

# THE CONDOR

## A Bi-Monthly Magazine of Western Ornithology

---

Volume XXV

March-April, 1923

Number 2

[Issued April 3, 1923]

---

### THE FULVOUS TREE-DUCKS OF BUENA VISTA LAKE

By DONALD R. DICKEY and A. J. VAN ROSSEM

WITH SIX PHOTOGRAPHS BY THE AUTHORS

IN VIEW of the varying accounts of the breeding and behavior of the Fulvous Tree-duck (*Dendrocygna bicolor*), the data we have gathered during recent field seasons may possibly be of interest to CONDOR readers. The fact that all the following notes were made at Buena Vista Lake, Kern County, California, must be borne constantly in mind, for these birds are so erratic that field work in a different locality might result in findings not entirely consistent with those recorded here. In Tulare County, for instance, the junior author found the species nesting much earlier in 1919, and frequenting an entirely different type of marshland.

One very important factor which must be taken into consideration in any study of conditions at Buena Vista Lake is the variable water level. In former years this lake maintained a much more stable depth than it does today, for it was automatically kept full, or nearly so, by the flow of the Kern River. The increased practice of irrigation, however, has diverted more and more of the water, until now the lake receives only the surplus of the flood season when the melting Sierra snows deliver more water than can be handled by the present canal system. This excess is turned into the lake, which then becomes a broad shallow reservoir, approximately eight miles east and west, by six miles north and south. After the flood season is past and the river no longer furnishes the requisite increment, this shallow storage basin is drawn upon as needed, until by the next spring there remains only a small pond of alkaline water surrounded by a wide expanse of mud. Conditions vary from year to year, depending upon the rainfall; but one can easily conceive of what normally happens to such duck nests as are built before the high water mark is reached. The flood usually starts about May 1, and continues steadily until the first week of July, resulting in an average rise of about an inch a day in the level of the lake. Nests which float readily do not suffer to any great extent, but as comparatively few ducks build this type of nest the vast majority are forced to try again and again, with only occasional success.

The resumé of our observations and journal notes concerning the Fulvous Tree-duck can be most conveniently divided into the following subheads.

HABITAT.—In summer, Tree-ducks were found feeding or flying about all parts of the lake where suitable cover afforded protection for resting or feeding birds, but were never seen at any great distance out on the open water, or away from the immediate vicinity of the shore. In 1920 and 1921 they preferred an area of wild timothy which was dotted with tule clumps and flooded to a depth of about six inches with fresh running water. This afforded at once food and nesting sites. In 1922, on the other hand, the lake reached the highest level attained in many years, and completely inundated all of the for-

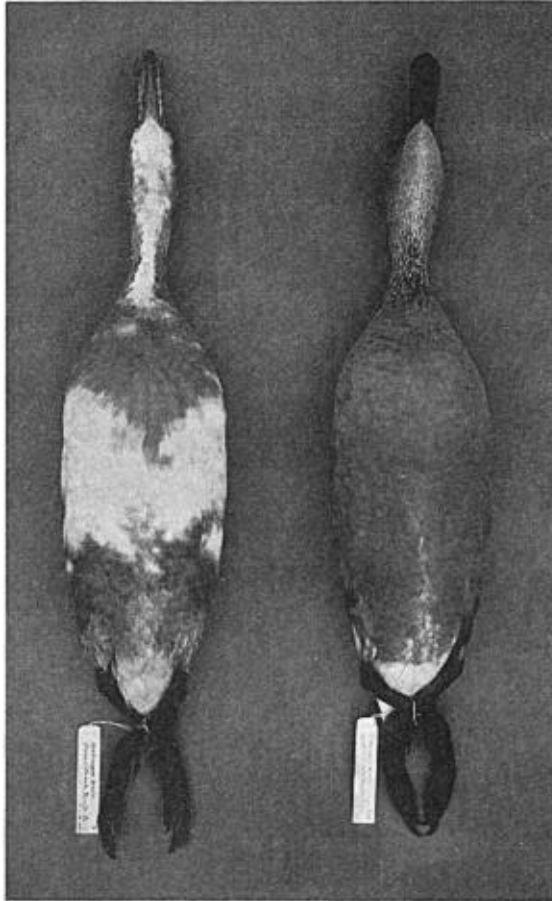


Fig. 15. AN ALBINISTIC SPECIMEN OF *Dendrocygna bicolor*.

mer marshlands. The dense growth of *Polygonum* which covered the lake bed in early May kept pace in its growth with the rise of water, and finally resulted in dense and often impenetrable cover. In this tangle the Tree-ducks found a secure retreat during the summer and early fall.

BEHAVIOR.—With the possible exception of the Coot, it would be difficult to conceive of a more sociable water bird than the Tree-duck. Even at the peak of the laying season in late June, the great majority of birds were continually gathering into small groups of two or more mated pairs. These groups

broke up in the early morning during the laying hour, but assembled again by noon to feed and rest together. Throughout the laying season, the male was in almost constant attendance upon his mate, or at least in her near vicinity. When a single bird was flushed, it would be joined almost immediately by its mate, and both would then circle the intruder at forty or fifty yards, keeping up a constant whistling. There were in addition to the small groups of mated birds several much larger flocks, which were probably composed of unmated birds and non-breeders. Two females which were shot from such flocks on June 2 and July 17, 1921, showed but little trace of breeding activity, and were very fat, whereas all obviously breeding males and females were noticeably thin. Such flocks, when flushed, were very apt to leave the locality at once, in marked contrast to the action of the smaller mated groups and pairs. These non-breeding flocks gradually diminished in size, reaching a minimum about the 10th of July. After that date, their ranks were again augmented by large numbers of birds which had probably become discouraged by the continual flooding of their nests and had given up nesting operations for the season. When going through the combined breeding and feeding ground, with ducks rising continually, it was often difficult to decide which had been merely jumped while feeding, and which had flushed from nests, but by carefully marking the spot and noting the subsequent actions of each bird flushed, one soon became quite proficient in finding nests. Notwithstanding the marked anxiety displayed by the parents when once they are in the air, they are conspicuously shy on the nest, usually flushing at about forty or fifty yards. One bird, however, proved a distinct exception to this rule of behavior. Despite the very exposed situation of the nest, this individual stuck tenaciously to its clutch of twenty-three heavily incubated eggs, and permitted close approach on many occasions.

In 1921, wild timothy probably formed the bulk of the birds' food supply during the summer months, as shown by the examination of several stomachs. In 1922, however, the most available foodstuff during the late summer and fall was the seed from several varieties of *Polygonum*. In getting at these foods, the birds usually settled in a small open space and pulled the heads down one by one, instead of flattening out a feeding area by dropping on the grain itself.

While the species is largely diurnal, there is unquestionably a certain amount of activity after dark. Very often in the early evening just after dusk, large bands of Tree-ducks could be heard flying about, all whistling and squealing at top pitch. Such flocks can be heard for some distance and their route followed by the characteristic and unmistakable notes which are given almost continuously in flight. This whistle is not too easy to describe, although it can be easily imitated. The native Salvadorean name for the Black-bellied Tree-duck is *Pi-shi-shi*, in onomatopœic imitation of its whistle. The double, or rarely triple, note of *Dendrocygna bicolor* is very similar, but differs in being a little more forceful, with a vocal quality which the true whistle of *Dendrocygna autumnalis* lacks. In the call of each species—whether it be of two notes as is usually the case with *bicolor*, or three, as with *autumnalis*—the stress falls always on the second syllable. The note varies a good deal with circumstances, being loudest and most forceful during night flights, and very querulous when the birds are on their nesting or feeding grounds.

The large wing-surface of the species permits of comparatively slow flight on occasion, and a good deal of hovering is indulged in when alighting. But in direct and hurried flight the birds are capable of a very high rate of speed, probably equalling that of the Redhead. They are very curious and decoy readily to even a crude imitation of their whistle, and will often come up from some distance to investigate any unusual occurrence or object.

Tree-ducks are very easily killed not only on account of their usually unhurried flight, but also because of their inability to stand punishment. Most of the specimens taken were shot with a .410 gauge collecting gun at an average range of about forty yards. Their bones are very brittle. For example, the humerus and femur can be easily broken with one's thumb and forefin-

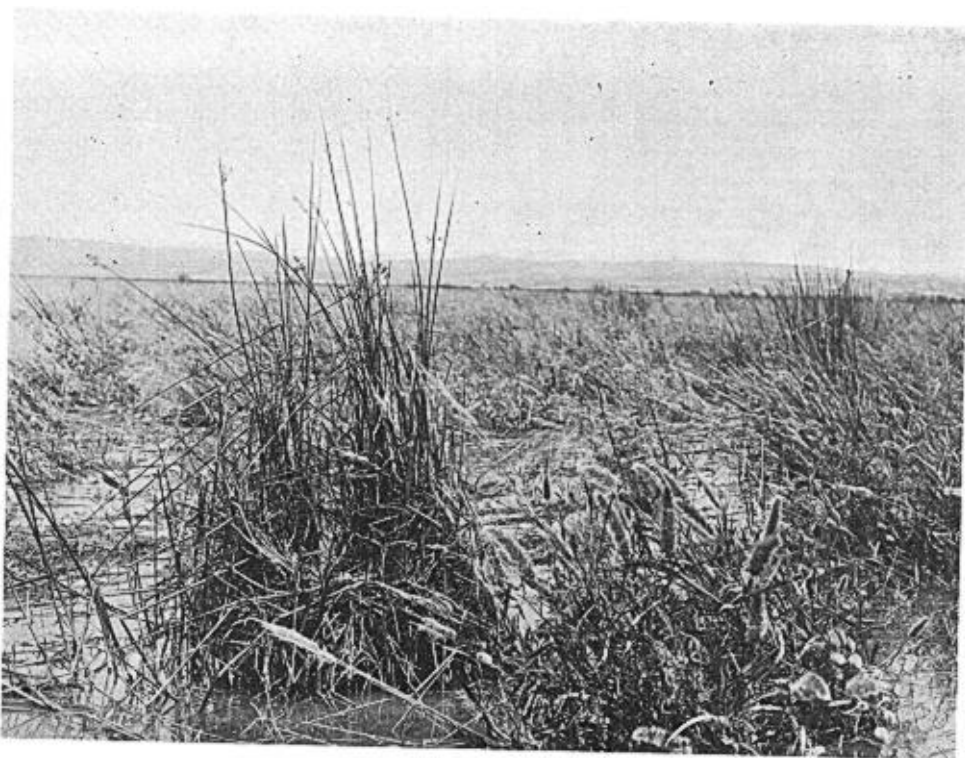


Fig. 16. THE TREE-DUCK NESTING GROUNDS AT BUENA VISTA LAKE. THE SITE OF NEST SHOWN IN FIGURE 14.

ger; even no. 8 shot at forty yards will fracture these bones. The birds are adept at diving, and even when sorely wounded manage to submerge and burrow under fallen weeds or tule roots. If one can see the exact spot where the bird went down, however, it is usually an easy matter to locate it by feeling with the hands and feet, for it is almost always to be found within ten feet of the place where it submerged.

By the first of September, 1921, all Tree-ducks had left the lake. Most of the water had been drawn off for irrigation purposes by this date, leaving only a shallow alkaline basin, miles from the original shore line, and entirely barren of cover. As such a condition offered no attraction, either in the way of

food or shelter, the birds had left the vicinity. In 1922, however, fall conditions were much more favorable. In this year there was an unwonted persistence of high water, with consequent cover and an abundance of food. By the first of October, therefore, the already numerous summer population was augmented by thousands of new arrivals from less favored localities, and by migrants which found here sufficient inducement temporarily to halt their southern flight. Soon after the first of October, the normal southward migration, added to the opening of the shooting season, rapidly decreased the flocks. Advancing the opening of the season from October 15 to October 1 would therefore seem to be a mistake from the standpoint of the preservation of this interesting southern species within the limits of California, since it resulted in the death of thousands of birds which would in the former course of events have been safely out of reach by the opening day. To make matters worse, there were vastly more birds killed than recovered by the average careless gunner, for on account of their habits and flight routes they usually fell in dense weeds, and so were lost. In fact, it was not unusual to see hunters recover but a single duck out of five or six, and in one case eight, knocked down from a passing flock. At least fifty per cent of the ducks killed between October 1 and October 10 were of this species. After that the proportion declined rapidly, and by October 15 the great majority had disappeared, only three or four Tree-ducks being included in the average "limit" bag on that date. On October 16, the total birds to be seen about the lake did not exceed two hundred individuals. On October 22, there was a decided increase, possibly due to the influx of a new migration wave, but the effect was only temporary.

On December 2, the authors revisited the lake, and while they did not themselves see any Tree-ducks, two birds were brought in by another hunter who reported having shot them from such a considerable flock as to suggest that a few healthy birds had remained until this date. From December 29, 1922, to January 1, 1923, van Rossem again watched conditions at the lake, but at this time careful observation failed to locate even a single bird, nor had any been brought in by the hunters for over two weeks. It is probable that a certain number of wounded birds will be present all winter, because of their inability to join the southward flight while the migration stimulus was still in force. Anyone noting Tree-ducks in California at extremely late dates should therefore take this factor into account as the probable cause of these mid-winter records.

NESTING.—With a single exception, all 1921 nests were placed in tufts of a dwarf species of tule (*Scirpus* sp.). Situations which would often have afforded much better cover, such as close-growing patches of knotweed (*Polygonum*), thick stands of timothy, or dense weed-clumps, were absolutely ignored. The one exception was a nest located in the center of a clump of another species of larger tule, which is also common about the lake. This nest was a flimsy platform probably started by a Ruddy Duck or Coot and never finished. In the construction of a typical nest, spears in the center of a tule clump would be pulled down, and on the resulting platform, a few square inches in area, the first egg would be laid. This beginning was elaborated day by day to accommodate the growing clutch. By the time the set was complete, the finished nest consisted of a compactly matted and well-cupped bed

of stems, usually interspersed with a small amount of fine weed or grass stems, and lined with stray bits of down and feathers. Sometimes tule stems alone were used. The other extreme was a rather exposed nest built almost entirely of weeds and grass and placed in the center of a tuft of a few score scattered stalks. Occasionally definite arching or partial doming of the nest was to be observed, after the fashion of the meadowlarks and the Oven-bird. The bits of down usually found in a nest containing a hard-set clutch were probably dropped during the normal course of preening while on the nest, for contour feathers were not uncommon at such times. This casual—one might well say purely accidental—use of down in the nests of *bicolor* is in interesting contrast to the profuse employment of down in the nesting holes of its more tropical congener, *autumnalis*. In Salvador the junior author found the

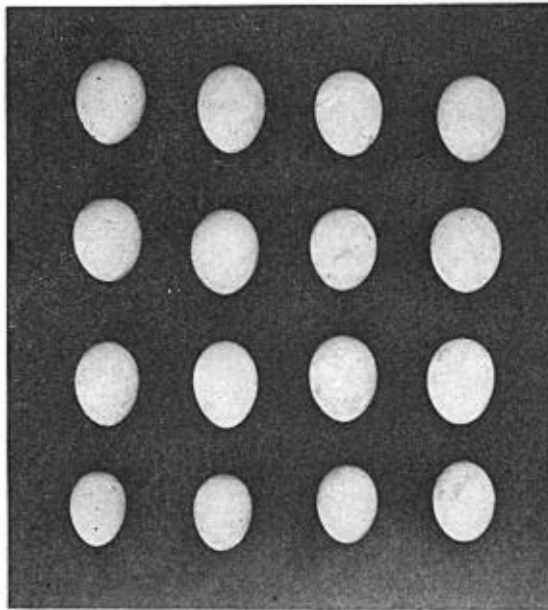


Fig. 17. SIXTEEN EGGS FROM ONE NEST OF THE FULVOUS TREE-DUCK, SHOWING VARIATION IN SIZE AND SHAPE.

hollow-tree nesting sites of the latter species lined with a densely packed mattress of down and feathers in every instance that came to his attention.

The matter of colonization may be accounted for either by the social and gregarious instinct of the species, or by the strict limitation of the area in which grew the dwarf tules of their preference. Probably both factors entered in. Whatever the reason, some fifty nests were found in 1921 on an area about one half mile long by two hundred yards wide, and there were undoubtedly many more which escaped detection. This does not mean that any such aggregation of nests was present at any one time, for observation covered the period between June 1 and July 15. Nor were all sets by any means complete. Many were deserted for no apparent reason, while others were flooded out by the rising water. Several sites were classed as nests only out of deference

to the fact that eggs had been deposited there, for in some cases the eggs had been dropped so casually and rolled together so carelessly as to suggest a chipmunk's storehouse rather than a premeditated set. Such eggs we believe would never have been incubated. The "set" of twenty-nine mentioned farther on was in a cleft in a tule tuft so narrow that the eggs were in several layers, and a touch sent some into the water to join the half-dozen already there. One nest found on July 5 held one egg each of the Ruddy Duck, Pintail, and Fulvous Tree-duck; another nest on the same date held two eggs of the Ruddy and two of the Fulvous Tree-duck. On July 13, two more Tree-duck eggs had been added to each nest, but there were no more additions on July 15, our last day in the field during the nesting season of 1921. This shifting of maternal cares might arise from any one of several causes; probably all of those mentioned here have some bearing at one time or another. The destruction of her own nest before the set was complete might cause the homeless bird to lay the remaining eggs wherever she could find unguarded nests. Another possibility is that there is a streak of parasitism in the *Dendrocygna* make-up, a tendency which would be stimulated by the destruction of the original home. In the case of unmated but laying females this trait would be still more apt to crop out. Least probable of all is that forgetfulness of the exact spot where her own nest is placed leads her to deposit her egg in another nest close by. Circumstances occasionally made this last hypothesis seem possible, despite the lack of analogy in other species.

The summer of 1922 was a year of abnormally high water. The nesting grounds of the previous year were flooded to a depth of five feet, so that not a single tuft of the small tule was to be found. The result was a complete reversal of the colonizing rule of former years. Nests were generally isolated and placed in all sorts of locations. Because of the great area covered by weeds, it was difficult to find many nests; most of those encountered were simply stumbled on, more or less accidentally. In this year, nests were found in dense clumps of the larger tule, both green and dead; in knotweed, and even built of floating material in open water, with absolutely no concealment! In all cases they were made of whatever material was close at hand. In other words, if a nest was situated in or on a raft of dead tules, it was sure to be made of brown tule stems; if in a clump of knotweed, then knotweed was used almost exclusively, although often in the latter case a light lining of dryer material such as grass stems was added.

The average number of eggs laid by a single female is a difficult problem to determine; however, ten to sixteen will serve as an approximate average. Most of the nests to which eggs were added at the normal rate of one a day fell between these figures. The larger sets are usually open to suspicion. On June 11, 1922, a Tree-duck's nest was found in a very exposed site on a half-submerged tule raft through which a few green spears of new growth protruded. At that time it contained two eggs. One egg a day was added until there were six on June 15. By 9 A. M. of June 16, four more had been laid! The next day saw three additions; the next day two, one of them being a runt; with one addition for each of the two following days. Thus in a "set" of seventeen eggs there were at the very least six "parasitic" eggs. When this set was blown, seven of the eggs, including the runt, proved to be infertile, while the other ten showed progressive incubation. This may have been pure coin-



Fig. 18. AN EXTREME EXAMPLE OF THE EXPOSED TYPE OF NEST.



vidence—it very probably was—but it at least suggests the possibility that the many foreign eggs one finds are the infertile product of unmated females. There was of course no way by which to distinguish the eggs laid by the owner from those foisted upon her by uninvited guests; for the individual variation even among eggs presumably laid by the same bird is very great (see fig. 17).

Another community nest had a still more varied history. On July 6, a set of twelve heavily incubated Tree-duck eggs was taken from a rather massive and well-built nest which was placed in a strip of tules beside the outlet canal. The next day this nest was found in a torn and dishevelled state, exposing a single ancient Redhead egg which had probably been covered in the nest when the Tree-duck took possession. On July 20, this nest was again examined, and was found to contain two very old and very rotten Redhead eggs, two Tree-duck eggs which had been laid about a week, and four fresh eggs of the Ruddy Duck.

The largest set encountered was taken on July 5, 1921. It contained twenty-nine eggs, which ranged from fresh to a trace of incubation. Two eggs were certainly infertile, and doubtless many more would have proved so had any real test been made. The eggs in this set were in three layers—thus making a mass of eggs nearly as deep as the nest was wide. When over fifteen or sixteen eggs are laid, they are pretty sure to be piled two deep in spots, but unless an exceptionally large number of eggs is to be covered, they are brooded in a single layer. The earliest date on which eggs were found was June 1, 1921, incubation in the sixteen eggs varying from fresh to one-third. Much the latest set was found on August 12, 1922; it contained eight eggs which were nearly ready to hatch. A female taken August 13 was in full breeding condition and contained an egg with shell partly formed. This may indicate a still later nesting, but the probability is that she was merely dropping eggs and had no nest.

The period of incubation is twenty-five days. In most of the sets which were collected and prepared, the incubation was found to be progressive, that is, it varied from fresh to about one-third, or even one-half, depending upon the number of eggs, thus showing that the young must hatch in the order in which the eggs are laid. In other sets it was absolutely uniform, so that no rule in this regard can be laid down. A possible explanation of the progressive cases is that the sun heat initiates development in some eggs as soon as they are laid. The local temperature in midsummer runs from 100° to 115° in the middle of the day, and there is not sufficient change at night to seriously chill the eggs. Moreover, the eggs of this species display remarkable vitality and persist in developing under even the most adverse conditions, as the following instance will show. Nine fresh eggs from incomplete sets in flooded nests were put under a domestic hen. These eggs had been under water for periods ranging from one to three days! Despite this unpropitious start, one of the eggs hatched in twenty-five days. The other eight were broken for examination on the twenty-seventh day. In three cases, the young were found to have died in the shell when on the point of hatching, while the other five were addled. This vital embryonic persistence in the face of adversity seems truly remarkable.

PLUMAGES.—The natal down of the Fulvous Tree-duck seems to be so little known that we deem it advisable to describe in detail the two twenty-four-

hour-old chicks in our collection which represent that stage. The color terms employed are from Ridgway's Color Standards and Nomenclature (1912).

Number J 862, ♂, newly hatched young, Buena Vista Lake, Kern County, California; June 25, 1921. Whole top of head, including lores and space below eye, uniform dark mouse gray. Hind neck, sub-auricular streak extending from hind neck to beneath



Fig. 19. AN EXAMPLE OF DOMED ARCHITECTURE.

posterior portion of eye, and entire upper parts, including sides of body and outer surface of wings, uniform mouse gray (intermediate between mouse gray and deep mouse gray). Supraloral spot, ring around head separating crown from hind neck, lower face, chin, throat, sides of neck, under sides of wings, and entire under parts, white—pure on chin and tinged with mouse gray across pectoral and posterior regions. Upper man-

dible dark plumbeous, nail clay color, lower mandible (dry) maize yellow, legs and feet (dry) deep neutral gray, claws (dry) clay color. The lines of demarcation between white and gray areas are sharpest on head and most indistinct on body areas.

Number J 889, sex ?, newly hatched young, Buena Vista Lake, Kern County, California, July 4, 1921. Differs from the foregoing in having a partially concealed white spot on each side of back near the bases of the wings, exactly paralleling the similar spots seen in almost all young ducks of the same age. It will be noted that in this feature this specimen differs from the description given by Grinnell, Bryant, and Storer in *The Game Birds of California*, pp. 246 and 250, showing that at least a strong indication of this character is sometimes present. It will also be noted that in both our birds there is a strong pectoral wash.

As the young develop, the head markings soon become obscure and the gray areas muddy, taking on a decided brownish tinge. A one-third-grown bird is just assuming the juvenal plumage. This appears first on each side of the back at the bases of the wings, and simultaneously across the pectoral region, along the anterior portion of the flanks, and on sides of the face.

The complete juvenal plumage is similar to that of the adults, but is of very much looser texture, and the feathers are decidedly narrower and longer. In color it differs as follows: Everywhere paler; the blacks less pure, and strongly tinged with brown; the white areas on the feathers of the flanks, rump, and neck usually duller, or suffused with buffy; brown tipping on the back and scapulars duller, with the line of demarcation indistinct or sometimes lacking altogether. The chestnut on the wing coverts seems to be purely an individual character, although averaging brighter in adult birds. It may be very pronounced or almost lacking, irrespective of age or sex. A good mark of immaturity is the shape of the bill. The lateral outline of the juvenal culmen is nearly straight, with practically none of the concavity so pronounced in mature birds.

The first fall, or immature, plumage is attained about the middle of October, and so far as observed is identical with that of fresh fall adults, save that the brown tipping on the back is usually a shade darker in the young birds. The entire juvenal plumage including the rectrices is shed, save only for the flight feathers of the wings, which are probably retained until the next fall. Most of the birds of the year are on the way south before this moult is complete, and the majority of juveniles examined during the first two weeks in October had only a sprinkling of new feathers. Toward the latter part of this time, however, enough evidence had been gathered to establish a complete moult, with the one exception of the wing feathers, as noted above.

The moult of the adult occurs somewhat earlier and is complete in most birds by the first week in October. During the period when the primaries are being shed it seems impossible to obtain specimens, for the birds then keep to the dense weed cover, and escape by diving or hiding, in both of which accomplishments they are remarkably adept. The only data secured covering the adult primary moult were gained by examining hundreds of ducks killed by hunters. On October 3, one was found which still had the bases of all flight feathers encased in sheaths, showing that these are acquired simultaneously, as is the case with other ducks.

Among the hundreds of individuals examined and the thousands seen during the three summers spent among them, only one departure from the normal type of coloration was observed. This was a partially albinistic adult fe-

male taken July 12, 1920 (see fig. 15). When captured, it contained a fully formed egg, and was accompanied by a normal male.

There are admittedly many points in the foregoing paper which are imperfectly covered, or have been passed over more or less hurriedly because of lack of data on which to base conclusions. Our personal field work, however, in the locality in which these observations were made is practically completed. There is therefore so little likelihood of our gaining further information on these points for some time to come that it seems best to contribute without further delay the few items we have to add to the life history of this comparatively little known, but unusually interesting duck.

*Pasadena, California, January 25, 1923.*

## WILLIAM WIGHTMAN PRICE

By WALTER K. FISHER<sup>1</sup>

WITH TWO PHOTOGRAPHS

**D**URING the pioneer decade following the opening of Stanford University, in 1891, an enviable zeal for exploration characterized the institution's activities in the field of zoology. Natural history was appraised at its real worth, and expeditions, prosecuted under both private and governmental auspices, visited various parts of Alaska, Bering Sea and the Arctic Ocean, Lower California, Mexico, Panama, the Galapagos Islands, Hawaiian Islands, Samoa, and Japan. Nearer home, the valleys and mountains from Washington to Arizona were scrutinized, while the new Hopkins Seaside Laboratory on Monterey Bay stimulated and broadened students as no other experience could have done. Men who have now reached middle age were then emerging enthusiastically from their "teens" and were nothing loath for a spice of action to mix with the pabulum of learning. They approached biology as it should be approached—with a healthy curiosity, through the door of natural history—and grew to be ecologists without the damper of jargon and dogma.

William Wightman Price was one of these men. Doubtless the younger generation of ornithologists know few of that coterie<sup>2</sup> of explorers except by hearsay, an occasional record, or a museum label. In the course of time some

<sup>1</sup>The writer wishes to acknowledge, with thanks, aid rendered in the preparation of this article by Mrs. Bertha de Laguna Price, Mr. Robert M. Price, Dr. Ray Lyman Wilbur, Mr. Dane Coolidge, Dr. O. L. Elliott, and Professor J. O. Snyder.

<sup>2</sup>Among the students most interested in field work of various kinds were the following: J. F. Abbott, Malcolm Anderson, W. F. Allen, Norman Buxton, John Colliver, Dane Coolidge, G. B. Culver, R. W. Doane, Marion Dole, W. K. Fisher, Joseph Grinnell, Arthur Greeley, Flora Hartley (Mrs. C. W. Greene), Lou Henry (Mrs. Herbert Hoover), Edmund Heller, Dora Moody (Mrs. T. M. Williams), A. G. Maddren, R. C. McGregor, Chester McGee, W. H. Osgood, K. Otaki, C. J. Pierson, W. W. Price, Cloudsley Rutter, Alvin Seale, Elsie Shelley (Mrs. Harold Heath), J. O. Snyder, R. E. Snodgrass, Norman Scofield, E. C. Starks, J. M. Stowell, John Van Denburgh, R. L. Wilbur, T. M. Williams. Among the instructors (in the field often rather difficult to identify by current definitions and descriptions of university professors) were Harold Heath and C. W. Greene (as yet with pinfeathers), D. S. Jordan, C. H. Gilbert, O. P. Jenkins, W. W. Thoburn.