

tribution, will find here much valuable data; and the amateur bird student and the school-teacher with nature classes in the region treated, will have a good, reliable text-book to fall back upon. It is to be hoped that the work can be brought to the attention of the two last mentioned groups in particular.

It is fortunate, and also a recommendation for the work published by Mr. Tyler, that such competent experts as J. Grinnell and H. S. Swarth were prevailed upon to edit the paper.—FRANK S. DAGGETT.

THE SEQUENCE OF PLUMAGES OF THE ROOK, With Special Reference to the Molt of the "Face." By H. F. WITHERBY. (British Birds, London, vol. VII, no. 5, Oct. 1, 1913, pp. 126-139, pls. 4-11).

In a great deal of the work that has been done on the molts of birds, little attention has been paid to the molt of the less conspicuous feathers and feather-structures of birds, and it is a pleasure to find that this phase of the subject is coming into the prominence which it undoubtedly deserves. It is to be hoped that Mr. Witherby's investigation of the molts of the "face" of the Rook (*Corvus frugilegus frugilegus*) is the herald of much more study along this line, and that the interesting results of his research may stimulate others to do this sort of work, realizing that the less conspicuous structures are not necessarily less interesting or less significant. Throughout all the literature on the subject of molts, scarcely a reference can be found to the shedding of filoplumes, or of the down feathers of adult birds which possess them, nor has the reviewer hitherto been able to find any thorough account of the molts of the rictal and other facial bristles, ear-coverts, eye-lashes, oil-gland "tuft," or other modified feathers of the head and trunk. In a few cases the life and development of specialized feathers have been studied, as for instance the "racket" feathers of the motmots; but where is there any thorough light on the development, molt, and seasonal changes of the "brush" of a turkey, the powder down of herons, or the eye-lashes of any birds?

Mr. Witherby devotes the first half of his article on the Rook to a study of the molt and history of the feathers of those parts of the "face" which ultimately become bare, namely, the upper throat, chin, forehead, base of mandibles, and lores. The results which he obtained, well illustrated by the first seven plates accompanying the article, are very interesting in showing what the trend of evolution has been in bringing about the bare face of the European Rook (*Corvus f. frugilegus*), and in demonstrating how such bare spots may have arisen in other birds which have them. The comparison with the East-

ern Rook (*Corvus f. pastinator*) is particularly interesting. In the second part of his article, the method and general character of all the molts of the species is carefully described, so far as contour and flight feathers are concerned; but here, again, as in other literature on the subject, no reference is made to the molt and acquisition of filoplumes, relative to the contour feather with which they are associated, nor is there any statement concerning the loss and replacement of eye-lashes; moreover, it is not made clear what is the subsequent history of the nasal bristles. Nevertheless, Mr. Witherby's article is undeniably a step in the right direction, and it is hoped that it will be followed by further work along similar lines.—ASA C. CHANDLER.

A STUDY OF A COLLECTION OF GEESE OF THE *Branta canadensis* GROUP FROM THE SAN JOAQUIN VALLEY, CALIFORNIA, BY HARRY S. SWARTH (Univ. Calif. Publ. Zool., vol 12, no. 1, pp. 1-24, 2 pls., 8 text figs.).

In a paper of 24 pages Mr. Swarth sets forth his conclusions as to the status in California and probable relationships of the four forms of the *Branta canadensis* group, as derived from the study of one hundred and fifty-three skins. The author finds that great confusion has arisen in connection with our effort to understand these geese, because of the highly variable character of certain marks, notably the white cervical collar and the black throat line, marks which have previously been relied upon for diagnostic distinction. This variability is convincingly illustrated by two tinted plates, which exhibit twenty heads of *B. c. minima*, of which no two are alike in pattern, or even in correlation of the discredited characters. Mr. Swarth finds that measurements, especially of bills and tarsi, when taken in connection with the general color tone of under plumage, whether light or dark, afford the only reliable basis of distinction. He concludes from these data that the only breeding form in California is *Branta canadensis canadensis*; that *Branta c. occidentalis* has no status as a species of California, but that it is a nearly resident form occupying the humid northwest coast region, where it probably intergrades with *canadensis* upon the east and *hutchinsi* on the north; and he predicts that a closer study of conditions in the Northwest will show that *hutchinsi* and *minima* do not, as has been frequently asserted, overlap in their breeding ranges, but that a regular gradation of size from *hutchinsi* to *minima* will be found to exist as the region is traversed—though whether from east to west or south to north does not yet appear. This