

Chapter 7 - Zoology

SUGGESTIONS AS TO COLLECTING LAND VERTEBRATES ON CORAL ATOLLS

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Each member of the party should be provided with a copy of "A field collector's manual in natural history" publication 3766 of the Smithsonian Institution, Washington, D. C. This concise pocket book gives complete instructions for collecting and preserving all types of animals.

The Field Notebook

Preferably loose-leaf, of medium size, the field notebook is much more important than the specimens. In it are recorded observations on the behavior, feeding methods, habitat, breeding activity of the various animals.

Species Accounts: Keep the records for each species in a series of pages devoted to that species alone. Memory is treacherous, and to be of value, these observations should be written down in the field while you are watching the animal.

Catalogue of Specimens: The catalogue duplicates the information on the specimen label, and is the place where additional information (for which there may not be enough room on the label itself) such as coloration, stomach contents, parasites found, slides prepared, condition of gonads, amount of fat, habitat, time of collecting is entered. Number each specimen in serial order, in the order in which they are collected, using the same consecutive series of numbers for all the vertebrates. Each number then is unique for the particular specimen, and this number appears both on the specimen label and in the catalogue.

Label: Labels will be provided by the Smithsonian Institution. They should be of tough paper which will not go to pieces in liquid, and should be written upon clearly with Higgins Eternal Fountain-pen Ink. For any vertebrate specimen, the information which must appear on this label is

exact locality
date
your signature
your catalogue number

In addition, for birds, the sex, as determined by opening the body cavity and examining the gonads, must be entered; for mammals, in addition to the sex, the following measurements must appear, and to save space, you can merely put the numerals down in this order, in millimeters: total length, tail length, hind foot, ear. In addition, for all vertebrates, put as much of the further information as stated above under catalog for which there may be room. A strong label, the "skull tag" bearing your initials, cat. number, sex, is tied to the mammal skull.

The Specimens

With the bookkeeping methods well in mind, let us now turn to the actual preservation of the specimens.

Reptiles and amphibians: Don't neglect the nocturnal species. They may easily be found by their eye-shine, seen when you hold the flashlight near the level of your eyes. A head flashlight is a great convenience. These animals are easily caught by hand while they are active, or when uncovered in their hiding places. For the shy forms, a noose of leader or grass at the end of a long

stick is an efficient collecting device. Tie a label on one hind leg, slice open the body wall and big muscle masses in a few places to permit penetration of the preservative, and place in 70% ethyl alcohol. Alcohol can usually be obtained from Navy hospitals. Spike or change the alcohol before shipping home. Record coloration in the catalogue, for these animals fade.

Birds: These can often be obtained from the natives, who have various methods of snaring them. It is not absolutely necessary to take a shotgun along to collect birds, as the forms found on atolls are pretty widely distributed and well known from the standpoint of specimens. They are practically unknown as regards behavior, annual cycle, etc. You can make a good skin of a bird shot with a small bore rifle, as long as it is not hit in the head. Powdered arsenic, dry sand, cotton and scissors and forceps are needed in preparation. Liberally sprinkle sand all over the bird while skinning, so that blood and juices may not soil the feathers. The process of bird skinning in a nut-shell is this: make an incision lengthwise of the belly from about the middle of the breast muscle to the cloaca. Lift the skin away from this opening and turn the skin completely inside-out, thus removing it from the carcass, and cutting it away from any attachments to the carcass in the following order:

Cut each leg from under the skin at the knee; cut the tail through the caudal vertebrae, again under the skin, as you expose this area in turning the skin inside-out; cut the wing through the humerus, pull out the ears, cut the eyelids between the skin and skull; cut out the back of the skull and roof of the mouth. Do not cut off the bill. You now have the skin inside-out, with the bill, skull, wings, feet and tail all attached by the skin. Clean off all meat, brains, fat, and if very fat soak in gasoline or scrape and keep sprinkling with sand. (Gasoline-soaked skins easily fluff out and dry if held up in a brisk wind.) Now turn the skin right-side-out again and from the ventral incision, fill each eye with a ball of cotton. (Sprinkle arsenic on the skin before turning right-side out.) Put a stick wrapped with cotton into the neck, and anchor the sharpened end of this stick in the base of the upper mandible. Roll up a piece of cotton the size of the carcass and put it into the skin, with the neck stick ventral to it - thus the neck stick runs along the throat, and we have left a hollow space at the back of the neck into which the neck feathers can find their proper alignment. Sew up the incision, cross the feet and tie the label around both at the point where they cross. Wrap in cotton until dry. The object of this preparation is to have a specimen resembling the dead bird, which will be well filled out with cotton so as to reveal the plumage and coloration, and from which measurements of the bill, wings, tail and feet may be taken. This requires that the bill should be closed in a natural fashion. For large birds, it is necessary to skin out the muscles of the wing. This can be done by turning the wing skin inside out as far out as the wrist. This of course involves stripping the secondary feathers off the ulna, but is a justifiable procedure as long as you are certain to pull these feathers back along the ulna to their original locations when you turn the wing right-side out again.

The sex determination appearing on the bird label should be based on an examination of the gonads, which lie at the anteroventral portion of the kidneys, near the adrenals. Two oval white or yellowish bodies with tiny tubules showing through the transparent covering, which has a smooth surface, indicate a male. In the female, there is usually only the one gonad, on the left, and it is granular and irregular in shape, owing to the presence of numerous ova.

Mammals: Again, it is well to bear in mind, especially if you are restricted as to luggage, that it is not absolutely necessary to have traps. The little Polynesian rats, and the larger house rats can readily be taken as follows: break open a fresh coconut and lay it at the edge of a pile of coconut husks, or a rock wall, or a rotten log. Sit quietly with a stick and club the rats on the back as they come out to eat the coconut meat. The natives can get you many in this way, though they make the mistake of hitting them on the head, thus ruining the skull for scientific study. The skinning method is similar to that used for the birds with this important difference: the four measurements must be taken before skinning, and the entire undamaged skull must be removed from the skin, the brains blown out through the foramen magnum, and a skull tag attached to the skull. The tail bones also are entirely slipped out of the tail skin, to be replaced with a long wire carefully wrapped with long-fibered cotton of just the right thickness to get all the way back to the tip of the tail. After dusting the skin with arsenic and turning it right-side out again, it is filled with a cylindrical piece of cotton, pointed into the snout, and wires wrapped with cotton are thrust into the four feet. These four wires and the inner end of the tail wire lie between the skin and the stuffing, on the ventral side of the animal. After sewing up the incision and tying the label on the hind foot, the rat is pinned down on a board, with the soles of the feet down.

Problems of Interest on Atolls

Large series of the rodents and lizards should be preserved. Look for signs of the introduction of house rats, and determine if they are eating the green coconuts. Apparently the Polynesian rat does not eat the nuts on the tree. Among the reptiles, the skinks are of particular interest for they are apt to show polymorphism (within the same species) and you are likely to observe different proportions of the various color phases on different islets of the same atoll. You may even find in the skink genus Emoia that two closely related forms, differing markedly in color replace each other about the atoll (apparently not occurring together upon any one islet). Exceedingly valuable data will accrue from a brisk survey of every islet of the atoll, whereby you collect representative samples of such a species and note the environmental conditions under which each form flourishes as well as the conditions upon islets where neither is found. Thus one might be permitted to evaluate the possible role of natural selection in bringing about such strange distributional patterns. In other words, environmental conditions about an atoll may not be as uniform, from the standpoint of land vertebrate habitats, as one might suppose. Striking irregularities in distribution may be disclosed by such a canvass of the entire vegetated land area of the atoll--vastly worth-while even though brief. For birds, the items of interest are a determination of the breeding period for each species. (On Ascension Island, the sooty terns are now known to breed every 9 1/2 months, year in, year out!). Also observe and record location of colonies, time of activity, whether flocking or solitary, behavior in general. The most valuable observations accrue from continuous or daily observations of the same individual or group.

Parasites

After going such a long distance to get your specimens, it is rather too bad if you do not take full advantage of all the information that they may yield, before they are preserved. It is worth the trouble, therefore, to take along a microscope and look for rectal and caecal protozoa, and for intestinal helminths. These are easy to find, for if they occur at all, they are usually swarming. For instance, a drop of liquid which a lizard exudes from his cloaca when handled, may be just a living mass of flagellates. The same applies to the caeca of birds and of rats. Take along a stock bottle of Bouin's fixative, and a supply of round coverslips, and vials into which they just fit, round papers, the size of the covers. Smear the fluid from the rectum or caecum on one side of the cover slip and immediately (before it begins to dry) float it face down upon the surface of the Bouin's solution. After a half hour or so, transfer it to 50% alcohol, then to 70% alc. in the vial. On top of the series of covers all coming from one vertebrate specimen, put a paper label bearing your catalogue number for that particular vertebrate, and the organ from which the smear was made. It is of great scientific interest to do the same for the protozoa living in the hind gut of termites. Keep a vial of the termites in alcohol with a catalogue number corresponding to that on the label for the coverslip preparations, so they may be identified.

Roundworms are killed in hot 70% alcohol (this makes them straighten out) to which is later added a little glycerine, if handy. Flatworms should be placed in Bouin's fixative overnight, then placed a few minutes in 50% alcohol, then stored in 70% alcohol. If time and space are very limited it is possible to get good results by just leaving these cover smears and flatworms in the Bouin's, but it is preferable to store in alcohol after killing in the Bouin's.

Ectoparasites: Mites, ticks, lice, fleas, hippoboscids, and other external parasites are only collected efficiently in conjunction with collection of their hosts. Mites which infest lizards are automatically preserved with their hosts in alcohol, but, because they may drop off, the lizards should, at least at first, be placed in separate receptacles of alcohol, separating the species and localities. When the alcohol is changed any mites that have dropped off may be picked up with a medicine dropper and placed in a vial with a label. Wrapping bird and mammal skins in a thin layer of cotton while they are drying will serve to gather many of the ectoparasites, which leave the host as it dries. They do not live long, especially if the skins are dried in the presence of paradichlorobenzene or naphthalene, and when they leave the skin they usually lodge in the layer of cotton. Rats, which usually have fleas, may be left for a short while in a jar with paradichlorobenzene crystals or a few drops of gasoline or ether. The fleas will be killed and either remain in the hair of the rat or fall to the bottom of the jar. All of these parasites may be preserved in alcohol. Like the helminths, they should be kept in a separate vial corresponding to each host specimen, as proclaimed by a slip of paper in the vial, which bears your catalogue number of the vertebrate host, as well as the location or organ where the parasite was found.