section of this region, crossing the strike of all the formations between the coal-measures and the fundamental gneiss. But even here the exposures are few and poor, although what is definitely known of the succession of the lower formations in Pennsylvania has been in great part derived from the study of the rocks along this river and the Schuylkill.

Our author regards these crystalline rocks as belonging largely to the older eozoic formations, and accepts Dr. Hunt's definitions of the Laurentian and Huronian systems, referring to the former the porphyritic and hornblendic

gneisses, with their accompanying coarse limestone and graphite; and, to the latter, a large part of the chlorite and mica schists, and serpentine, with associated limestone, steatite, and argillite, and chrome and nickel ores, east of the Susquehanna, and the felsitic, chloritic, epidotic, and quartzose rocks of the South Mountain.

The felsites are said to be distinctly interstratified with the other rocks named, and the theory of their igneous origin is vigorously combated. The position of the Huronian in this region is shown to be clearly above the Laurentian, and below the primal sandstone; but it is also allowed to fill this great gap, to the exclusion of the Montalban system, which Dr. Hunt has recognized here.

The Taconian system is not admitted to the Pennsylvania column; but the quartzite, schists, marble, argillite, and iron-ores claimed by its defenders are referred, as by the first survey, and by Lesley, Dana, etc., to the Cambrian. With the exception of the Scolithus, found in a small part of the so-called primal or Potsdam series, all these rocks are alike unfossiliferous. Lithologically and stratigraphically they present little resemblance to the primal, auroral, and matinal west of the great valley and in New York; and hence the confident reference of these semi-crystalline rocks to the horizons named seems to rest on a very slender basis of facts.

NOTES AND NEWS.

The English astronomers continue their observations of the great red spot on the planet Jupiter with all the enthusiasm of past years; one observer, Mr. Stanley Williams, obtaining, as early as the morning of Sept. 20, a favorable sight of that part of the disk of Jupiter which should be occupied by the red spot. It was still a visible object, although, at the then unfavorable position of the planet, one of extreme difficulty and delicacy. Only a very occasional glimpse of it could be obtained at all, as a faint patch of no particular color or boundary, until after its transit of the central meridian, when the spot was once seen in its entirety, and with a distinct reddish tinge about it. The great hollow in the red south equatorial belt still remains visible, but it appears to have much diminished in plainness. Mr. Williams has also observed three equatorial white spots, one of which is probably identical with a well-known white spot which has been followed for many years. The red spot has also been re-observed by Mr. Denning.

— At the October meeting of the Natural science association of Staten Island, Mr. Davis exhibited a specimen of one of our green grasshoppers, Conocephalus dissimilis, which he had found without any head, and stridulating while perched upon a blade of grass. When touched by the finger, the insect did not close its wings tightly, as usual, but let them remain far apart. It had evidently not been long decapitated; for, when captured, the muscles in the thorax had their normal appearance. But gradually the tissues dried, and on the third day of its captivity it died without having stridulated again, though every means thought of was employed to induce it.

— Dr. David Gill, her majesty's astronomer at the Cape of Good Hope, will contribute the article on parallax for the forthcoming volume (xviii.) of the ninth edition of the Encyclopaedia Britannica.

— Dr. E. B. Tylor, in an address to the anthropological society of Washington a few weeks ago, in which he narrated some of his experiences among the Mohaves and Zuñis last summer, said the Mohave has the same abhorrence of parting with a lock of his hair that is shown by an Italian or a Spaniard. The Zuñi uses the same sound-producing piece of wood to warn the women away from certain rites attending the admission of youths to the privileges of manhood as is used for a like purpose both in Africa and Australia. The latter consists of a piece of wood attached to a thong, and well known in England as a 'bull-roar,' from the character of the noise it makes when whirled rapidly. The use of bark skirts by the Zuñi women, who now wear a part of them under their joined red handkerchief robes, is paralleled by that of the Australian females. The Zuñis wore these originally in two parts, — one in front, and the other at the back, — forming, when both in place, a complete covering for the lower part of the body. Now that cotton-cloth is procurable, they make a skirt of bright-colored handkerchiefs sewed together, and wear this outside the bark garment, only the rear half or bustle of which they wear. The Australian women preserve the ancient custom by putting on bark skirts on festival occasions. Both customs show a tendency to survival, and a corresponding mode of perpetuating an ancient usage.

— A correspondent of the *Science monthly* writes that for the last year he has been engaged in the herring-fishery on the Kintyre coast, and has often been surprised during the night to hear a strange chirping-sound, like the far-away disconsolate 'chirp' of some small dying bird. "It was something in the air, and always portended southerly winds and foul weather, and was known everywhere as the 'Cheepach,'" was all the explanation that his mates had to offer. It is most frequently heard from the beginning of August till the end of November, and is never heard before sunset or after sunrise, but always during the darkness of night. It is never heard ashore, but often enough within two or three hundred yards of it. It is generally heard whilst sailing, but sometimes, though rarely, while lying at anchor. It is always accompanied by a dampness in the atmosphere, though never with rain, so far as he remembers. The sound is so very like the chirp of a bird that superstitious fishermen attribute it to the ghosts of little birds that have blown to sea and drowned.