A HARNESS FOR ATTACHING RADIO TRANSMITTERS TO LARGE OWLS

By Thomas H. Nicholls and Dwain W. Warner

INTRODUCTION

Owls seldom receive intensive study because their activities are generally nocturnal and night observation is difficult. To overcome this, miniature radio transmitters were placed successfully on Barred Owls (*Strix varia*) and Great Horned Owls (*Bubo virginianus*) at the University of Minnesota's Cedar Creek Automatic Radio-tracking Station (Cochran, et al., 1965). This paper reports results of a laboratory and field-tested harness bearing a radio transmitter. The harness was modified in design after that used and described by Cochran et al., (1963) on geese.

OBJECTIVES

The objectives were to make and test a harness for use on large owls that would carry a transmitter without influencing their natural activities and which would meet the following requirements: minimum effect on owl, minimum weight, permanence of attachment, maximum protection for transmitter, placement of harness to avoid the possibility of being snagged on branches or other objects, and to avoid aerodynamic problems.

MATERIALS AND METHODS

Several materials were tested before a satisfactory harness was made for owls. A successful harness was made of a single 25-inch strand of No. 12 copper electrical wire shaped into a 3-inch diameter neck loop and a 4-inch diameter body loop (Figure 1). These dimensions varied depending upon the size of the owl. The wire served as the antenna in addition to keeping the transmitter on the owl. A 1/2-inch strip of strong leather about 5 1/2-inches long was used for a back strap. One end was looped over the neck loop and the other over the body loop. It was secured tightly in place by two rivets so the leather loops would not slip on the wire. This made the back strap 3 to 3 1/4 inches between neck and body loops. The back strap was essential for holding the transmitter in proper position as well as making it impossible for the owl to remove the harness.

The battery was attached to the harness with string and transmitter parts were attached to one side of the battery and antenna with solder. Transmitter parts and battery were encapsulated in a waterproof, cold-resistant, durable acrylic (commercial preparation Perm, cold-cure, dental acrylic, available from Hygienic Dental Mfg. Co., 1245 Home Ave., Akron, Ohio 44310) hard enough to withstand biting and clawing. The ingredients consisted of a liquid and a powder which could be mixed to any consistency. The transmitter was dipped into the mixture to cover all parts.

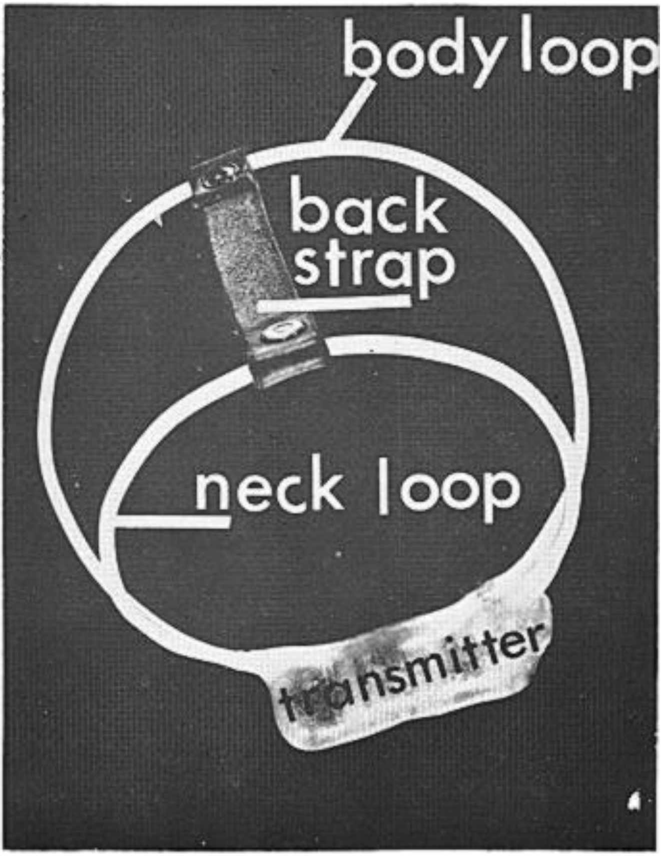

Figure 1. A 70-gram transmitter-harness used on Barred and Great Horned Owls.

A finger dipped into the liquid was used to smooth the acrylic over the transmitter. The acrylic has a working time of 5 minutes and a hardening time of about 30 minutes. Its reaction is exothermic, but the resulting temperature increase will not damage heat sensitive parts if no current is flowing through the transmitter. After the acrylic hardened, the transmitter was started by connecting two exposed wires and covering the connection with about three drops of acrylic. It transmitted 175 to 200 days using a Mallory ZM12 battery with a current drain of less than 1 mill-ampere and it had a maximum range of 3 miles. The harness and transmitter weighed about 70 grams but weight could be reduced for use on smaller owls by using a smaller battery although transmitter life would be shortened.

The harness was put on while one person held the owl's legs and

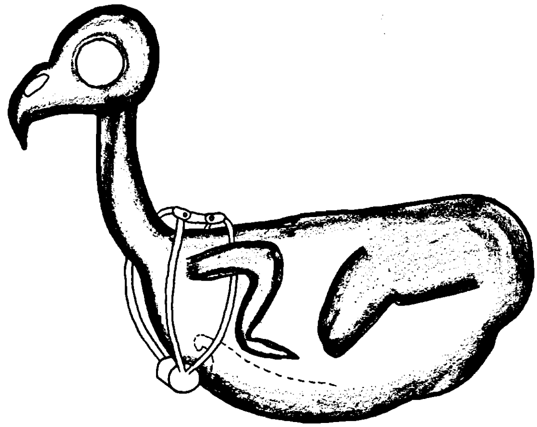

Figure 2. Position of transmitter-harness as it appears on the body of an owl without feathers.

another person pulled a wing through each space located between the two loops and back strap. Care had to be taken in this procedure to avoid straining wing muscles. The neck loop was then slipped over the head and positioned on the lower part of the neck. In this position the transmitter was located near the front of the sternum with the back strap on the midline of the back between the wings (Figure 2).

The harness was tested for 3 months on two captive Great Horned Owls and their behavior compared to one without a harness. The owls were put in large cages where they could fly freely. After experiments with caged owls were completed, the harness was used on 12 wild owls at the University of Minnesota's Cedar Creek Natural History Area.

RESULTS AND DISCUSSION

Captive Owls. Harnesses placed on two captive owls caused slight irritation during the first week. Occasionally the owls used their beaks to tug at the transmitter and harness. They were never observed using their feet in an attempt to remove the harness. The owls adapted quickly to the harness and it was completely covered by feathers in about 3 days.

The owls' ability to fly and to attack, kill, and eat live prey, which consisted of rats, mice, and pigeons, was not affected by the harness. The behavior of owls wearing harnesses was no different from that without a harness. Owls wearing the 70-gram transmitter-harness and carrying 300- to 400-gram rats flew easily to perches.

Each owl's harness was removed at the end of the 3-month test and the owls were examined to determine if the harness had caused

Figure 3. A Great Horned Owl about to be released with a radio transmitter.

injuries. No injuries were found and the birds appeared to be in excellent condition.

Wild Owls. After successful completion of tests with captive owls, harnesses with working transmitters were used on 10 Barred Owls and two Great Horned Owls during 1965-66 at the University of Minnesota's Cedar Creek Automatic Radio-tracking Station. Owls were caught with Japanese mist nets. These owls provided 1,245 data days comprising some 25,000 locations as determined by triangulation from degree bearings obtained from two receiving towers 1/2 mile apart. Radio-tracking these owls has provided information on their natural movements. Determinations have been made of home range, habitat use, activity periods, daily and seasonal movement patterns, and other factors.

Two Barred Owls, when released with a transmitter, had some difficulty flying, but adjusted quickly. One Barred Owl, trapped in winter with a mist net, could not fly after a transmitter was put on. Apparently the wing muscles had been strained either as a result of being caught in a mist net or when its wings were pulled through the harness. This owl recovered in 8 days; it was then released, and its transmitter sent in 201 days of continuous data.

During the study, four Barred Owls were recaptured 1, 30, 32, and 89 days after initial release to determine if the harness kept transmitters in proper position and to see if they caused injuries. None of the retrapped birds sustained injuries and their transmitters were in proper position with no sign of damage. The harness and transmitter on all birds were completely covered by feathers (Figure 3) which was an advantage in cold weather because transmitters were kept warm.

We did not make any visual observations of nesting owls although there were indications that some owls did nest as determined by their activity patterns. However, additional research may be needed on the effect of the transmitter-harness upon nesting owls.

Of the 12 owls, one Barred Owl died, apparently from natural causes. Two Great Horned Owls died; one was shot by a farmer, and the other died of a pole-trap leg injury.

With modifications in wire, loops, and battery size we believe this harness can be used for attaching radio transmitters to other species of large owls and possibly other birds. We do have some evidence that it will not work well on hawks but more testing is needed.

SUMMARY

The increasing use of radio-telemetry techniques has created a need for methods and materials used in attaching transmitters to animals. This paper describes a durable, waterproof, transmitter-harness used successfully on two Great Horned and 10 Barred Owls for a total of 1,245 days. It weighed 70 grams, had a maximum range of 3 miles, and transmitted 175 to 200 days. Owls adapted quickly to the harness and it did not appear to influence their natural activities or cause injuries even after prolonged use. Over 25,000 owl locations were obtained by the University of Minnesota's Cedar Creek Automatic Radio-tracking Station while using the transmitter-harness.

ACKNOWLEDGEMENTS

This study was done while the senior author was a predoctoral trainee under a National Institutes of Health Training Grant (5 T1 AI 188) to Dr. Dwain Warner. Valerian B. Kuechle and Clyde Ransom built the transmitters. We gratefully acknowledge help and encouragement from Dr. Jay Schnell and Paul Rice during the study.

LITERATURE CITED

COCHRAN, W. W., D. W. WARNER and D. G. RAVELING. 1963. A radio transmitter for tracking geese and other birds. Minn. Mus. Nat. Hist. Tech. Rept. No. 1, 4pp.

COCHRAN, W. W., D. W. WARNER, J. R. TESTER, and V. B. KUECHLE. 1965. Automatic radio-tracking system for monitoring animal movements. *Bio-Science,* **15**(2): 98-100.

James Ford Bell Museum of Natural History,
University of Minnesota, Minneapolis, Minnesota 55455.
(Present address of senior author: North Central Forest Experiment Station, Forest Service, U. S. Dept. of Agriculture, Folwell Ave., St. Paul, Minn. 55101.)

Received January, 1968.

JOSSELYN VAN TYNE, A PIONEER BIRD BANDER

By ANDREW J. BERGER

That Josselyn Van Tyne was an ornithologist of international repute is well known. That he also was an avid bird bander is not well known. His banding activities began in 1920, when he was 18 years old. Van Tyne's first banding permit (Collaborator's Permit No. 79) is dated 12 October 1920, and was valid until 31 December of that year. His permit for 1921 is dated 13 December 1920 (Collaborator's Permit No. 184). A note typed on a 3 x 5 card by Van Tyne states simply: "Begun—Dec. 18, 1920." This possibly was the date on which he banded the first bird on his own permit.

I have no way of being certain that all of Van Tyne's banding records were in fact turned over to me in early March of 1957, but certain apparent gaps in the records suggest that I did not receive the complete files. Nevertheless, the available records seem to me to justify a short biographical note on Josselyn Van Tyne's bird banding activities for the period 1920 through 1956. All of his banding data in my possession has been returned to the University of Michigan Museum of Zoology in Ann Arbor for permanent filing.

We now know a great deal more about the longevity and the post-breeding movements of birds than was known 30 years ago, of course. As is invariably true in biographical studies, therefore, one must consider the point in time of a man's activities in order to appreciate fully the nature and value of his work.