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Title: "General Directions for Collecting and Preserving Objects of Natural History" by Spencer Baird

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GENERAL DIRECTIONS FOR COLLECTING AND PRESERVING OBJECTS OF NATURAL HISTORY.

The SMITHSONIAN INSTITUTION being desirous of procuring objects of Natural History for its Museum, would respectfully ask assistance of the friends of science generally, and especially of officers of the Army and Navy. Any specimens of animals, plants, minerals, and fossil remains will be acceptable, particularly such as may be enumerated in the following brief directions for their preservation. All contributions will of course be duly credited to their respective donors, in the Museum and the reports of the Institution. By reference to the annexed letter, it will be seen that the Quartermaster's Department is authorized to receive and forward specimens.

The best way to preserve animals of moderate size is in alcohol. Next to this, rum or whiskey (the stronger the better) may be employed. When spirits cannot be obtained, the following substitutes may be used :

I. GOADBY'S SOLUTION.—A. *The Aluminous fluid*, composed of rock salt, 4 oz.; alum, 2 oz.; corrosive sublimate, 4 grains; boiling water, 2 quarts. B. *The Saline solution*, composed of rock salt, 8 oz.; corrosive sublimate, 2 grains; boiling water, 1 quart. To be well stirred, strained, and cooled.

II. A strong brine, to be used as hereafter indicated for Goadby's Solution.

III. In extreme cases dry salt may be used, as in salting herring, &c.

The collector should have a small keg, jar, tin box, or other suitable vessel, partially filled with liquor, into which specimens may be thrown as collected. They should be alive, or as near it as possible when this is done, as besides the speedy and little painful death, the animal will be more apt to keep sound. The entrance of the spirit into the cavities of the body should be facilitated by opening the mouth, making a small incision in the abdomen a half or one inch long, and especially by injecting the liquor into the intestines through the anus, by means of a small syringe. After the animal has soaked for some weeks in this liquor, it should be transferred to fresh. Care should be taken not to crowd the specimens too much, and the slightest taint of putridity should be the signal for the employment of fresh spirits. When it is impossible to transfer specimens to fresh spirits from time to time, the strongest alcohol should be originally used.

To use Goadby's Solution, the animal should first be macerated for a few hours in fresh water, to which about half its volume of the concentrated solution may then be added. After soaking thus for some days, the specimens may be transferred to fresh concentrated solution. When the aluminous fluid is used to preserve vertebrate animals, these should not remain in it for more than a few days, after this, they are to be soaked in fresh water, and transferred to the saline solution. An immersion of some weeks in the aluminous fluid will cause a destruction of the bones. Specimens must be kept submerged in these fluids.

To pack the specimens for transportation, procure a small keg, which has been properly swelled, by allowing water to stand in it for a day or two, and from this extract the head by knocking off the upper hoops. Great care must be taken to make such marks on the hoops and head, as will assist in their being replaced in precisely the same relative position to each other and the keg, that they originally held. At the bottom of the keg place a layer of tow moistened in liquor, then one of specimens, then another of tow and another of specimens, and so on alternately until the keg is filled. Replace the head, drive down the hoops, and fill completely with spirits by pouring through the bung hole. Allow it to stand at least half an hour, and then supplying the deficiency of the liquor, insert the bung and fasten it securely. An oyster-can or other tin vessel may be used to great advantage, in which case the aperture should be soldered up and the vessel enclosed in a box. A glass jar or bottle may also be employed, but there is always a risk of breaking and leaking. In the absence of tow, chopped straw, fine shavings, or dry grass may be substituted.

Fishes under six inches in length need not have the abdominal incision. Specimens with the scales and fins perfect, should be selected, and if convenient, stitched or pinned in bits of muslin, &c., to preserve the scales. In general, fishes under twelve or fifteen inches in length should be chosen. The skins of larger ones may be put in liquor. It is important to collect even the smallest.

Skulls of quadrupeds may be prepared by boiling in water for a few hours. A little potash or ley added will facilitate the operation. The flesh can then be removed. Skulls of the American Indians and other human races are desirable when they can be obtained, as also the skulls and skeletons of the larger mammalia, as deer, bears, wolves, panthers, foxes, beaver, badger, antelope, rocky mountain sheep, mountain goat, seals, buffalo, wild cat, prairie dogs, marmots, &c., &c.

Birds and mammalia larger than a rat should be skinned. The proper material for the preservation of such skins is arsenic, applied to the inside, either in powder, or mixed with alcohol or water. Such specimens should be perfectly dry before packing away. In the absence of arsenic, skins of large mammalia may be salted down in casks.

Skeletons may be roughly prepared by skinning the animal and removing all the viscera, together with as much of the flesh as possible. The bones should then be exposed to the sun or air until completely dried. Previously, however, the brain of large animals should be removed, by separating the skull from the spine, and extracting the contents through the large hole in the back of the head. In case it becomes necessary to disjoint a skeleton, care should be taken to attach a common mark to all the pieces, especially when more than one individual is packed in the same box.

Specimens of the following kinds, preserved in spirits, are particularly desired:—SMALL QUADRUPEDS, as field mice, shrews, moles, bats, squirrels, weasels.—REPTILES, as snakes, lizards, scorpions, (so-called) frogs, toads, tree frogs, and, above all, the salamanders, or lizards without scales, found in water or under logs and stones, known by the various names of hellbender, young alligator, ground puppy, water-puppy, &c. FISH of all kinds, especially the gars, perch, pike, sunfish, chubs, suckers, minnows, and other fresh water species. Also the skulls, teeth and bones of animals in general, and especially the fossil remains of teeth and bones, found in marl-pits, rocks, caves, and the superficial soil.

INSECTS, BUGS, &c.—The harder kinds may be put in liquor as above, but the vessel or bottles should not be very large. Butterflies, wasps, flies, &c., may be pinned in boxes, or packed in layers with soft paper or cotton. Minute kinds should be carefully sought under stones, bark, dung, or flowers, or swept with a small net from grass or leaves. They may be put in quills, or small cones of paper, one in each.—They may be killed by immersing the bottles, &c., in which they are collected, in hot water, or exposing them to the vapor of ether.

Marine shells, crabs, worms, sea cucumbers, star fishes, sea urchins, and polypes should be put in spirit and in small vessels, so as to prevent too great pressure. Sea urchins and star fishes may also be dried after having been previously immersed for a minute or two in boiling water, and packed up in cotton, or any soft material which may be at hand.

Shells without the animals, skulls, bones, fossils, minerals, &c., should be packed so as to prevent attrition, in separate pieces of paper, or in cotton, grass, sawdust, &c., leaving no vacancy in the box. All specimens should be accompanied by marks indicating the locality whence obtained.

SPENCER F. BAIRD,
Asssist. Secretary of the Smithsonian Institution, in charge of the Nat. Hist. Dept.

[COPY.]

QUARTERMASTER GENERAL'S OFFICE,
Washington City, March 31*st*, 1848.

COL.:—I am in receipt of Professor Baird's letter with your endorsement, dated the 25th instant. In reply, I have to inform you, that where public wagons are returning empty, from the interior to the depots on the coast, and public vessels returning from Mexico or Texas, to New Orleans, or other ports in the United States, specimens can be transported and kept in public stores, as requested by Professor Baird, free of expense, but that no money can be paid for expenses, it being contrary to law.

I remain, Colonel,
Very respectfully,
Your obedient servant,
THOS. S. JESUP, *Q. M. Gen.*

COL. S. CHURCHILL,
Ins. Gen. U. S. A.

SPECIAL DESIDERATA.

As comparatively little is known of the animals and plants of the country west of the Mississippi and Gulf of Mexico, the attention of officers of the army, and others, is especially invited to this region. Of the fresh water fishes, trout, grayling, minnows, &c., little or nothing is on record, and the same may be said of the marine species. The reptiles, birds, smaller mammalia, (squirrels, marmots, gophers, pouched rats, hares, &c.,) and other animals should also be carefully collected.

This region likewise abounds in fossil bones, teeth, &c., of the greatest interest, especially in those portions known as "Mauvaises Terres," or "Bad Lands," and occuring along the Missouri and its tributaries, White River, Milk River, Platte, Eau qui Court, &c. The banks and beds of these and other streams, likewise contain rich treasures of fossil bones. Similar remains are to be looked for in all caves, peat bogs, alluvial soil, marl pits, fissures in rocks and other localities throughout North America.

A list of the principal species of large North American animals is subjoined, with reference to the collection of skulls and skeletons. For the purpose of having complete series in the different stages of age and sex, and for supplying other Museums, it is desirable to have a considerable number of the skulls of each species. When possible, at least one skeleton should be procured. It must, however, be remembered, that a single tooth or bone, of an animal, in the absence of anything more, will be of importance. *Each specimen should, as far as practicable, have the age, sex, and locality distinctly marked on the bone in pen or pencil.*

HUMAN RACES, civilized and uncivilized.
BUFFALO.
MUSK OX.
MOUNTAIN SHEEP, or BIGHORN.
CALIFORNIA WILD SHEEP.
MOUNTAIN GOAT.
ANTELOPE.
ELK.
LITTLE ELK.
MOOSE.
REINDEER, or CARABOU.
BLACK TAIL DEER, of Rocky Mountains.
" " " of the Pacific.
MULE DEER.
WHITE TAIL DEER.
DEER—other species.
BEAVER.
PRAIRIE DOG.
MARMOTS.

HARES.
LARGE WOLF, black, white, or grey.
LOBOS WOLF.
PRAIRIE WOLF.
COYOTE.
INDIAN DOG.
FOXES, all species.
SEA OTTER.
COMMON OTTER.
GRIZZLY BEAR.
WHITE BEAR.
BEARS, other species.
RACCOON, especially from California.
BADGER.
WOLVERENE, or CARCAJOU.
FISHER.
MARTEN.
PANTHER.
JAGUAR.

OCELOT.
OUNCE.
TIGER CAT.
WILD CAT.
LYNX.
CIVET CAT, or BASSARIS.
ARMADILLO.
PECCARY, or MEXICAN HOG.
WALRUS, or MORSE.
SEALS.
PORPOISES.
DOLPHINS.
WHALES.
MANATEE, or SEA COW.

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ALLIGATOR.
SHARKS, STINGREES, RAYS, DEVIL FISH; teeth, jaws, and vertebræ.