of the Adirondacks south of Raquette Lake." The spike-horn was described as differing greatly from the common antler of the species, it consisting of a single spike, more slender, and about half as long as the antler, projecting forward from the brow, and giving "a considerable advantage to its possessor over the common buck." In consequence of this advantage, the 'spike-horns' were said to be 'gaining upon the common bucks,' with the prospect that in time they might 'entirely supersede them in the Adirondacks.' The descendants of the original spike-horn — 'merely an accidental freak of nature' — are supposed by this writer to have propagated the peculiarity "in a constantly increasing ratio, till they are slowly crowding the antlered deer from the region they inhabit."

Although this view of the case was criticised by subsequent writers in the *Naturalist*, the original account attracted the attention of Mr. Darwin, who cites it, and generalizes from it in his 'Descent of man.' It has since been affirmed by high authorities that the 'spike-bucks' of the Adirondacks are all nothing more than yearling bucks with their first antlers.

Dr. Merriam scouts the idea (and we think with good reason) that the 'spike-bucks' (which have obtained no little celebrity, and been the basis of much speculation with somewhat visionary writers on evolution) are a distinct race of deer, and is able to cite but a single exception to the rule that 'spike-horn bucks are always yearlings,' — that of a maimed, very aged, ill-conditioned animal. This exception he views as an illustration of the tendency in extreme age for certain parts to revert to a condition resembling that of early life, and of the fact that ill-nourished bucks bear stunted and more or less imperfect antlers. All yearlings, however, do not have true spike-horns; and, if the term be made to include all unbranched antlers, Dr. Merriam inclines to the belief that two-year old bucks may sometimes grow them. The myth of the spike-horn, like many other myths in science, will doubtless still live on, with the characteristic persistency of fanciful errors.

Dr. Merriam's observations respecting the bats, the moles, and the shrews, throw much light upon their obscure ways of life, in confinement as well as in a state of nature. His biographies of the rodents are also full of fresh material. Attention may be especially directed to the accounts of the gray and red squirrels, not less for their grace of diction than for their fulness of detail, and vividness of portrayal.

THE MOSSES OF NORTH AMERICA.

Manual of the mosses of North America. By LEO LESQUEREUX and THOMAS P. JAMES. With six plates illustrating the genera. Boston, *S. E. Cassino & Co.*, 1884. 447 p. 8°.

THANKS to our sole surviving bryologist, the venerable Lesquereux, we have at length a comprehensive manual of North-American mosses. In connection, first with Sullivant until his death, and more recently with James, who devoted himself unweariedly to the necessary microscopical investigation up to the very day almost of his passing away, Mr. Lesquereux has for years been more or less actively engaged in this work, and now happily sees its completion. Those who have been attracted to this most interesting family of plants, but have been deterred from their study by the dearth of accessible books upon the subject, will here find their chief wants supplied. It throws open to our younger botanists a broad field, where much can be done, and needs to be done, and where enviable reputations may be won by patient, skilled, and judicious workers.

The history of our mosses begins with Dillenius, who had received about a score of species from John Bartram, *colonus curiosus* of Philadelphia, and from Mitchell and Clayton of Virginia, describing and figuring them in his 'Historia muscorum,' in 1741. Some others of Clayton's collection were described later by Gronovius, but only seven of these species were recognized as from America by Linné, in his works.[1] The first edition of Sullivant's 'Mosses of the United States' (originally published in the first edition of Gray's Manual, in 1848) included 205 species, of which 51 were exclusively American. In the second edition (1856) the number was increased to 402, the American species being 143. In the present work, with a wider range, there are described 883 species, 363 confined to North America, and 21 others found only in tropical America. Of these American species, one-half (180) were detected and described by our own Sullivant, Lesquereux, James, and Austin; the remainder by Europeans; there having been scarcely a bryologist, from Hedwig and Schwaegrichen to the present generation, that has not been concerned with them. A considerable number of these species have been made on scanty material

[1] One of these Linnean species is not referred to in the manual; viz., Phascum caulescens, based upon the 'Sphagnum foliis teneribus, graminis, pellucidis,' of Dillenius, which is Tetraplodon australis, Sulliv. and Lesq.; to which must now be added the needless synonyme, Tetraplodon caulescens, Lindberg.

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