AN ABNORMAL WING DEVELOPMENT IN A PINTAIL DUCK

WITH TWO ILLUSTRATIONS

By HILDEGARDE HOWARD

Note: In presenting the following case, it is the writer's aim merely to present the evidence as it was presented to her, coupled with the facts as she has observed them.

On September 27, 1929, Mr. Fisher C. Baily sent to the office of Mr. George Willett, Ornithologist of the Los Angeles Museum, a male Pintail Duck (*Dafila acuta*). Mr. Baily explained to Mr. Willett that the duck was a pet that had just died and that he thought the Museum would be interested in it because its left wing had been severed some time before and a new one had grown in its place. The detailed history of this bird as later told to Mr. Willett and the present writer is as follows.

About 17 miles northwest of Wasco, California, in the duck season of 1926, Mr. Baily had shot the duck, then adult. The shot broke the bird's left wing through the carpo-metacarpus. Mr. Baily wished to keep the bird alive, and prepared to doctor the badly broken wing. [From other remarks made during the course of the conversation, it would appear that this operation was not unfamiliar to Mr. Baily, since his interest in birds, as a hunter and bird bander, and in handling birds as pets, has necessitated similar operations at various times.] He first removed all of the feathers of the entire wing, leaving only a sparse covering of pin feathers. This, he explained, was to prevent any possibility of irritation of the wound by dirt collecting on the feathers. He then laid the bird on a table, spreading the wing out, and with a large hunting knife severed the wing through the broken portion, making a clean cut. He then cauterized the wound thoroughly with iodine.

The duck was brought to Mr. Baily's home in Los Angeles and kept with his other birds. It was fully a year later, Mr. Baily said, before he noticed any peculiarity in the bird's wing.

After Mr. Baily had joined the Biological Survey, in 1928, the duck was banded with no. 639448. At this time Mr. Baily made the following notation regarding the bird, in his report to the Survey: "Old Sprig Duck with broken elbow. Has grown a new elbow; old elbow still hanging. Only case known to any naturalist consulted." [Apparently the angle at which the new portion joined the old led Mr. Baily to the supposition that this junction represented an elbow, in addition to the true elbow which had never been removed.]

At the time it came into the possession of the Los Angeles Museum, the bird had been with Mr. Baily three years. At this time the abnormality of the wing was immediately noticeable in the angle at which the new portion joined the old (see fig. 21), and in the fact that the new part hung loosely upon the remainder of the wing. Mr. Baily remarked that the bird, when alive, had a habit of twitching this tip of the wing, although it was entirely useless in flight and could not be moved normally.

The new portion of the wing was about 102.5 mm. long to the tip of the longest feather. There were five partially developed primaries present; four other feathers of good size were present, but from their position, coloring and general appearance they were taken to be primary coverts. There were no primaries on the remaining portion of the wing, but two old and hardened quills, 10.6 mm. in length, showing evidence of having been cut, were noted.

The cut in the wing occurred through the carpo-metacarpus about 34 mm. from the carpal joint. This "stump" (see fig. 22, cc') could be felt protruding slightly behind and under the new portion of the wing.

The new and old portions were held together by means of tissue which was continuous, from one part to the other, in only two places, both on the upper side of the "stump", with a gap of 3.3 mm. between them. The most proximal connection (see fig. 22, *a*) measured 6 mm. in length (from bone to bone), the other, which was more distal and posterior in position (see fig. 22, *b*), measured 3.5 mm. Each connection was entirely lacking in cartilage or bony substance. The space between the connections was an evenly rounded hole entirely bounded by tissue.

The new portion of bone was held in place by these tissue connections, 4 mm. proximal to the end of the "stump", and above and toward its outer, or anterior edge (with the wing spread). (See fig. 22; dotted lines indicate "stump" lying under the new bone.)

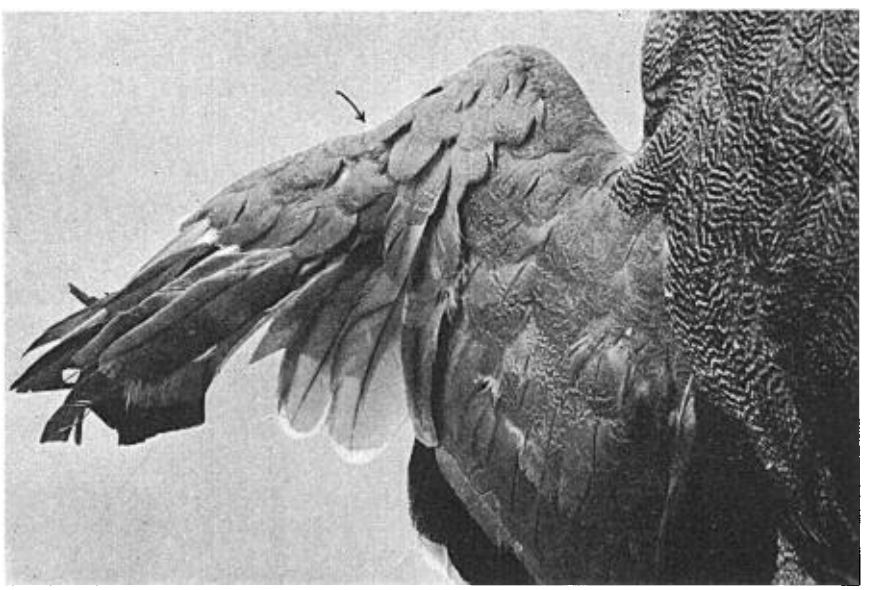

Fig. 21. LEFT WING OF PINTAIL DUCK, VIEWED FROM ABOVE. ARROW MARKS JUNCTION OF NEW PORTION OF WING WITH OLD. APPROXIMATELY × ¾.

Photograph by H. Wm. Menke.

The tissues were dissected away to reveal the bone.

On the "stump", 6.7 mm. proximal to the end, the bone was enlarged, showing signs of excess callus. Metacarpal III was joined to metacarpal II at this point, and a roughened area, 7.4 mm. long (see fig. 22, *d*), was present along the anterior edge of the upper side. The bone distal to this enlargement had a diameter of 3.8 mm. as against 4.6 mm. for a normal carpo-metacarpus in this region. According to Dr. Roy L. Moodie, who has made a study of pathological conditions in bones, and to whom the writer showed the bone in question, the condition noted here indicates atrophy.

With the outside tissue pulled away, a direct tissue connection from the tissue surrounding the new portion to the roughened area of the carpus was noted (approxi-

mately as in *e* in the figure, though no attempt has been made to indicate that *e* lies beneath *a*). This connection occurred between the other two connections and at a deeper level, differing from them, also, in being attached solidly to the bone along the roughened area. It appeared at first to be about 1.8 mm. broad and 2.9 mm. long, and to be attached only to the lower end of this area. Upon attempting to dissect it away from the bone, however, it was found to be closely attached along the entire 7.4 mm. of the length of the roughened area. This connection, like the others, contained no bone or cartilage.

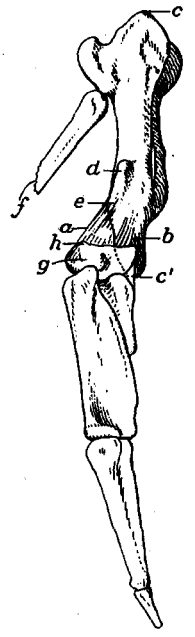

Fig. 22. CARPO-METACARPUS AND DIGITS OF THE LEFT WING VIEWED FROM ABOVE, SHOWING RELATIONSHIP OF NEW PORTION OF WING TO THE "STUMP". SEE TEXT FOR DETAILED EXPLANATION OF LETTERS. × 1.

Drawing by John L. Ridgway.

Digit I attached to the "stump" showed signs of having been broken at the tip (see fig. 22, *f*).

The new portion of the wing was found to have digits II and III complete (phalanges 1, 2, and 3 of digit II and phalanx 1 of digit III) as well as what appeared to be the distal portion of the carpo-metacarpus (see fig. 22, *g*), though slightly abnormal in shape, measuring 9.7 mm. across by 3.4 mm. and 6.5 mm. in length (proximo-distally). This metacarpal bone was smoothly rounded proximally except for a small projection (see fig. 22, *h*), and showed no sign of excess callus. It was set at an angle to the digits, leaving a space 3.6 mm. high between it and the proximal end of digit II at the anterior edge, and forcing the phalanx of digit III to a position 1.7 mm. distal to the normal. The metacarpus and the adjacent phalanges were all held rigidly together. In form and size the phalanges were normal and similar to those of the opposite side of the same bird.

SUMMARY

1. The wing was broken by shot.
2. Before the wing was cut, the feathers were removed.
3. The wing was severed with a large knife.
4. Three years had elapsed since the wing was cut.
5. There was no bone or cartilage connecting the two parts of the wing.
6. The end of the "stump", completely surrounded by tissue, protruded beneath and posterior to the new part of the wing.
7. The tissue of the new portion was continuous with that of the old in only two places, both on the upper and outer side of the "stump", and separated from each other by a hole 3.3 mm. in diameter.
8. At a deeper layer the tissue in this region (see 7) was attached to an abnormal ridge appearing on the "stump".
9. Digit I appeared to have been cut at the tip.
10. The "stump" showed signs of excess callus.
11. The new portion of metacarpus showed no signs of excess callus.
12. The new metacarpus was slightly abnormal in shape, and was set at an abnormal angle on the digits.
13. The metacarpus and adjacent phalanges were held rigidly together.
14. A small point of bone was present on the otherwise smooth proximal surface of the metacarpus.
15. Digit III was closer and more firmly attached to digit II than normally.
16. In number, shape and size the phalanges were normal and similar to those of the opposite side.

To the writer's knowledge there has never been a reported instance of regeneration of bones in the class Aves. Considering the close relationship of birds with reptiles, however, we cannot flat-footedly deny the possibility of such an occurrence.

In the case at hand we admittedly have only Mr. Baily's assertion that the end of the wing was removed. If the reader, however, could have opportunity of conversing with Mr. Baily, he would be convinced of the absolute sincerity with which Mr. Baily makes this assertion.

Los Angeles Museum, October 14, 1929.