

ing on the surface. Two Sooty Albatrosses appeared in the distance, probably *Phoebetria palpebrata*, as the mantle in each was conspicuously light. The albatrosses already noted, the black petrels, and dove petrels were plentiful.

May 26: The number of birds in sight was much the same as on the previous day except that the Sooty Albatrosses had disappeared. Black-browed Mollymauks (*D. melanophrys*) were by far the commonest, including one young bird in which the bill was iron gray, and the neck suffused with gray.

June 2: (Off Cape Palliser, and along the coast to Wellington Heads.) Birds were very plentiful. *Puffinus cinereus* and the unidentified black petrel were still present, accompanied by mollymauks (*Diomedea melanophrys*), Sooty Albatrosses (*Phoebetria palpebrata*), Cape Pigeons (*Daption capensis*), Giant Petrels (*Ossifraga gigantea*) and Black-backed Gulls (*Larus dominicanus*) which appeared insignificant in size and labored in flight in comparison with the familiar oceanic birds which were still in company. Two fine albatrosses differently marked from any seen previously, were also observed. In these birds the white on the upper surface of the wings extended just to the humeral flexure (fig. 17b) and there appeared no vestige of the yellow neck patch which was a fairly constant feature of adult birds of the common form of *Diomedea exulans* and of the still more snowy form (fig. 17c). Possibly these two birds were examples of the Royal Albatross (*Diomedea epomophora* Lesson, *Diomedea regia* Buller). Our scanty knowledge of the breeding habits of this bird on Campbell Island and a section of the Antipodes shows it to be a comparatively fixed form, not passing through any brown phase of plumage at all. The first plumage of the immature bird also differs only very slightly from that of the adult; consequently no great range of variation is likely to be met with in this species. *D. exulans* apparently goes through the various brown stages until it attains the plumage usually considered adult, namely, white, with wings almost wholly blackish except for the white olecranal patch. The variable white form, however, in which the white on the wings extends far past the humeral flexure (fig. 17c) presents more difficulty in placing. Possibly the range of plumage variation in *D. exulans* extends through a stage at which it closely resembles *D. regia* and finally approximates to the form known as *D. chionoptera*, inhabiting the Indian Ocean. On the other hand, the white birds seen may have been examples of the Indian Ocean form at the eastern limit of its range.

Such a paper as the present, however, cannot hope to do more than offer suggestions in a matter which requires so much further investigation.

Devonport, Auckland, New Zealand, December 23, 1924.

AQUATIC VISITORS TO LAKE MERRITT, OAKLAND, CALIFORNIA

WITH ONE SET OF GRAPHS AND INSERTED TABLE

By A. S. KIBBE

WHILE the general situation at Lake Merritt is a matter of common knowledge, it will not be amiss at this time to state that the lake is located in the heart of a residential district, less than one mile from the city hall of Oakland, California. It is composed of sea water, admitted from the estuary through tidal gates, and is freshened by rain and the discharge from two small streams. Its periphery is about three miles in length and its area approximates 150 acres. About one-third the area is closed off during the fall and winter by a boom which prevents encroachment by boats, leaving an expanse about 2,100 feet long and 1,000 or 1,100 feet wide, dedicated to the use of aquatic visitors. Certain of the species habitually visit the shore to graze over the lawns bordering the lake or to participate in eating the grain which is spread twice daily over an enclosure which also offers a fresh-water swimming pool and sprinkling, rain-like fountains. The bulk of this class is made up of pintails,

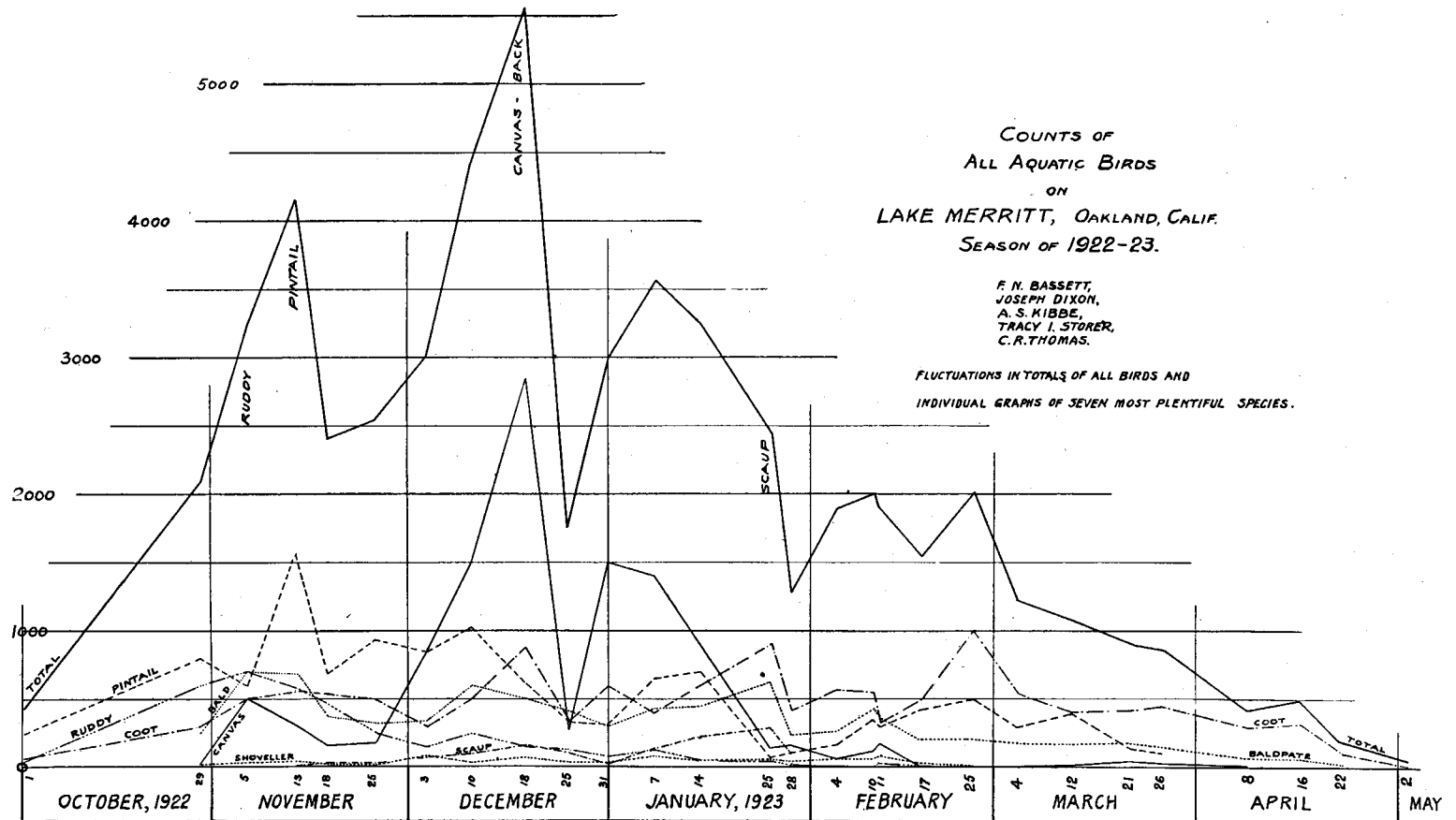


Fig. 18.

baldpates, coots, a sprinkling of shovellers, and many gulls. Uninvited guests are the flocks of tame pigeons and Brewer blackbirds. Now and again a canvas-back will wander ashore, but for the most part these ducks remain afloat with the ruddys, scaups, buffle-heads, golden-eyes, teal and others.

The Audubon Association of the Pacific has taken its January field trip to the lake for a number of years, but it was not until 1918 that a member of the association, Mr. H. Van Straaten, submitted at a meeting a census he had taken of the lake birds on January 17 of that year, when he found some 3,300 birds there. In March, he reported that the number had been reduced to 668. Mr. Van Straaten returned to Holland soon thereafter, and the matter of censuses lay dormant until January, 1920, when the counting of the different species became a part of the regular program for the annual Audubon field day at the lake. A sharp fall of rain prevented the count in 1921, but it was made in each January thereafter. These six mid-January counts fluctuated from 3,250 to 5,150, and the meagerness of the information afforded thereby led to an arrangement whereby five members of the Cooper Ornithological Club and of the Audubon Association of the Pacific undertook to make weekly counts from the coming of the ducks in October, 1922, to the time of their final dispersion in May, 1923. The group was made up of Messrs. F. N. Bassett, Joseph Dixon, A. S. Kibbe, Tracy I. Storer and C. R. Thomas. The last-named gentleman had taken a count on October 1, which served as a start, but it was impossible to inaugurate the regular schedule until October 29. With some slight unavoidable irregularities the counts were maintained until May 2. Through a misunderstanding, counts were made on two successive days in February, thus affording an unintentional check between two observers.

The results were, in a sense, disappointing. The fluctuations in the numbers of the seven principal species precluded the making of a composite chart which would have any value and it was obvious that random counts at weekly intervals would leave vital questions unanswered. These facts and the pressure of other business postponed the publication of the data, and it was hoped that some means might be found in the succeeding season to devise some scheme whereby critical dates might be determined and counts made thereon. The season of 1923-24, however, was marred by dredging operations throughout the lake, and by the fruition of an idea in the mind of someone in a position of authority, to the effect that the birds in question needed an island. After our experience of the previous season, the making of counts in an atmosphere of constant disturbance was not attractive and no effort was made to organize a corps of observers, nor was it possible to do so for the current season, 1924-25.

In pursuance of requests from interested parties, the results of the above-mentioned counts are herewith submitted for what they may be worth, in two forms, tabular and graphic. Ten species appear neither in the tabulation nor the plotting of individual species, but their numbers are included in the grand totals.

The number of gulls frequenting the lake would probably average 150 to 200. The dominant species is the California, with ring-billed represented more than half the time. Glaucous-winged are present almost always, and occasionally to the number of 100. A few Bonapartes will appear now and then, and casual visits are made by western, herring and Heermann. Very rarely, a cormorant appears, a sandpiper or a few terns. As gulls are constantly flying over the bay cities all winter, and as the supply in the bay district is inexhaustible, there is little point to the recording of their numbers. We have had a European widgeon, and perhaps two, for guests at various seasons, notably 1922 and 1923.

The absence of any recording of mallards may excite some surprise. We have

constantly with us some hybrids which are understood to have been raised about the lake or park. The island may lead to an increase, but exotic specimens and partially tame ones do not appear to have a place in any such study as ours. The ordinary count of mallard-like birds ranges around two dozen, but the mallard score occasionally reaches between 30 and 60, so some real mallards may visit the lake now and again.

Following the columns of specific observations, there are given the total numbers and the averages per observation of eleven of the species observed between October 29 and April 8, inclusive. At the end of the table are given the results of the six mid-January counts above referred to.

The graphic chart, as submitted herewith, appears to the writer more fruitful of indications of what we would like to know, than of definite data. It does, however, afford suggestions of a number of interesting problems in bird psychology.

The four names printed vertically indicate the dates upon which the numbers of ruddy, pintail, canvas-back and scaup reached their well-defined maxima, greatly in excess of any subsequent record. The baldpate and shoveller develop no such characteristic. The baldpate, like the coot, seems to do what other masses of birds do, but whether they lead or follow is not clear.

The one striking feature of the chart is the indication that something very unusual happened during the week before Christmas, 1922. Here is a critical period to which nothing less than a daily count would afford a solution. It will be seen that 90 per cent of the canvas-backs departed the lake in that week, and of these nearly one-half returned the week following. The numbers of each of the seven species dropped remarkably in the same week, and in every case except that of the canvas-backs, reached higher numbers thereafter. Did the canvas-backs think they were starting away? Did they leave *en masse*, and drag a large portion of the others with them, and did something outside drive half of them *back*, OR, did some occurrence at the lake drive them all away at once? A daily count for these two weeks would be of intense interest. A third explanation is possible, namely, that we have here recorded an annual occurrence, and if so, it would seem that mid-January is a period too critical for mere annual counts to afford valuable comparisons, and it might be wiser to move them back to mid-December, before the canvas-backs become all stirred up and jumpy. The tabulation of the six mid-January counts adds color to this hypothesis. There are two high counts and four medium counts. The 1925 count was made one week after the Audubon field trip because of unfavorable conditions encountered. The writer made the count, and his first impression on reaching the lake was that there were about one thousand birds less than had been on the lake during the previous Sunday, when he had been unable to count them in detail. If this were true, the count of 3,800 made on January 18 would have been 4,800 on January 11, and the decrease from the 5,100 of January, 1924, would have been inconsiderable. Following a study of the chart and tables, the writer is not unwilling to believe that the total numbers of the seven principal species visiting Lake Merritt during the six latest winters have not materially changed, with the possible exception of the shovellers. The 1918 and 1920 counts of this species reached 250 and 350, and nothing like these numbers have since been observed.

But, when all is said, we still lack any definite conception of the degree to which the visitants to this favored shelter might stand as criteria of the situation in which the great mass of like birds which pass through, or loiter within, the bay district, find themselves.

Berkeley, California, February 8, 1925.