by a Storm which Overtook them in Migration, in May, 1888, by Dr. C. Hart Merriam. The Relationship of the Large Florida Herons, by W. E. D. Scott. Notes on a Collection of Birds from the Vicinity of Quito, by J. A. Allen. On a Collection of Birds made in Bolivia by Dr. H. H. Rusby, with Field Notes by the Collector, by J. A. Allen. *The Booming of the Bittern, by Bradford Torrey.† *Remarks on the Three-toed Woodpeckers, by Dr. L. Stejneger. *Nesting Habits of Clarke's Crow, by Capt. C. E. Bendire. *Notes on the Southern Breeding Range of *Pinicola enucleator*, by Philip Cox. *The Anhinga, by Col. N. S. Goss. *The Main Divisions of the Swifts, by F. A. Lucas.† *The Summer Birds of Berkshire Co., Mass., by Walter Faxon.†

The meeting proved, in point of attendance and in the number and character of the papers presented, the most successful thus far held, and from a social point of view left little to be desired, the Washington members giving their visitors a most cordial welcome. On Tuesday evening a reception was given them by Dr. and Mrs. Coues, and another on Wednesday evening by Dr. Merriam and Mr. Henshaw.

It was voted to hold the next meeting in New York City, on the second Tuesday in November, 1889.

RECENT LITERATURE.

Cooke's 'Report on Bird Migration in the Mississippi Valley.'‡—This Report forms 'Bulletin No. 2' of the Division of Economic Ornithology of the U. S. Department of Agriculture—a work that has been long and "clamorously" awaited. To quote from the editor's 'Prefatory Letter,' the report "consists of two parts: (1) an introductory portion treating of the history and methods of the work, together with a general study of the subject of Bird Migration, including the influence of the weather upon the movements of birds, the progression of bird waves and causes affecting the same, the influence of topography and altitude upon migration, and the

† Published in the present number of 'The Auk.'

‡ U. S. Department of Agriculture. | Division of Economic Ornithology. | Bulletin No. 2. | — | Report | on | Bird Migration | in the | Mississippi Valley | in | the years 1884 and 1885, | by | W. W. Cooke. | — | Edited and Revised by Dr. C. Hart Merriam. | — | Washington: | Government Printing Office. | 1888. 8vo, pp. 313, with Map.

rates of flight in the various species; and (2) a systematic portion in which the five hundred and sixty species of birds known to occur in the Mississippi Valley are treated serially, the movements of each during the seasons of 1884 and 1885 being traced with as much exactness as the records furnished by the one hundred and seventy observers in the district permit."

The labor of elaborating and compiling this report has evidently been very great, not only the data from this large number of field observers having been collated, but much matter relating to distribution having been incorporated from published sources. Part II thus contains a very large amount of information bearing upon the migrations and breeding ranges of the birds found in the Mississippi Valley.

Under the head of 'Theoretical Considerations' (pp. 11, 12), the author states his belief that the autumnal migration is "the result of two causes—the approach of winter and the failure of the food supply," and that the spring migration is due to "a strong home love—an overpowering desire to be once more among the familiar scenes of the previous summer." In respect to the autumnal migration, it is considered obvious that the failure of the food supply is the primary cause of the movement, "since it is well known that single individuals of species which retire far to the south often remain behind, and, favored by an abundance of food, withstand the most severe weather." The impulse that leads to the return of birds in spring to their summer homes is doubtless not to be wholly accounted for by what has been called "love of home," to which theory the editor in a footnote (p. 11) takes strong exception. He attributes this movement to failure of "the food supply," to unfavorable "climatic conditions," "to physiological restlessness" induced by "the approach of the breeding season,' and to an inherited "irresistible impulse to move at this particular time of the year." The reasons given for the autumnal movement clearly afford a satisfactory explanation, since in most instances were migratory species to remain in winter at their accustomed breeding grounds few would escape total extinction. The reasons for the return movement are more complex and less obvious. Lack of food can hardly be assumed as one of them. Increase of temperature at their winter quarters, as spring advances, must render the lower latitudes at this season uncongenial, and at the same time awaken the periodic activity of the reproductive system, which "gives rise to physiological restlessness," and imparts "the irresistible impulse to move at this particular season of the year" toward the breeding habitat of the species. While it is assumed that birds are directed thither by the "unerring instinct" of "inherited memory," the ultimate choice of a particular district by the different individuals may be determined by a true home love, which beyond question leads birds to the same fields and nesting trees for many successive years, and possibly also their descendents for generations.

If, however, we may reason from birds to migratory fishes, whose migrations are quite as exact and methodical as those of birds, it would seem that there is still something to explain in regard to the return of birds

to practically the same locality year after year to breed. In the efforts of the Fish Commission to restock our exhausted rivers with fish it has been found that such migratory species as the shad, when placed as fry in rivers remote from the habitat of their parents, return the next year not to the home of their ancestors, as 'inherited habit' would seem to demand, but to the very rivers where they were turned out as fry. Such phenomena seem to introduce a new problem into the question which may well receive serious consideration.

Migration, as is well known, is by gradual stages, occupying many weeks, and often several months, and is largely influenced by meteorologic conditions, which govern the ever varying rate of progress, periodically accelerating or holding in check the onward movement, and giving rise to what are known as waves of migration. The beginning of return migration in spring is coincident with the first 'warm wave,' which may occur earlier or later according to the season. This first advance is usually soon checked by a falling temperature, and the movement remains stationary during its continuance, the retardation being governed by the length and intensity of the period of cold. With an immediately succeeding warm wave the northward journey is resumed, to again soon receive a more or less decided check by an alternating cold wave; and so on, with a greater or less number of repeated checks and impulses, till the various species of migratory birds have reached their summer homes. While all this has long been known in a vague way, Professor Cooke has now given us the history of the spring migration during the years 1884 and 1885 for a large number of birds inhabiting or passing through the broad region of the Mississippi Valley, and has traced in detail many 'bird waves,' with their concomitant meteorologic conditions. It is thus demonstrated that in general the migratory movements of birds in spring are governed by atmospheric changes, notably the alternation of warm and cold waves, the former favoring and the latter retarding or wholly checking movement, according to their severity. As these alternating cold and warm atmospheric waves depend upon atmospheric pressure,— the direction of winds being toward an area of low barometer,— and pass across the country from the west toward the east, warm winds blow from the south over the region south of a 'storm centre' or area of low barometer. Thus the waves of bird migration during the spring movement are not only necessarily from the south northward, but are coincident with a warm atmospheric wave and a southerly wind; and the wave of migration varies in magnitude with the duration of the warm atmospheric wave and its intensity as regards temperature.

While these are the favorable conditions for bird migration, birds move more or less under the ordinary conditions of the weather proper to the season, and are only held in check by the unfavorable conditions of a cold wave, accompanied by northerly winds and a sometimes fatal reduction of temperature.

Professor Cooke gives the average rate of movement of certain birds based on the data collected, from which it appears that the Baltimore Oriole

passed from Rodney, Miss., to Oak Point, Manitoba, a distance of 1298 miles, in 48 days, giving an average rate of progress of 27 miles per day. The records for 58 species during the spring of 1883 give an average rate of 23 miles per day. But of course the rate of progress is not uniform for even the same species, it being greater over the northern portion of the route than over the southern, and much greater during some days than others, according to whether the conditions for movement are favorable or otherwise. Also, as would be expected, the late migrants move more rapidly than the early ones.

While Professor Cooke has thus thrown much light upon the manner and coincident phenomena of migration, and made a most valuable contribution to our knowledge of the subject, his limitations in respect to the quality and number of the data at hand give a somewhat pioneer character to his work. His observers were too few and the greater part too untrained to give a satisfactory basis for the task so energetically undertaken; yet his report is a remarkably successful effort, considering the embarrassing circumstances under which he has labored; and we believe that the editor, in his prefatory letter, does not overrate its importance in considering it "the most valuable contribution ever made to the subject of Bird Migration." It gives one a vivid forecast of what may be looked for in forthcoming reports on the same subject, based on the work of many more observers, covering a much longer period.

In closing this notice it would be a grave omission not to call special attention to the model work of Mr. Otto Widmann at St. Louis (see pp. 33-37), and also the important assistance rendered by Prof. D. E. Lantz, of Manhattan, Kansas. A dozen observers like Mr. Widmann, scattered at proper intervals, would give a fairer basis for generalizations than hundreds of observers of the grade on whom Professor Cooke was obliged to depend for many of his data. This should stimulate the more experienced and well qualified field ornithologists to contribute to the fullest degree possible to the furtherance of this important investigation.—J. A. A.

Nelson's Report upon Natural History Collections made in Alaska.*—Following close upon Mr. Turner's 'Contributions to the Natural History of Alaska' (see Auk, Vol. V, pp. 409, 410) comes Mr. E. W. Nelson's 'Report' upon his natural history work in the same Territory during the years 1877–1881. Two thirds of this carefully prepared volume, or some 210 pages and 12 colored plates, relate to Alaskan ornithology. Mr. Nelson arrived at St. Michaels, June 17, 1877, which place was his headquarters, and where he passed the greater part of his time, till the last of

* Report | upon | Natural History Collections | made in | Alaska | Between the years 1877 and 1881 | by Edward W. Nelson. | — | Edited by Henry W. Henshaw. | — | Prepared under the direction of the Chief Signal Officer. | — | No. III. | Arctic Series of Publications issued in connection with the Signal Service, U. S. Army. | With 21 Plates. | — | Washington: | Government Printing Office. | 1887 [= 1888]. 4to., pp. 337. (Birds, pp. 19–230, pll. i-xii, colored.)