

Querquedula, *Dafila* and *Nettion* are all quashed in favor of the older, inclusive, name *Anas*. This logical ruling, made in the most important ornithological work of the year, will, I sincerely hope, "impress" the A. O. U. Committee on Nomenclature with the real trend of scholarly feeling against generic splitting. Popular feeling in the same direction has already registered abundantly.

The next feature of Volume II, in comparison with Volume I (for general appraisal, see review in CONDOR, XXV, 1923, page 74), is the plethora of illustrations. There are 26 plates, mostly in color, besides 38 maps. While the color plates in Volume I were nearly all from the work of Fuertes, nearly all the plates in Volume II are from the brush of Allan Brooks; and, to date, these comprise the most worthy single offering from the last-named illustrator. The "wash" drawings, showing the nuptial behavior of several species of ducks, demonstrate Brooks' ability to observe happenings in nature with discernment of innumerable details.

From the standpoint of nomenclature, again, we note that the name of the Mallard goes back to *Anas boschas*; this is certainly far easier to write than *platyrhynchos*! The "Southern" Blue-winged Teal (*Querquedula discors albinnucha*) falls as a synonym of *Anas discors*. But the lately described New Mexican Duck is recognized, under the name *Anas diazi novimexicana*. Incidentally (page 58), a specimen of this duck is recorded from Grafton [Yolo County], California, constituting an addition to the state list of California birds.

Referring to California further: the specimen of *Anas rubripes* recorded some years ago from Willows, Glenn County, it is suggested (page 72), may have been an escape from captivity. This possibility, even probability, of which I informed Dr. Phillips, presented itself when I learned that Black Ducks had been reared regularly on certain gun club grounds in west-central California. Another species, formerly ascribed to California, but which will now need to be put on our hypothetical list, is *Anas crecca*. I agree with Dr. Phillips (p. 217) that the two old California records "require further proof"—and this is not likely to be forthcoming.

As in the case of the first volume of "the duck book," the reader finds on almost every page comments of general interest—expressions of the author's matured views in various matters. For ex-

ample: "The word *courtship* has an anthropomorphic sound, and seems to imply a conscious and previously planned series of events, but it should not be considered in this sense when applied to behavior in animals. It would perhaps be better to invent an entirely new word to cover the long series of events which result from the 'mating hunger' of animals in general" (p. 30).

With this installment of Phillips' book, the undertaking is half done; that is, as regards publication, and this must mean that a good deal more than half of the vast work of assembling and assorting the basic data for the whole thing is done,—which inference is surely gratifying all around, to author and to expectant reader, alike.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, December 16, 1923.*

WALKER ON SOARING FLIGHT.*—This paper is of considerable interest to students of flight, as it is written primarily as a criticism of the unusual views advanced by E. H. Hankin in his volume entitled "Animal Flight" (London, Iliffe), and in various articles published elsewhere. Hankin's not very hopeful conclusion, from a great mass of data on the soaring flight of Indian kites and vultures, is that the phenomenon is shrouded in complete mystery. Walker, whose observations cover the same territory and are for that reason the more valuable, finds in air currents a sufficient explanation of this type of flight.

In the early morning, in the vicinity of Agra, atmospheric conditions as affected by temperature are extremely stable up to a height of 1 kilometer, and moderately stable between 1 and 2 kilometers. In the afternoon, however, there may be a difference of 22° C. between the temperature of the ground surface and that of the atmosphere 1.2 meters above, and the temperature may drop further 17° up to an altitude of 1 km. This causes conditions of great instability, creating currents which are sufficiently powerful in April and May "to reverse the direction of the ground winds over the whole region represented by Bareilly, Lucknow and Benares."

Over rocky or sandy soil, aviators report an "upward bump" to a height of several thousand feet, and a "downward bump" on passing over green vegetation

* Meteorology and the non-flapping flight of tropical birds, by Gilbert T. Walker. Proceedings of the Cambridge Philosophical Society, vol. 21, pp. 363-375:

or water. "At Simla within 1½ hours of (after?) sunrise currents of 6 to 10 feet a second are common at heights of only 20 feet above tree-clad slopes facing the sun." At Agra a rather crude recording instrument, set on a tower 45 feet above the ground, on sunny days "indicated ascending currents beginning shortly before the upward gliding of birds and ending shortly after this had ceased."

It is stated that the "alula" type of wing has been successfully introduced in airplane design, its tendency being to reduce the angle of descent in gliding. This point, in the opinion of the reviewer, the author has insufficiently developed.

Contrary to some theorists, a steady horizontal wind is as useless in gliding as a perfect calm. But winds are constantly changing in velocity and direction. Calculations are introduced to show that the requisite energy for soaring may be derived from successive gusts of wind. This is regarded as a sufficient explanation of what Hankin calls "wind soarability" in the absence of sunshine. Also Rayleigh's theory of energy derived from a progressively increasing wind velocity with gain of altitude may occasionally suffice to explain gliding; at least it is a "useful auxiliary." In the case of gulls circling about the stern of a steamer, calculations are introduced to show that the differential wind velocity astern affords an adequate source of energy for this type of gliding.

In general, however, ascending currents are regarded as the source of energy of soaring flight. The author states: "During the past 7 years I have not seen a bird gliding upwards in a region where, from physical causes, descending currents could be expected; and in most cases ascending air has been strongly indicated."

The paper is concluded with a review of certain inaccuracies and discrepancies in Hankin's work, from the point of view of physics and mechanics, and mention of certain items of observation in which Walker cannot concur.

Most students of flight have felt that Hankin took insufficient account of known physical laws in arriving at his conclusions, and will appreciate this timely criticism, which is at the same time a contribution to our knowledge of soaring flight, clearly and concisely expressed. One lapse occurs on page 372, where the fact that kites and vultures

have difficulty in gliding at low altitudes is invoked as evidence that the ascending currents are stronger at higher altitudes, although the latter has previously been postulated in explanation of soaring.—ROBERT C. MILLER, *Department of Zoology, University of California, January 3, 1924.*

HANKIN ON THE FLIGHT OF GULLS.*—

By an odd coincidence, in the same number of the journal containing the above mentioned criticisms of his work appears another paper by Hankin in which further startling conclusions are set forth. When a steamer is under way, it is stated, some gulls may glide in the ascending currents to windward, while others soar in a "soarable area" to leeward of the stern. In the windward ascending current gain of height is gradual, with the axis of the body horizontal. But in the soarable area to leeward of stern the case is said to be very different. The gain of height is rapid, steep upward glides of 50 or more degrees occurring, "commonly to the level of the top of the stern flag-staff."

Gulls in the soarable area are further characterized by the appearance of a faint color on the wings. "The underside of the wing of a soaring bird often shows a power of reflecting color which power is usually absent when the bird is gliding with loss of height or in an ascending current of air."

But most surprising of all, the soarable area was found to be in the region of a *descending* current of air, as demonstrated by trailing strings astern, throwing grass overboard, and observing the behavior of smoke from the funnels. *Ascending currents were avoided.* If a gull happened to get into an ascending current, it was forced to flap until it regained the descending current, when it could again soar easily. The author also observed gulls soaring "in the probable position of descending gusts of wind" to the leeward of Gibraltar and Aden. In the latter case it was noticed that the wings of the gulls showed a bluish tint; but three minutes later, when the birds were gliding in an ascending current, the undersides of their wings appeared white. "Thus the evidence goes to show that near sea-level, as a

* Soaring flight of gulls following a steamer, by E. H. Hankin. *Proceedings of the Cambridge Philosophical Society*, vol. 21, pp. 426-429.