thereon as *bayleyi*. Similarly *Reithrodontomys lacei* is spelled *lacyi*.

In dividing the work into parts it is a pity the publishers did not end the second part with the Carnivora instead of including the first 63 pages of the Rodentia. In binding by orders—the most convenient form for most uses—the volume on the Rodentia will have no title-page in front, but has one for the matter posterior to the 63d page, where the 3d fasciculus begins (page 453 of the whole Catalogue).

The reviewer is indebted to Dr. T. S. Palmer for calling his attention to a number of the errors in generic names and dates.

In two instances Trouessart imposes new names on forms distinguished but not named by previous authors, and in both instances modestly but wrongly credits the name to the previous author instead of himself. The cases in point are *Vespertilio gryphus septentrionalis*, attributed to Harrison Allen, and [*Mus*] *sylvaticus* var. *noveboracensis*, attributed to Erxleben, and placed as a synonym of *Peromyscus leucopus*.

The three parts now published comprise the Primates, Chiroptera, Insectivora, Carnivora and Rodentia and contain 760 genera and 4,085 species. Of these, 288 genera and 1,900 species are included in the single order Rodentia.

The Catalogue, in spite of its inherent imperfections, is an extremely useful document and must be at the elbow of every student of mammals.

C. HART MERRIAM.

Guide to the genera and classification of the North American Orthoptera found north of Mexico. By SAMUEL HUBBARD SCUDDER. Cambridge, Mass., Edward W. Wheeler. 1897. Pp. 89. Price, $1.00.

Dr. Scudder began his entomological studies with the Orthoptera, and is still at work elaborating the sub-families, genera and species with reference to a general work on the classification of the order. The little book before us is designed to serve as a Prodomus of the work, which we hope may be completed at a no distant day. As such it will be of great service to the student, since the families, subfamilies and genera are tersely and yet fully described. Besides these diagnoses there are elaborate tables for the determination of the families, sub-families and genera; the species not being mentioned.

In addition to the general bibliographical notes, those devoted to the families and the list of the literature are full and presumably exhaustive. The index appears also to be complete. The paper and printing are unexceptional.

It will be seen that the book will be indispensable to the student, as there is nothing like it in our entomological literature. That it has been prepared with thoroughness and care goes without saying. When will the time come when we shall have similar exhaustive manuals of the other orders of insects.

A. S. PACKARD.

Les Ballons-Sondes de MM. Hermite et Besançon et les Ascensions Internationales. Par WILFRID DE FONVIELLE. Bibliothèque des Actualités Scientifiques. Paris, Gauthier-Villars. 1898. 18mo. Pp. 112. Figs. 27.

This brochure by my colleague, the Secretary of the Aëronautical Commission, is timely, since it is the first complete account of an important investigation in Europe. M. de Fonvielle is well fitted to write on the subject, for he is not only a distinguished aëronaut and the author of several books on ballooning, but since their inception he has been an advocate of 'ballons-sondes,' or 'ballons perdus,' as formerly they were derisively named.

When one of these exploring balloons, set free by MM. Hermite and Besançon, in November, 1892, lost its buoyancy and fell to the earth there was obtained for the first time, from its minimum barometer and thermometer, the greatest height and the lowest temperature which had been reached. Fourteen of these small balloons having envelopes, generally of paper, filled with illuminating gas were liberated from Paris and most of them were recovered with their instruments recording the extremes of height and cold. MM. Hermite and Besançon, therefore, were encouraged to continue the exploration of the upper air with larger balloons made of goldbeaters' skin or of special silk, which they called *Aërophiles*. These carried continuously recording barom-

eters and thermometers of Richard's construction, and in March, 1893, records were obtained 49,000 feet above the earth. In 1894 the Berlin Aëronautical Society began similar explorations in connection with manned balloons, and in September the exploring balloon *Cirrus* rose 60,000 feet and recorded photographically a temperature 90° Fahrenheit below zero. In December of the same year Berson, of Berlin, ascended alone 30,000 feet, and, at the highest level ever reached by man, observed a temperature 54° Fahrenheit below zero.

Efforts were now made to secure international cooperation, and the International Meteorological Conference which was held at Paris in September, 1896, furnished the opportunity to M. de Fonvielle. As stated in SCIENCE of January 1, 1897, simultaneous flights of manned and exploring balloons were recommended, and in consequence of the successful experiments with kites lifting self-recording instruments at Blue Hill this method of studying the lower air was advised. A commission was appointed to execute these resolutions, consisting of Messrs. Hergesell (President), of Strassburg; de Fonvielle (Secretary) and Hermite, of Paris; Pomortzeff, of St. Petersburg; Erk, of Munich; Assmann, of Berlin, and Rotch, of Boston. In the first international flight of 'ballons-sondes' on November 14, 1896, balloons were despatched from Paris, Strassburg, Berlin and St. Petersburg, but only the *Aërophile* from Paris reached a great altitude. Three simultaneous flights were made the past year, and the results of these and subsequent ones will certainly elucidate the conditions prevailing through a large extent of the upper air at much greater heights than can be reached by human beings. With these balloons only the barometric pressure and the air temperature are recorded, but after several attempts to obtain samples of the air at great heights this was finally accomplished with the apparatus of Cailletet carried by the *Aërophile*.

The chapter on the theory of a ballon-sonde, and the effect of temperature on the height to which one will rise, presents simply and clearly some important facts and formulæ. In closing this review it may be well to point out a few typographical errors. On pages 16 and 17 the words 'en papier' evidently should be omitted from the heading of the table, since balloons of goldbeaters' skin are included; in the same table the date 1862 should be 1892 and 'température maxima' should be 'température minima;' in the heading of the table on pages 88 and 89 the words 'en soie spéciale' should be omitted for the reason stated above.

It is proposed to hold a meeting of the International Aëronautical Commission next February, to consider plans for a more extended exploration of the atmosphere. As yet exploring balloons have not been employed in the United States, but the development of the kite in this country has proved it to be the best agent for studying the meteorological conditions of the lower ten thousand feet of free air at definitely determined heights. In fact, the records of temperature and humidity obtained with kites 11,086 feet above Blue Hill probably exceed in altitude any balloon observations on this side of the Atlantic, while the proposed use of kites by the Weather Bureau to obtain data for daily synoptic charts of the conditions a mile above the earth's surface may result in improving the weather forecasts.

A. LAWRENCE ROTCH.

Volcanoes of North America: A Reading Lesson for Students of Geography and Geology. By ISRAEL C. RUSSELL, Professor of Geology, University of Michigan; author of 'Lakes of North America,' 'Glaciers of North America,' etc. New York, The Macmillan Co. 1897. 8vo. Pp. xiv + 346. Price, $4.00.

In giving to the world a companion volume to his Lakes, and Glaciers, of North America, Professor Russell has laid under renewed obligation both the geological student and the general reader. He is eminently fitted for the discussion of his present theme. His own travels and explorations have made him familiar with the eruptive phenomena of North America, through a wide range of latitude and longitude, and in manifold variety of type—from the Mesozoic trap sheets of New Jersey, to the majestic snow-clad cone of Rainier; from the craters of the Mono valley, to the widespread stratum of volcanic dust in the valley of the Yukon. To the knowledge gained by personal