Directions for Preparing Scientific Specimens

OF

Large and Small Mammals, Birds,
Birds' Stomachs for Economic Investigations,
Birds' Nests and Eggs,
Fish and Reptiles

BY

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THE OREGON FISH AND GAME COMMISSION

is making a collection of the skins of wild birds and animals that inhabit this State. The object of this collection is to gather the data that is necessary for proper identification and distribution of each species. In order to obtain the economic status of both song birds and game birds, an effort is being made to collect the stomachs of different birds that are killed, especially those of pheasants, grouse, quail and other game birds. An accurate examination of the stomach contents gives the truest indication of whether such birds are of economic value or harm about the farm. The Commission seeks the active co-operation of sportsmen and all others.

Before killing any of the birds or animals protected by the laws of the State of Oregon, the student should secure a certificate to collect for scientific purposes in accordance with the provisions of Section 48, Page 46, of the Oregon Fish and Game Laws. (Chapter 232, Session Laws 1913.)

Figures 1-2-3-4-5-6-8-15 are copies of illustrations from the Biological Survey of the United States Department of Agriculture. Figures 7-9-10-11-12-13-14 are original drawings by O. J. Murie.

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Directions for Preparing Specimens of Large Animals in the Field

SPECIMENS of large animals, including everything from a mink to an elk, can be roughly prepared in the field, and afterwards put in perfect condition by a taxidermist. This rough work is not difficult and needs no experience. Any animal can be skinned with a large pocket knife. A "specimen" is understood to mean the complete skin of any animal and its skull. When a skin is saved, the skull of the same animal should always be saved, even if it should be imperfect. Skulls of all animals, even unaccompanied by skins, are of much value in classification.

The preparation of a specimen in the field consists of measuring; making the opening cuts; removing the skin; applying the preservative; drying the skin; preparing the skull; labeling the skin and skull.

MEASURING

Three measurements should be taken (if possible, while the carcass is still warm).

(1) *Total length* from tip of nose to end of tail vertebrae (to end of bone and *not* end of hairs). In taking this measurement extend the body, neck, and tail as nearly in a straight line as possible. The smaller animals should be measured on a table or board, the larger ones on flat, level ground (Fig. 1). In the latter case drive a peg at the end of the nose and another at the end of the tail bone and measure the distance between, in a straight line. Never measure over the curves of the back.

Fig. 1—Measurement of total length.

(2) *Length of tail* from base to end of vertebræ. This is taken by bending the tail up at right angles to the back and measuring from its base (on the upper side) to the end of the vertebræ (Fig. 2).

(3) *Length of hind foot* (held straight) from heel to point of hoof (Fig. 3) or longest claw (Fig. 4). In hoofed animals the "heel" is called the hock.

Fig. 2.
Measuring tail.

Fig. 3.
Foot measurement
of hoofed animals.

Fig. 4.
Measuring the foot.

In the case of large game animals, the height at shoulder is important, but it is difficult to take accurately. It is best measured between pegs, one driven at the top

of the shoulder, the other at the soles or hoofs of the forefeet, the legs being straightened and held in position natural to the animal when standing in life, with the bottoms of both forefeet on the same plane, and against the stake. A tape—preferably a steel one—should be used for all measurements. The weight of large animals should be recorded whenever possible.

THE OPENING CUTS.

Make a single straight slit down the middle of the belly, extending from the front end of the breastbone to the base of the tail. In large animals (such as deer) this cut should be carried forward to the throat and backward to the tip of the tail; and in skunks and other fat animals the tail should be split on the underside. In all large mammals four additional cuts should be made, one extending down each leg.

Begin at the foot (between the hoofs in the case of a hoofed animal; at the base of the toes in a clawed animal) and carry the cut along the back or inner side of each foot and up the

hind side of each leg, to join the main cut (Fig. 5). If the legs and tail are not opened the hair is likely to slip and the skin to rot instead of drying. In case of all soft-footed mammals, the sole of the foot must be slit open to the toes in order to remove as much flesh and fat as possible and to allow direct application of the preservative. The cut should be made along the inner side of footpads.

Fig. 5.

Showing opening cuts for skinning large mammals.

REMOVING THE SKIN.

After making the cuts, work the skin back until the "knee" joint can be pushed up and unjointed, leaving the lower bones attached to the foot. Skin the legs and feet (down to the toes if possible) and cut the meat away from the bones, leaving the leg turned inside out. In small

mammals and those up to the size of a coyote the bones of the lower part of the legs should be left attached to the skin; in large mammals the leg bones should be cut off at the ankle joint. Work the skin over the rump to base of tail and after cutting all clear except the tail bone, make a short slit or two on the skin of the underside to assist curing, and draw out the bone. If this can not be done easily, use two sticks (or a split stick) and draw the bone through to get it out of the skin. If this fails, slit the underside for its entire length and skin out the tail bone. After skinning the legs and body, continue working the skin over the neck and head, cut the cartilage of the base of the ears where it is attached to the skull, and skin over the eyes, nose and lips. Special care is necessary in order to avoid cutting the eyelids. The skin is now free from the carcass. Before anything further is done, unjoint the skull, taking great care not to cut the bone. Then tie a numbered tag to the skull so that the skin to which it belongs may be certainly identified.

When the skin is off, clean it of adhering bits of fat and flesh, and finish work on the feet, making sure that the skin is separated from the bones as far down as possible. The skin of the head requires special attention. Cut away the flesh around the cartilage at the base of the ear and separate the skin of the back of the ear from the cartilage nearly down

to the tip. This may be done by pushing the thumb down between the skin and the cartilage and working it loose, or by using a blunt tool in the same manner. The thick skin of the nose and lips should be pared down and laid open until it is thin enough to allow the preservative to pass quickly through to the roots of the hair.

HORNED ANIMALS.

Animals with horns require a T-shaped cut on the back of the head and neck. The cut should be made from the outside.

Fig. 6.
Incisions for skinning out heads
of horned animals.

First slit the skin from one horn to the other and carry the cut around the base of each horn. Then, from the middle of the cross cut, carry a cut down the middle line of the back of the neck far enough to let the horns out (Fig. 6). In skinning animals with horns, skin as far down the neck as possible in the usual way, unjoint the head (or cut off the neck) and take out the body. Then turn the skin right side out and skin the head and take out the skull (with horns attached) through the slit in the back of the neck.

APPLYING THE PRESERVATIVE.

The main object of the preservative in any climate is to set the hair at once and prevent the outer thin skin, or epidermis, from slipping and taking hair with it. For this purpose salt is sufficient. Common table salt is best, but coarse salt may be used. Lay the skin flesh side up and rub salt into all parts of it; put plenty behind the ear cartilage, about the nose and feet and in the tail. When the tail is not split open fill it *all the way to the tip*.

DRYING THE SKIN.

After the skin has been salted, fold in the head and legs, roll it into a bundle with the hair side out, and let it lie for 12 to 24 hours. The salt draws the moisture to the surface during this time, and a great deal drains off. Then hang the skin over a line or pole in a shady place and allow it to dry slowly. In winter, or in damp climates, after it has dried in the shade for 10 or 15 hours it may be hung in the sun and dried more quickly; but a skin not cured by salt should

never be dried in the sun. Never "stretch" a skin, and never hang a large skin on a nail. When first hung up, examine the edges of the skin and if any part has not received proper attention apply more salt. While drying, examine a few times and open out any folds that may be found, exposing the soft places to the air.

PREPARING THE SKULL.

Carefully unjoint the skull from the neck and cut away the larger fleshy parts, including the tongue, being careful not to cut or break any of the bones. Scoop out the brains with a stick or wire loop, and rinse out the brain cavity with water, but never cut or enlarge the natural opening in the back of the skull. Then hang up the skull to dry. In dry weather never leave a skull in the sun. Never boil a skull or attempt to clean it thoroughly while in the field, but allow the flesh that is not easily cut off to dry on the bone. If the lower jaw has been taken off in cleaning, tie it in place with a strong cord. Never put salt or other preservative on the skull. Salt or alum injures the bone.

LABELING THE SKIN AND SKULL.

Tie a strong label to the skin. It may be tied through one nostril and over the lip. On this label record the sex of the specimen, its number and measurements, the date and locality, and your own name. A strong label bearing the same number as that on the skin, the sex and the collector's name should be tied firmly to the skull. Use the utmost care to avoid mistakes in labeling skulls; that is, label the skull *as soon as it is skinned*, and be sure that the number is the same as that of the skin from which it came. Extra skulls (those not accompanied by skins) should be labeled with sex, locality, date, and collector's name.

Fig. 7—Skin label, front and back, and skull tag. The back of the label should contain the collector's catalogue number, with a line drawn just above it and measurements in millimeters, in the following order: total length, length of tail, vertebrae, and length of hind foot, as shown in the figure. Any additional remarks concerning the specimen may be put on the back of the label.

PACKING AND SHIPPING.

As a rule specimens should be packed in boxes and shipped by express, charges collect. Skins may be sent in small bales covered with burlap, but are safer in boxes. They should be folded with the hair inside and packed down tightly. If the skulls are shipped in the same box with skins, they should be well wrapped and put in a separate compartment. Straw, paper or excelsior may be used for packing, but not cotton. All packages, whether sent by mail or express, should be plainly marked with the shipper's name, and should be addressed to the office of State Game Warden.

Directions for Preparing Scientific Specimens of Small Mammals

For making up scientific skins of small mammals, the following tools are necessary: a sharp knife or scalpel, tweezers, stout, short scissors, steel tape for measuring, arsenic for preservative, cotton for stuffing small specimens, tow or excelsior for larger ones, needles and thread, labels and corn meal.

All mammals up to the size of a mink or rabbit should be made up as soon as skinned, or before the skin is dried.

MEASURING.

Three measurements should be taken of all specimens before skinning, the *total length* from tip of nose to end of tail vertebræ, not to the end of the hairs; *length of tail vertebræ* from end of bone to rump, and *length of hind foot* from heel to end of longest claw. The weight of specimens should be taken whenever possible.

SKINNING.

Place the animal on its back with the head to your left, make the opening cut on the belly with a clean, straight sweep of the scalpel from one to four inches long in accordance with the size of the specimen, catch the edge of the skin with the fingers and work loose until the knee joint is reached, cut the bone with the scissors or disjoint with your knife and pull the leg bone out, skinning down as far as possible, cut the flesh off the bone and leave bone attached up to the knee. Treat the other side in the same manner. To skin the tail, catch the base of the tail bone between the thumb and forefinger and pull until the bone slips out, then work the skin up over the back until the fore legs are reached, treat them the same as the hind ones and skin on down over the neck and head until the ears are reached, cut them off close to the bone and work on until the eye is reached; cut through the transparent eye film, using care not to cut the lid of the eye; skin on down to the lips and sever the skin from the skull. The next step is to disjoint the skull from the vertebræ, take out the eyes and brain, cut off the fleshy parts, taking care not to injure the bone, and label the skull to correspond with the number of the skin, then it can be hung up in a shady place to dry. Clean the flesh or fat from the skin,

pare down the lips so the preservative can reach the base of the hairs; rub arsenic all over the inside of the skin. Sew the lips together and turn the skin right side out.

STUFFING.

Make a compact body of cotton, tow or excelsior, the size and shape of the one removed from the animal, and push it well into the skin, using care to have the head and nose well filled, but not stretched, then push a tuft of cotton into the legs to fill them out; to make the tail straight, wrap fine absorbent cotton around a wire of suitable size and force it into the tail to the tip. The next step is to sew up the opening cut and brush the hairs out smooth, tie the label on the right hind leg, then pin the specimen on a soft board into its natural shape, with the soles down, before putting away to dry.

Fig. 8—Sample of a mammal skin.

Directions for Making Bird Skins

For making up scientific bird skins only a few simple tools and materials are needed—a scalpel or slender-bladed pocket knife, a pair of stout, sharp scissors, and a pair of tweezers, some powdered arsenic for preservative and corn meal to absorb blood and other moisture while skinning, cotton for stuffing small specimens up to the size of the quail (larger specimens should be stuffed with tow or excelsior), a needle and thread for sewing up the finished specimen and a supply of labels.

An English sparrow, blue jay or crow is the best bird to practice on until good skins can be made.

Having shot a bird, examine it for blood stains and sprinkle any that are found with corn meal or fine dry earth, and plug the mouth and nostrils with cotton to keep any blood or other moisture from coming out and soiling the feathers. Then make a paper cornucopia and after smoothing out the feathers, drop it in, bill first, then your bird will carry safely in a game bag or hunting coat.

SKINNING.

First break each wing bone, close to the body. Place the bird on its back with its bill to the left, part the feathers along the breast and belly, hold the feathers back with the

Fig. 9—Opening cut (a) for skinning a bird.

thumb and forefinger and cut with a down stroke from the base of the breast bone to the vent. Be careful to make the cut just through the skin and not into the abdomen. Catch

the edge of the skin and work back until the knee joint is reached, sprinkle in plenty of corn meal to absorb the blood

Fig. 10—Skinning out the leg (a).

as you work and to keep the feathers from sticking to your fingers and the bird's body. Cut the bone at the knee joint

Fig. 11—Stripping out leg bone (a).

with scissors and draw it out of the flesh, which can be cut off, leave the bone in the leg to the knee, then work the skin back a little further. Treat the other side in the same manner, frequently using corn meal. Then cut across the

Fig. 12—Leg bones (a) free from flesh, tail ready to be freed from body at (b).

tail bone just above the quills, keeping the fingers on the other side as a guide so as not to cut the skin; then work

the skin up over the rump and back, until the wings are reached. Draw the wing bones out and cut off just below the

Fig. 13—Turning skin back over body, wings ready to be skinned out.

second joint. Keep the body well sprinkled with meal and work down over the neck until the ears are reached; pick them out with the tweezers rather than cut them off, then work the skin along with the finger nails until the eyes appear, cut

Fig. 14—Turning skin over head. Pull out ear membrane at (a). Disjoint wing at (b).

the transparent membrane without injury to the lids and skin on down to the base of the bill.

Next remove the eyes and cut off the base of the skull so the brain can be taken out, clean the flesh off the bone and if any fat or flesh remains attached to the skin remove it, and then dust dry arsenic on the entire inside of the skin, fill the eye sockets with pellets of cotton and reverse

the skin by pushing the bill back through the neck. If the skin becomes dry before turning it, moisten with a little water or wet cotton, but after a little practice the whole process of skinning requires only a few minutes.

As soon as the skin is turned right side out, smooth the feathers and adjust the eyelids in place.

STUFFING.

For a sparrow take a wad of cotton that will make a body the size of the one removed from the skin. To make the neck, roll a piece of cotton firmly between the hands, then catch the end of it with the forceps and push it firmly into the neck until the bill is reached, catch the end at the bill with the fingers and draw out the forceps. Then tuck in all superfluous cotton and draw the opening cuts together and sew up the skin.

Be careful not to stretch the skin and always use a stick wrapped with cotton in making the necks of birds larger than a robin. Leave each skin smooth and symmetrical when put away to dry and each feather in place.

LABELING.

Skins should always be fully labeled with the locality, date, sex, number and collector's name; *without this data specimens are of little scientific value.* A catalogue of all skins collected should be kept, showing the date of collection, locality where bird was killed, sex of bird, notes on breeding habits and food habits, as far as can positively be ascertained.

WRAPPING.

When the specimen is stuffed it should be wrapped in a thin film of cotton to dry, preferably absorbent cotton. To do this, take a piece of cotton of suitable size to cover the specimen, lay it on a smooth surface and place the bird on it with the bill inserted in one edge. Carefully wrap the specimen evenly and firmly, overlapping the cotton, using the utmost care to keep the plumage smooth and in place.

SEXING.

To determine the sex, cut through the abdominal wall, push aside the intestines, and close to the small of the back near the kidneys, if the bird is a male, you will see the two oval,

light-colored testes. If the bird is a female, in place of the two oval bodies there will be the ovaries, a mass of spherical ovules, resembling a tiny bunch of grapes. The male sign is Mars (♂); the female, Venus (♀). These signs should be used in the catalogue and on labels.

Fig. 15—A well-made bird skin.

Directions for Preserving Bird's Stomach

In collecting stomachs of birds for the Fish and Game Commission, the tags supplied by the game department should be used. The tags should be numbered and contain the initials of the collector with carbon ink, and should not be put into the preservative until the ink is thoroughly dry. The numbers should form one continuous series, and should not be repeated no matter how many or what kind of stomachs are preserved.

The tags should be tied to the gullet close to the stomach (gizzard) and the loose ends of the thread cut off. If the crop contains food it should be enclosed in a piece of cheese cloth with the stomach and securely tied with strong thread.

The stomachs should be put in alcohol (80 to 85 per cent) or formaline (4 or 5 per cent), where they should remain for at least ten days, or longer, if convenient. A glass fruit jar is the best to use for the preservative.

Data should be kept of all stomachs. The essential points are: *name of bird, date of collection, hour when bird was killed, and locality*; without these the stomach is useless. Other notes, such as *character of woods and conditions of weather* are important.

Before mailing the stomachs, they should be taken out of the preservative and partly dried. Three or four hours is usually long enough to dry them for mailing.

After drying, the stomachs should be wrapped in paper or cloth and put in a can or cigar box, or similar receptacle, wrapped in strong paper and mailed to the office of State Game Warden.

Collecting and Preserving Eggs

The first step in collecting eggs is to identify the nest positively, which in case of unknown or rare species, can only be done by shooting one or both of the parent birds and stuffing them for future reference. Eggs are *worse than worthless if there is any doubt as to their identity*. Only complete sets with the nests should be taken and notes should be taken on the position, structure and materials of the nest.

Each egg should be wrapped in a piece of cotton and each set kept separately in a box with plenty of cotton for carrying home.

The only tools necessary for blowing eggs are a slender blow-pipe and two drills.

For drilling, hold the egg between the thumb and two fingers of the left hand, place the sharp point of the drill against the side, twirl it evenly with slight pressure until it sinks into the shell, grinding out a small round hole, for a fresh egg the size of a pin head, while for an incubated one the hole may be an eighth of an inch in diameter. A fine stream of air should be forced into the opening without the blow-pipe touching the shell, and the contents will be forced out. Then fill your mouth with water and blow into the empty shell to rinse it out thoroughly, afterwards blowing out the water before laying away to dry.

Each set of eggs and nest should be kept in a separate box with a label showing *the name, collector, locality, date of collection, number of eggs in set, how identified, and state of incubation*, or whether fresh, slightly incubated or incubation advanced. *Without this data eggs are useless.*

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Preserving Fish and Reptiles

To properly preserve fish or reptiles use the same preservative as given for birds' stomachs, viz.: alcohol (85 per cent) or formaline (4 or 5 per cent).

Label the specimen with the date and locality, using India ink, and cut several short gashes in the abdominal wall so the preservative can work through the carcass. Specimens of fish or reptiles should *not* be removed from the preservative for shipping, but left in the jars permanently.