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by

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CONTENTS

	Page
Abstract.....	1
Introduction.....	1
Handling Cone.....	2
Materials.....	2
Construction.....	3
Weighing Bag.....	4
Materials.....	4
Construction.....	4
Handling Procedure.....	4
References.....	5

DEVICE AND TECHNIQUE FOR HANDLING RED SQUIRRELS

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Abstract.--Rapid, efficient weighing, examination, and marking of red squirrels (Tamiasciurus hudsonicus) resulted from use of a semiflexible wire-rod handling cone and a cloth weighing bag with a plastic window. The bag attaches to a trap entrance for transfer. Weighing and some examination can be done with the bag alone; for extensive examination and marking, the animal is transferred to the handling cone, which holds it exposed and immobile, freeing one or both hands of the operator. The cone is designed for animals of 80 to 300 grams but has been used for animals of 50 to 600 grams; larger or smaller cones could be constructed. The cone and weighing bag are light, compact, durable, and harmless to the animal. Construction details are given.

The red squirrel (Tamiasciurus hudsonicus) is an agile, excitable animal with a tendency to scratch and bite when handled. In a Montana population study, a procedure was needed to remove a squirrel from a single-door live trap (6 by 6 by 19 inches), weigh it, and hold it so that the body was accessible for examination, measurement, and marking. Ether and tranquilizing drugs, though effective, did not prove suitable for rapid mark-and-release work; giving the drug and waiting for the animal to recover prolonged the confinement time and involved some hazard to the animal, especially in adverse weather.

Other workers handling medium-sized animals have used handling cages (Baumgartner, 1940; Kilham, 1954; Sharp, 1958) or hardware-cloth cones (Aldous, 1946; Erickson, 1947; Longley, 1963; Rongstad, 1965). These are all rigid or semirigid devices that are bulky or prevent complete access to the animal. I tried Fitzwater's (1943) stretching board, but found that animals were difficult to attach and release. The girth hitch sling used by Melchoir and Iwen (1965) for the arctic ground squirrel proved impractical for the more active red squirrel. Flexible 1-inch-mesh chicken-wire cones (Allen, 1943; Uhlig, 1956), similar in principle to the African constriction cone trap (Mossman and Reynolds, 1962), were functional, but still not as collapsible as the one here described, which is a modification of Emlen's (1944) rat-handling cone.

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A modified handling cone, based on Emlen's design, was constructed of small gage tempered wire. I have used it since 1962, and have found it light, compact, durable, and harmless to the animal. The squirrel is held completely immobile in a full-length position (fig. 1). The cone can be held with one hand or compressed with a strap or between the operator's legs, thus freeing both hands.

The handling cone automatically adjusts to animals of 80 to 300 grams, though it has also been used successfully to handle 600-gram Columbian ground squirrels (Spermophilus columbianus), 50-gram golden-mantled ground squirrels (S. lateralis), and chipmunks (Eutamias sp.). Cones of different sizes can be constructed; V. D. Hawley (personal communication) regularly used a larger, heavier cone for marten and fisher (Martes americana and M. pennanti).

Originally, I weighed the animals in the handling cone but this proved awkward and had the added disadvantage that a scale capable of handling the extra cone weight of 225 grams did not have the desired precision. This problem was solved by the design and construction of a weighing bag based on the "zipper tube" (Shadle and Skarupinski, 1935; Fitzwater, 1943), without the zipper and with some other refinements, including a plastic window (fig. 2).

The weighing bag also serves as a transfer bag from trap to handling cone. The plastic window helps in overcoming squirrels' reluctance to enter a dark tunnel. When weighing or extensive handling are not necessary, the window makes it possible to examine animals and identify and check the condition of tags and markers by manipulation within the bag.

The rest of this paper describes the construction of the modified handling cone and weighing bag and outlines the procedures for using them.

HANDLING CONE

The overall length of the cone, without the cloth entrance tunnel, is 14 inches. This size is convenient for red squirrels. Longley (1963) used a 16-inch cone for gray and fox squirrels, while Emlen's (1944) rat holder was 10 inches.

Animals can be released from the cone by letting them back out, but this is not always desirable because markers may hang up in the cord fastened to the rods at the entrance. I modified the cone by adding a sliding catch (fig. 3) so that animals could leave by going forward.

Materials

- 14 15½-inch lengths of No. 7 gas welding rod, 3/32 inch OD
- 1 Metal ring, 3/4 inch ID (such as a harness ring, key ring, or curtain ring)
- 28 Metal eyelets (preferably steel), of a size to fit slightly loosely on the metal ring
- 1 24- by 24-inch piece of 8-ounce drill cloth
- 1 10-inch length of cotton bias tape, 1/2 inch wide

- 1 36-inch length of braided nylon mason's cord
- 2 3-inch pieces of brass tubing, 3/32 inch ID (ballpoint pen or model tubing)
- 1 1 1/2- by 7/8-inch piece of tin or thin copper sheet

6-inch round-nosed pliers, plier-type eyelet-setting tool, No. 4 leather punch

Construction.--Make a circular loop in one end of each rod for attaching to the metal ring. The loop is formed by heating the end of the rod to redness and bending it with round-nosed pliers to the desired inside diameter; for the harness ring I use, this is 3/16 inch. The loop should fit slightly loosely on the ring. Center the loop on the long axis of the rod.

On the other end of the rod, in the same plane as the "ring" loop, form a similar, more oval loop about 1/4 inch inside diameter. This loop can be cold-formed, and is not closed until it is attached to the cloth entrance tunnel (fig. 4).

To fit the rods onto the ring, cut through the ring at a shallow diagonal and spread. Flatten 14 of the metal eyelets with an eyelet-setting tool and alternately slip a rod and an eyelet spacer onto the ring. Close the ring after the last eyelet.

The cloth entrance tunnel has a 2 1/2-inch diameter (7.9-inch circumference) at the cone end and a 7-inch diameter (22-inch circumference) at the "entry" end. The tunnel is made according to the pattern shown in figure 5. Fold the square of drill cloth in half and trace the pattern on it; cut out, double stitch the seam, and hem each end. Sew 1/2-inch bias tape inside the narrow end as a reinforcement to hold eyelets.

Punch 14 holes, evenly spaced (about 0.6 inch apart), in the center of the bias tape, using a No. 4 leather punch. Set the remaining 14 eyelets in the holes and insert and close the rod ends (fig. 4).

The rods are kept from spreading too far by taking the length of mason's cord and knotting it around each rod 5 inches from the large end of the cone (fig. 1). The rods should be spaced 3/8 inch apart at that point; to hold the cone to proper shape, insert a 2-inch-diameter jar into the cone and slip a rubber band over the rods before knotting the cord. The cord encirclement can be slid forward or back to change the diameter of the cone. For small carnivores use soldered light chain rather than knotted cord.

To make the catch (fig. 3) arrange the two pieces of brass tubing in the same plane so that there is 3/16 inch between them at one end and 9/32 inch at the other. Curl the long edges of the 1 1/2- by 7/8-inch piece of sheet metal around the tubing at about its middle and solder in place. A small tab of bent metal soldered to the sheet metal serves as a handle. Cut two adjacent rods at a point 3 inches from the ring and slip the catch onto them, the narrow end nearer the ring. The catch holds the cut ends of the two rods together when the cone is in use. The catch is kept from sliding down the rods by wrapping a few turns of wire around each cut rod at about 4 1/4 inches from the ring and soldering in place.

Finally, put a very slight outward bend in all but the "catch" rods at a point 2 inches from the ring. This makes the rods nearly parallel and allows snug but not injurious pressure on the squirrel's head.

WEIGHING BAG

The finished length of the bag is about 18 inches, or roughly two body lengths less tail. The same ratio was used by Shadle and Skarupinski (1935) and is adequate for securing an animal once it enters the bag.

Materials

- 1 24- by 30-inch piece of 8-ounce drill cloth
- 2 Thin 16 1/2-inch expansion springs, or a 15-inch piece of heavy fabric elastic
- 1 Trapezoidal piece of vinyl plastic sheet (window material for convertibles, 0.040 inch thick, 5 1/2 inches long by 4 1/4 inches at top and 2 1/4 inches at bottom)
- 1 18-inch length of twill tape
- 1 Plastic or metal ring, 1 inch in diameter (approximately)
- Flexible vinyl cement

Construction.--Outline the pattern shown in figure 6 on the drill cloth, cut out, and sew. The side seams should be double stitched. The 3/4-inch hem holds the two expansion springs; I use springs from surplus parachute-pack opening bands, but heavy elastic would be as suitable.

After the bag is sewn, cut the window opening 4 inches from the tip of the bag and 1/2 inch narrower all around than the plastic window. Glue the window onto the cloth with a good grade of flexible vinyl cement. One type found superior to others was described as capable of sealing oil, gasoline, and water leaks as well as mending, waterproofing, and insulating. I found that the best glue bond was obtained by clamping the bag between two boards. A piece of waxed paper inside under the window prevents unwanted adhesion. After initial drying, seal the edges with extra cement.

Near the open end of the bag, sew on the twill tape, tacking it on in the middle so that the two ends can be used to tie the bag, and attach the ring for hanging the bag from the scale. I used a cylindric spring scale of 500-gram capacity. This type scale and handling cone can be conveniently carried inside the weighing bag.

HANDLING PROCEDURE

To transfer a squirrel from a live trap to the weighing bag, stretch the opening of the bag over the door end of the trap, with the window in the bag facing the maximum light (fig. 2). With the door end of the trap facing right, use the left hand to hold the trap tipped slightly upward and reach through the mesh with the fingers to hold the door up. With the right hand, hold the tip of the bag stretched out away from the trap. Squirrels that

have not been caught before usually are excited and dash deep into the bag. At this instant, drop the tip of the bag, and the squirrel's weight will pull the open end flat against the trap entrance. Quickly close off the bag with the free right hand and tie it shut. I usually have a thick rubber band on my left wrist to slip over and secure the bag, as a fast alternative to tying. Experienced squirrels are sometimes reluctant to enter and will approach the bag cautiously even though light shows through the window. By dropping the trap door behind them as soon as their tail clears they can often be startled into a forward dash. Otherwise, blowing on them helps, but prodding with sticks seldom works. For the occasional recalcitrant individual that will not leave the trap, the bag can be attached on the trap rear. By manipulating the trap treadle and rear door simultaneously, the squirrel can be forced into the bag opening.

Weighing should be done quickly, since red squirrels tend to climb upward, bouncing the scale and making readings difficult.

To transfer the squirrel to the handling cone, untie the bag and insert the open end well into the cloth entrance tunnel of the cone (fig. 7). Hold the bag and tunnel with one hand and force the squirrel forward by gently squeezing the bag with the other. Once the animal is within the tunnel, hold one hand behind it and carefully withdraw the bag. Squirrels usually dash forward into the cone when they detect this apparent route to freedom. Once they move forward it is important to quickly grasp and constrict the cone (fig. 1).

Squirrels' reactions to the cone vary. Most are relatively quiet but some, usually experienced animals, are active and forceful in trying to spread the rods apart. A firm hold is always advised, but it may also be helpful to slide the cord encirclement forward. Release animals by sliding the catch toward the ring end and flipping the two rods forward, leaving an opening for the squirrel to get out. They can also be allowed to back out.

I have used the handling cone to hold squirrels while administering an inhalation anesthetic in preparation for attaching radio-tracking transmitters. I made an anesthesia cone by cutting off the bottom of a 100-ml polyethylene bottle and taping a 15-inch-long polyethylene sleeve to this cut end. The sleeve was about 3 1/2 inches in diameter, or just wide enough to slip over the handling cone with a squirrel inside. The anesthetic was poured on cotton held by wire gauze in the cap end of the bottle. Exposure to the vapor was controlled by moving the handling cone closer to or further from the cotton. Anesthesia was then maintained by positioning the squirrel in the anesthesia cone sleeve.

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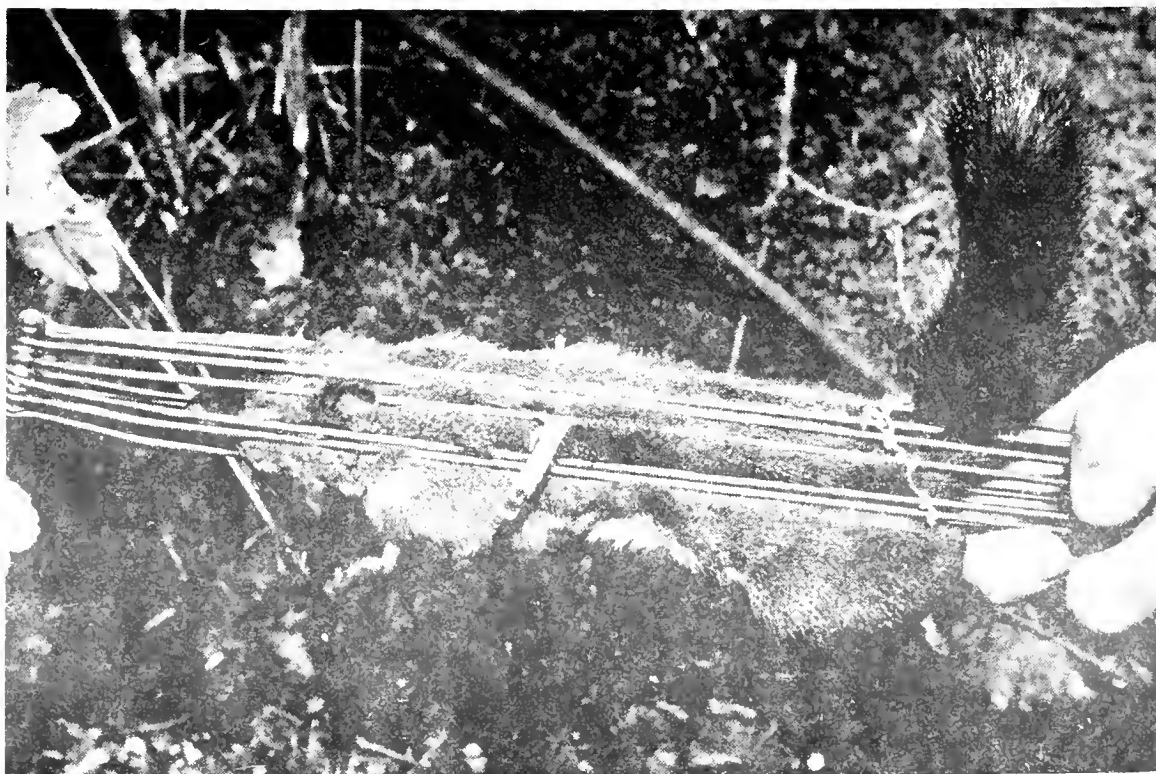


Figure 1.--Live red squirrel immobilized in handling cone for examination.



Figure 2.--Weighing bag attached to trap entrance. Squirrel, visible through plastic window, has just entered from trap.

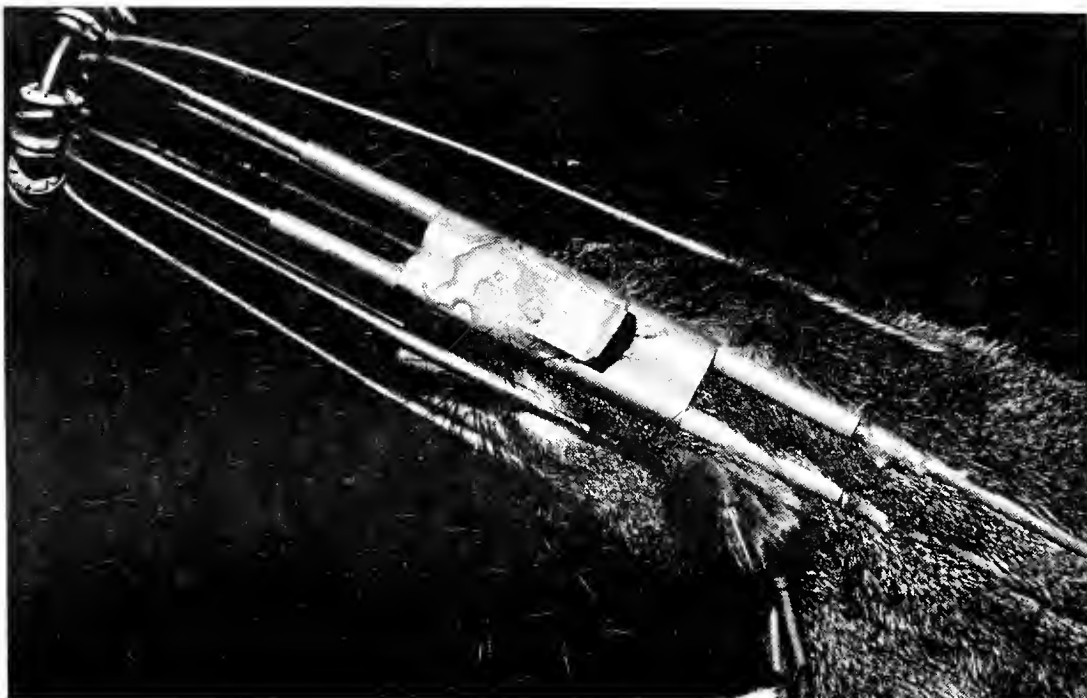


Figure 3.--Sliding catch used to release animal. Catch is slid toward end of cone, freeing two cut rods.

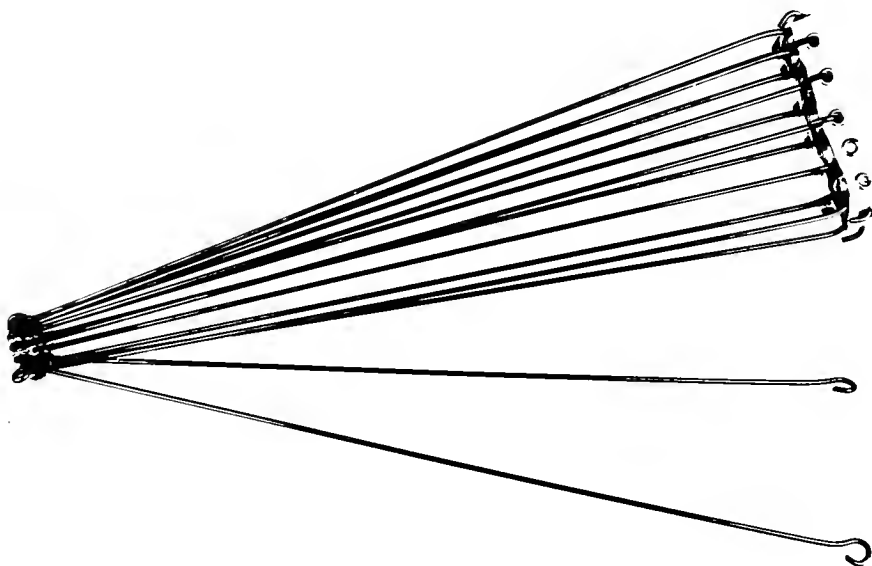


Figure 4.--Handling cone rods being attached to cloth entrance tunnel. Loops are then crimped closed.

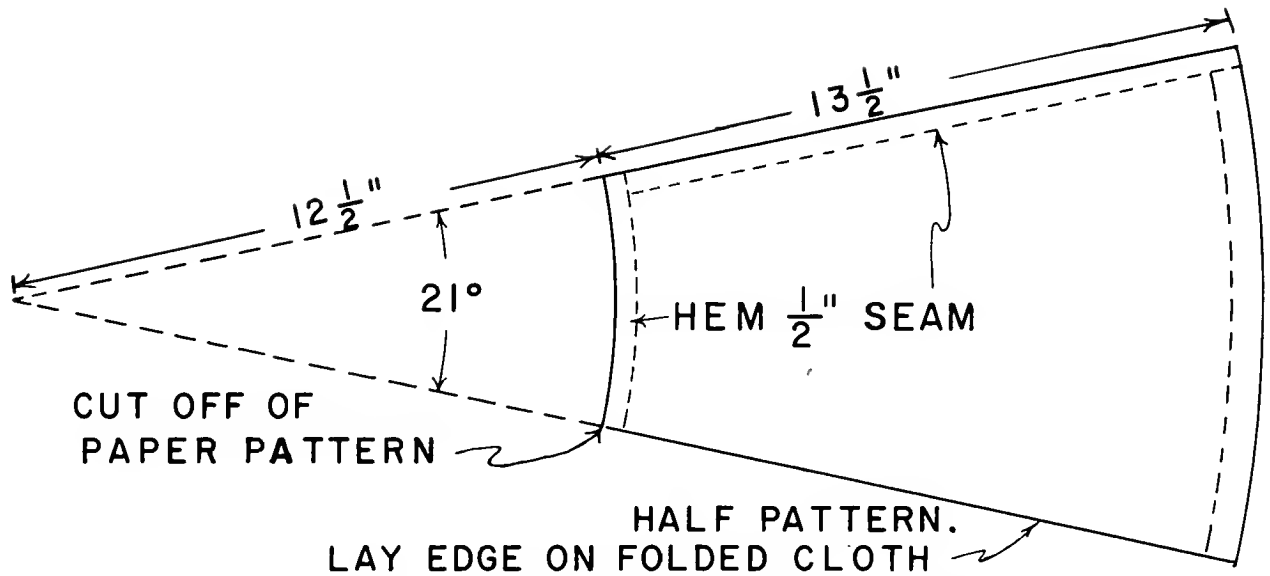


Figure 5.--Pattern for cloth entrance tunnel.

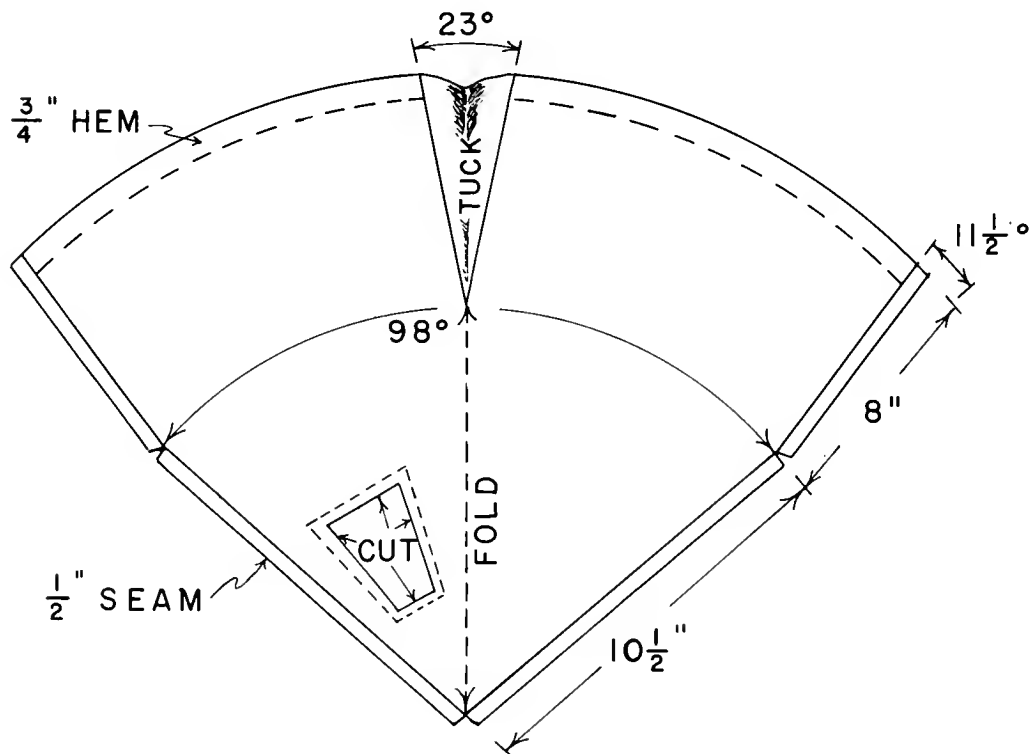


Figure 6.--Pattern for weighing bag. Plastic window is glued over the cut-out within the dotted margin.



Figure 7.--Transferring squirrel from weighing bag to handling cone.

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