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SUGGESTIONS AS TO COLLECTING

Use one serial set of field numbers for all specimens (including "pick-ups," nests and eggs, and wet preservations), continuing number from last trip. In arranging notes by sections, catalogue precedes itinerary, and species accounts are last.

For each specimen always give altitude and county as well as exact place; for example: "3 mi. NE Lone Pine, 3700 ft., Inyo Co., Calif." Note proper abbreviation for California. Attend minutely to proper punctuation. If not true NE, give miles north and miles east. Distances always to be air-line. Locality data to be given in notebook precisely as on specimen label.

Record data on all tags in following order (in 3 or 4 lines, as necessary): Sex; number and size of embryos (or indicate no embryos) and condition of mammary glands; age of birds determined from skull; your field number; your name; locality, on second or second and third lines; development of gonads and fat in birds; on last line, measurements (of mammals and snakes only), weight, date.

All miscellaneous material should bear labels stating to what species it pertains, with notebook references, including field number. Nests should be "threaded" and have labels attached to them (not only to container). Folders for plants should each be inscribed with full data, as in usual botanical practice. Eggs should have labels placed within containers in which packed. Miscellaneous material should be packed with as great care as skins or skulls. Cheek pouch contents, feces, etc., should be placed in small envelopes or boxes, with labels inserted, and such containers packed in a stout box to prevent crushing.

In collecting specimens, keep improving technique; turn out smooth, symmetrical, firm skins of birds and mammals. For frequent reference, carry with you a copy of R. M. Anderson's "Methods of Collecting and Preserving Vertebrate Animals." Keep skins with you until thoroughly dry. In preparing for shipment, take special pains to pack specimens tightly so that they will not move lengthwise of the box. Much of smoothness and symmetry may be lost through loose packing.

In cleaning skulls of birds skins avoid removing so much of the back end of the cranium as to loosen the articulations of the lower jaw. Leave the lower mandible in place so that the bill will close in normal position. In tying bill, do not draw thread so tight as to force lower mandible back out of normal position against upper. In birds larger than linnet, if leg bones be broken, replace with sticks so that feet remain firmly anchored to body. In birds larger than meadowlark use solid excelsior or tow body; but avoid over stuffing; with larger birds aim to make a flattish skin. Be faithful in removing all fat and grease. Clean cavity of tibia of large birds, using applicator as a "ramrod." Make certain to remove the oil gland.

Fat mammal skins should be thoroughly scraped and soaked in cold white gasoline for 8 hours. The foot pads of skunks, woodchucks, etc., should be injected with formalin, mixing one part of full strength (40%) with five parts water. In stuffing mammals larger than gophers use excelsior covered with sheet cotton.

Mammal skulls should be severed from the vertebral column using extreme care not to injure the skull. Skulls the size of Citellus or larger should have the major part of the masseter muscle snipped

off to allow the skull to dry quickly. Prevent sawdust from drying on the skull; dermestids will not clean sawdust-covered skulls.

In making out the skull tag, enter sex symbol, field number, and initials with Higgins eternal ink. Leave ample room for department catalogue number. In all cases write large and heavy so that the ink penetrates the fibers; slight dampening of the tag before writing will facilitate this. Remember that fading of the number means the loss of a specimen. Enter the same data in pencil on the reverse side. Cut off the loose ends of the string.

Attach tag to skull by running the string between the lower jaws. Tie with about 1/4" slack in the string. Do not tie tightly around the lower jaw; there is danger of breaking it in bat or shrew skulls. Also a loose string allows dermestids to eat the meat directly between it and the jaw bone.

Soak skulls in cold water in a glass container for 12 hours, to remove the blood and loosen the brain. In very hot weather it may be necessary to change the water to prevent fermentation. Bones acquire a bluish tinge when the temperature of the water rises and maceration begins.

After taking the skulls out of water, blow the brains out with the aid of a hypodermic fitted with a blunt needle, or atomizer bulb fitted with a short rubber tube and blunt hypodermic needle.

Large and small skulls should not be strung on the same wire. If, for example, squirrel and mouse skulls are strung together, the smaller certainly will be more or less broken.

Above all, do not allow skulls to become fly blown. This is apt to occur when they are hung up

to dry and while soaking, as some will float and thus be exposed to flies. Maggots do a great deal of damage by discoloring the bone, loosening the sutures, and obliterating data on tags. Never hang skulls in the sun -- always in the shade, and if possible, where there is a breeze. When skulls are quickly dried, any fly eggs deposited will not hatch. If, because of damp weather, the skulls are apt to remain moist, protect by cheesecloth (when hung up) to exclude the flies. When traveling by automobile, skulls may conveniently be dried by hanging over motor under hood, but fasten them securely so that they will not swing or knock together or be lost, and do not leave them longer than is necessary to dry them.

When packing skulls for shipment, or when moving camp, use a container with plenty of air holes. Never put damp or even dry skulls in air tight containers; this causes sweating and maceration.

When preparing skeletons, skin the body completely, which means to the tip of the tail and to the claws of the feet. The pads of the feet of mammals and the covering of the tarsi of birds are nearly impervious to dermestid beetles. Always "draw" the animal and cut off all large muscles. Tag skeletons (each separate piece) in the same way as skulls.

When roughed out, skeletons should be wrapped with thread or string so that the head and extremities will not be broken off when they are dry and brittle. The legs are pulled up along the body and the head brought back. A few wrappings of thread will suffice for small skeletons; do not use so much thread that the beetles have difficulty in getting to the meat. Do not wrap too tightly, as fresh bones are easily bent.

Preserve amphibians, reptiles, young of birds and mammals, and materials of like nature, in formalin. If necessary kill animals with light doses of ether or chloroform. Ordinarily mix one part full strength (40%) formalin with nine parts water except for amphibians, for which use about one to fourteen parts. "Pick-up" specimens in which there has been some spoiling need special treatment; viscera should be removed from spoiled segments and preservation should be in stronger formalin (one part in six). Inject each specimen with formalin mixture; in large lizards and snakes make certain to inject posterior alimentary canal, bulging food masses, eggs, and bases of tails. Coil specimens symmetrically into containers. Be sure that they are relaxed before attempting this. Do not crowd specimens as they may become pressed out of shape; remember that a large volume of specimens reduces concentration of preservative. Examine specimens at intervals to see that they remain in good condition.

In packing preserved specimens for shipment, drain off fluid and wrap in cheesecloth so that each specimen is separate from its neighbor; place in containers with tight-fitting tops, filling in extra space with excelsior to prevent specimens from moving about and rubbing against one another. Pour in just enough preservative to keep packing material moist.

In preparing mammals caught, divide your efforts logically between the common and rare species. As a rule, even with the commonest species, save a pair of adults from each locality. Where available, series up to thirty from one locality should be saved, these to include young of different stages as well as adults.

With birds, do not use up time on series of well-known and particularly migrant, species. However, save anything unrecognized, or needed to back up notebook determination.

NOTE TAKING

In upper left-hand corner of each and every notebook page enter collector's name and year. Set up headings for each page of catalogue, itinerary or journal, and species accounts as follows:

Catalogue

9 mi. W Benton, 8300 ft., Mono Co., Calif.

June 20, 1942

2430 ♂ Peromyscus maniculatus 172-88-20-16. Wt. 17.5 gm.

Journal

North Santiam River, 3400 ft., Linn Co., Ore.

June 10 (Begin here)

Dryobates villosus

June 9 4 mi. SW Prineville, 3300 ft., Crook Co., Ore. — (Begin here.)

In catalogue enter for each specimen all details of data pertaining to take -- collector's number left of red line, and also there, if not conventional "skin," whether (if) skeleton, skull-only, or alcoholic; to right of red line enter sex, name of species, breeding data, measurements, weight, and, on occasion, color of iris and soft parts and deposition of fat. Use a vernacular name of the species, if you are not sure of the scientific name.

Write full notes, even at risk of entering much information of apparently little value. One cannot anticipate the needs of the future, when notes and collection are worked up. The following are suggested topics, but do not restrict yourself to these alone. Be alert for new ideas and new facts.

Describe vegetation (saving plant-press samples of species not positively known), nature of ground, slope exposure, and drainage of each belt of animal life collected in. Describe exact location of trap lines, and also enter a sketch, in profile, or surface view, or both, to illustrate the location and relations of the different habitats crossed. Properly marked maps for each region worked should ultimately be bound in with the field notes of at least the leader of a party.

Keep record of closeness of settings of traps, distance covered, and results of each night's trapping; give number and type of traps put out in each habitat and number of animals of each species captured in each habitat (whether or not preserved), with sex, age, and breeding condition of each animal.

Keep full record of breeding data: Number and approximate size (length) of embryos, or of young found in nests; state of incubation in eggs. Dig out burrows if practicable; make drawings to scale, plan and elevation; describe fully.

Record food plants; keep specimens for identification where not known by a definite name; preserve cheek pouch contents, contents of gullets, stomachs of mammals and large birds. If these are not saved, identify and record contents.

Note regularly in notebook all "pick-ups," that is, odd skulls or fragments of animals of whatever source, serially numbered along with specimens of the more usual sort. Give full information, as with odd skulls secured from trappers, so that labels complete in all data can be made.

Keep frequent censuses of diurnal birds and mammals, with locality preferences indicated. When leaving a well-worked locality, enter a summary of

species observed, with remarks of a general nature, such as relate to local conditions of terrain, human activities, etc.

As opportunity affords, interview old residents, trappers, National Forest and National Park rangers in each locality visited. Always record accurately the name, official position or occupation, and address of each person giving information; give also your opinion as to his reliability. Note general attitude of men interviewed as to game laws and conservation and record specific comments, complaints or criticisms.

Ascertain present numbers and distribution of large mammals and birds as compared with former status. So far as possible get definite statements expressing ratio of abundance now, compared with a definite number of years back. Record fully all evidence as to human influence upon original or "natural" balance. Record present economic relations of vertebrate animal life, that is, effect on agriculture, stock raising, etc., with full details. Note opinions as to whether species should be protected or destroyed. Describe local methods of capture or destruction; give your opinion as to their effectiveness and justification.

Opportunity offering, record detailed observations on effects upon vertebrate animals, of severe storms, floods, fires, over-grazing, lumbering, road-building, or tree-planting.

Enter as much information as is feasible under species accounts. It will be easier to look for it there at a later date.

SUGGESTIONS AS TO LIFE HISTORY NOTES

(Birds, Mammals, Reptiles, Amphibians)

Markings and coloration (meanings apparent as associated with significant circumstances: directive, disruptive, concealing).

Speed (gait, climbing, swimming, walking, running, flying); tracks.

Abundance: by impression; censuses.

Plant associates: habitat; environment (define distinctive ecologic niche or biotope in which each animal is found).

Range (home range or "cruising radius" of individual, topographic and geographic range of species, any indications of change in range).

Call-notes or voice (interpretations whenever circumstances give any clue); "songs" of birds.

Migrations (regular, irregular, local, altitudinal, geographical); movements and flight.

Degree of gregariousness (including "social instincts"); manner or means of communication (as voice, gesture, touch, and smell-signals).

Nests, dens and lairs; breeding habits (including number of young, length of breeding period, mating; whether promiscuous, polygamous, monogamous; relations of individuals of family group to each other); modes of locating nests or homes; sanitation; solicitude; reactions of young; care of young; mastology (distribution of mammary glands).

Boldness; belligerence; intolerance; shyness.

Food-habits; forage range; manipulation of food; storage.

Scatology (dung or feces).

Acuteness of the various senses (touch, taste, sight, hearing, smell, and direction).

Enemies; disease (parasites, internal and external).

Odd partnerships; commensalism; any biotic interrelationships apparent.

Age (length of life of individual).

Refuges: from enemies; for resting or roosting.

Dormancy: hibernation or estivation; evidences of; places where undergone.

Note -- Read above suggestions every few days, devoting half an hour or so to thoughtful consideration of the objects of our field work, which are: To ascertain everything possible in regard to natural history of the vertebrate life of the regions traversed, and to make careful record of the facts gathered in the form of specimens and notes, to be preserved for all time. All this is for the information of others; strive to make your records in all respects clearly intelligible. Remember that the value of our manuscripts increases as the years go by and faunal changes take place. Some of our earlier notebooks describe conditions now vanished in the localities they dealt with.

Revised from previous editions prepared by
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