

LOCOMOTION OF WOOD DUCKS

BY PAUL A. STEWART

A STUDY of several aspects of the life history of the Wood Duck (*Aix sponsa*) was recently conducted in central Ohio. Survival was of primary concern, and some attention was given to the means utilized by this species for escape from capture. Although speed alone seldom assures escape from pursuing predators, it is a pertinent factor in maximum escape efficiency. The readiness with which Wood Ducks move into different environments may be a more important life-saver than speed itself, but versatility is sometimes more meaningful to the extent that it is supplemented with quick changes. How quickly can a pursued Wood Duck move from land to water or from water to land?

ACKNOWLEDGMENT

This paper is a contribution from the Ohio Cooperative Wildlife Research Unit: U.S. Fish and Wildlife Service, Ohio Division of Wildlife, Wildlife Management Institute, and the Ohio State University cooperating. I am indebted to Eugene H. Dustman and Milton B. Trautman for critical readings of the manuscript, and to the former for guidance and financial support throughout the course of the study. I am also indebted to Maurice Giltz and Ernest E. Good for aid in making the counts of wing beats.

SWIMMING SPEED

It is difficult to obtain data on maximum swimming speeds of Wood Ducks because, when pressed, the flightless young either dive beneath or skitter over the surface of the water, and the fully feathered ducks take flight. As would be expected from its slowness, swimming alone is used for only leisurely escapes.

Three measurements of swimming speeds were obtained for day-old ducklings. For these measurements a lane was constructed of two pieces of chicken wire placed parallel in a vertical position about 6 inches apart and extending from the shore toward the center of a pond. This lane was 20 feet long and the wire extended 4 inches above the surface of the water. The ducklings were released near the shore into the lane, and the time they spent in swimming at an approximately uniform speed was measured with a stop watch. When the birds ceased swimming and dived or skittered over the water, the watch was stopped and the swimming distance was measured. As the measurements were taken immediately before the ducklings resorted to a more speedy method of escape, it is believed that approximately maximum swimming speeds were recorded. The speeds of 3 ducklings ranged from 0.8 to 1.2 feet per second with an average of 0.9 foot per second or 0.6 of a mile per hour. Hochbaum (1944:120) reported that flightless adult Canvasbacks (*Aythya valisineria*) swim at a rate of 2 to 3 miles per hour.

DIVING

When pressed immediately on leaving the nest, the ducklings dived and swam under water for short distances. The length of time four ducklings just out of the nest remained under water was measured with a stop watch; the periods of submergence varied from 7 to 13 seconds. One day-old duckling came to the surface 7.5 seconds after diving 16 feet from the spot where it had submerged. When under water, this bird swam an average of more than 2 feet per second.

By the time the ducklings were 3 to 4 weeks of age, they swam submerged through much greater distances. Unsuccessful attempts were made to determine the time spent and the distance moved under water by ducklings at more advanced ages. Ducklings more than 2 to 3 weeks of age seldom reappeared on the surface of the water before reaching protective plant cover. Sites 75 feet from the nearest shore were chosen for the release of several ducklings 3 to 4 weeks of age in an effort to measure their time and distance under water, but in each case the ducklings were not seen again. When ducklings were released near the shore, they commonly dived, swam a short distance, came out on the shore, and ran into plant cover. Presumably these birds which were not seen after being released 75 feet from shore swam all of the distance to plant cover before they emerged from the water.

SKITTERING SPEED

Skittering is accomplished by the duck's elevating the anterior part of its body higher than in swimming and by running, with much splashing, over the surface of the water. One measurement of the skittering speed of a day-old duckling was made in a similar method to those of the swimming speeds. This duckling skittered at the rate of 8.5 feet per second or 5.8 miles per hour for a distance of 17 feet. The skittering speed of an adult male in the flightless stage of the postnuptial molt was 75 feet in 5.4 seconds, a rate of 14.0 feet per second or 9.5 miles per hour. This is faster than the maximum terrestrial speed of 13.3 feet per second or 9.1 miles per hour for the Red Squirrel (*Tamiasciurus hudsonicus*) reported by Layne and Benton (1954: 103). Hochbaum (1944:120) reported a skittering speed for flightless male Canvasbacks of 8 to 10 miles per hour.

RUNNING SPEED

Tests of running speed were made on a plot of almost-level, closely-grazed pasture. A liberal application of paint was smeared on the bottoms of the ducklings' feet before release. Measurements of strides included the distance from the anterior end of one track to the anterior end of the next track. The time travelled in an approximately straight line was measured with a stop watch. In spite of the fact that ducks in general do not appear well adapted

for running, young Wood Ducks can run rather rapidly, and one bird 3 to 4 weeks of age ran 10.4 feet per second for 24 feet. During the first several yards, which are not included in this calculation, its strides were only about 5 inches long, but after running several yards its strides lengthened to 8 inches. Each of three other ducklings 3 to 4 weeks of age ran 8 to 9 feet per second. The strides of two of these ducklings were 7 to 8 inches long, but one duckling made strides 12.5 inches long. This duckling did not move correspondingly faster and covered only 8 feet per second. These ducklings made 7.7 to 15.4 strides per second, or each stride required one-eighth to one-fifteenth second of time. They ran at the rate of 5.5 to 7.1 miles per hour. The maximum observed terrestrial speed of a Wood Duck was 12 feet per second or 8.2 miles per hour. This was the performance of a bird 6 to 7 weeks of age.

The maximum running speed of 8.2 miles per hour is not markedly lower than running speeds recorded for some terrestrial species of birds. Cottam, Williams, and Sooter (1942:131) recorded maximum running speeds of 10 miles per hour for three Ring-necked Pheasants (*Phasianus colchicus*), and 12 and 15 miles per hour for two Road-runners (*Geococcyx californianus*). Even among mammals maximum running speeds of only 10.6 miles per hour for the Chipmunk (*Tamias striatus*), 9.1 for the Red Squirrel, and 17.0 miles per hour for the Gray Squirrel (*Sciurus carolinensis*) have been reported by Layne and Benton (1954:103).

FLIGHT

The flight speeds of eight Wood Ducks over a distance of 204 feet were measured through the use of a stop watch. The watch was started when the birds had flown approximately five feet after being released. There was little or no wind when the measurements were made, and the birds flew almost horizontally. The flight speed of these eight birds averaged 45.8 feet per second or 31.2 miles per hour with a range of 27.8 to 34.8 miles per hour.

Because of variations under which the birds were flying, as well as variations in making measurements, it is difficult to find published data on flight speeds for comparison. Speeds from 26 to 72 miles per hour have been recorded (Cooke, 1937) for various species of ducks. McLean (1930:1-2) noted that the speed of a Cinnamon Teal (*Anas cyanoptera*) increased from 32 to 59 miles per hour when the bird was chased. Doubtless a higher speed could be attained after flight had been in progress for a longer period of time than was the case in this experiment with Wood Ducks.

Motion pictures were taken of four Wood Ducks when flying in order to determine the number of wing beats per unit of time. These birds were followed with the camera for several hundred feet after they were released. The

pictures were projected at a slower speed and the wing beats of the birds on the screen were counted. These four birds made 7 to 7.5 wing beats per second. Aymar (1935:144) reported that the Goldeneye (*Bucephala clangula americana*) makes 9 wing beats per second. At 31.2 miles per hour, the Wood Duck moves approximately 6.5 feet at each wing beat.

SUMMARY

1. Day-old ducklings when pressed swam an average of 0.9 foot per second or 0.6 of a mile per hour.
2. Day-old ducklings remained submerged a maximum of 13 seconds. One swam 16 feet under water.
3. One day-old duckling skittered over the water at the rate of 8.5 feet per second or 5.8 miles per hour. An adult male in the flightless stage of the postnuptial molt skittered at the rate of 14.0 feet per second or 9.5 miles per hour.
4. Three Wood Ducks at 3-4 weeks of age ran a maximum of 10.4 feet per second. The longest strides were 12.5 inches. The maximum running speed was 12 feet per second or 8.2 miles per hour by a bird 6-7 weeks of age.
5. The average flight speed of eight Wood Ducks soon after being released was 31.2 miles per hour.
6. Four Wood Ducks in flight made 7 to 7.5 wing beats per second, moving forward approximately 6.5 feet with each wing beat.

LITERATURE CITED

- AYMAR, G. C.
1935 Bird flight. Garden City Publishing Co. 234 pp.¹
- COOKE, M. T.
1937 Flight speed of birds. *U.S. Dept. of Agric. Circ. No. 428.*
- COTTAM, C., C. S. WILLIAMS AND C. A. SOOTER
1942 Flight and running speeds of birds. *Wilson Bull.*, 54:121-131.
- HOCHBAUM, H. A.
1944 The canvasback on a prairie marsh. Washington, D.C., Amer. Wildl. Inst., 201 pp.
- LAYNE, J. N. AND A. H. BENTON
1954 Some speeds of small mammals. *Jour. Mammalogy*, 35:103-104.
- MCLEAN, D. D.
1930 The speed of flight in certain birds. *Gull*, 12:1-2.

¹ Cited with the permission of Dodd, Mead & Company.