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DIRECTIONS FOR COLLECTING REPTILES AND
BATRACHIANS.

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Part E of Bulletin of the United States National Museum, No. 39.

WASHINGTON :
GOVERNMENT PRINTING OFFICE.

1891.

DIRECTIONS FOR COLLECTING REPTILES AND BATRACHIANS

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INTRODUCTORY NOTE.

The following directions are prepared for the use of collectors who, without being herpetological experts, desire to procure for the Museum specimens of the reptiles and batrachians which they may be able to gather in the neighborhood of their residence or while traveling. Persons who devote themselves to collecting these animals exclusively are but rarely met with, but there are numerous collectors of other objects of natural history who would be willing to preserve the reptiles and batrachians, if they only knew how to do it in the easiest and most satisfactory way. Such persons have usually very limited space and time to devote to this branch of zoölogy, a circumstance which has been taken into consideration in preparing these directions.

The herpetological specialist will know how to collect better than I can tell him, and the scientific explorer who goes into distant lands far from communication with the civilized world, with a large outfit and for a protracted period, will need special instructions and extensive apparatus (soldering outfit, distilling apparatus, etc.), which can be more advantageously prepared in each individual case.

APPARATUS.

The following articles are more or less necessary for successfully collecting reptiles and batrachians, though many of them are not exclusively used for this purpose. By checking off on this list before starting the collector may at once know whether he has supplied himself with the essential means of collecting.

1. Gun with auxiliary barrel, or collecting pistol (see Directions for Collecting Birds, pp. 7-9).
2. Dip net.
3. Fishhooks and tackle.
4. A pair of stout leather gloves.
5. Bags of cotton cloth, or cheese cloth (see page 9).
6. Fishing basket, or botanical collecting box of tin.

7. Collecting can with strap. The one-gallon copper can (described under the following number) with two loops fastened on top for the insertion of the strap will do good service.

8. Chest of tanks filled with alcohol. A very compact and handy outfit is figured in the appended cut (fig. 1). It consists of two copper tanks and a tin case inclosed in a wooden box. The latter is made of half-inch boards and measures outside, exclusive of strips, length 13, width 12, height $9\frac{1}{2}$ inches. The hinges are fastened on the inside, and there is a handle on the top of the lid for carrying. It is locked by means of a brass padlock. The larger tank measures, outside, $9\frac{1}{4}$ inches

FIG. 1.—Chest of tanks.

long, $6\frac{3}{4}$ inches wide, and $7\frac{5}{8}$ inches high, and holds about 2 gallons of alcohol; the smaller holds a little less than a gallon, with the following measurements: length $8\frac{3}{8}$, width $3\frac{1}{8}$, and height $8\frac{5}{8}$ inches. Both have brass screw tops with rubber packing, the larger with an opening $4\frac{1}{8}$ inches in diameter, the smaller $2\frac{1}{2}$ inches. To lift them out of the box the larger has two handles on top, the smaller one on the side. The tin box has the following dimensions: Length $9\frac{7}{8}$, width $8\frac{5}{8}$, height $2\frac{5}{8}$ inches, and should also have a handle. In the box is room enough for the hypodermic syringe, forceps, notebook, writing materials, labels, cheese cloth for wrapping, bags, cotton, etc. The whole outfit when filled weighs only 40 pounds.

It is always the best policy to use the best quality of alcohol, but when this cannot be had, methylated alcohol will do for temporary use, at least. Even native whiskies, brandy, or other alcoholic liquids may be used in cases of necessity, if of sufficient strength. As a practical test for ascertaining this point, it may be said that an alcoholic liquid will preserve the specimens as long as it can be ignited without first being heated.

9. Iron bar or "key" for unscrewing top of tanks.

10. One pair of Bond's placental forceps, 12 inches long (see fig. 2). Invaluable in the field both for picking up specimens and for handling the alcoholics. In the field it may be carried conveniently by the side like a sword. I found one of the buttonholes of my suspenders quite the thing for this purpose. Price, about \$2.50.

11. Long spring forceps, not less than 8 inches long, for handling alcoholics (same kind as described in Directions for Collecting Birds, p. 11, fig. 8).

12. Hypodermic syringe with needle point for injecting alcohol into specimens (see fig. 3). Its capacity should not be less than 60 minims. A syringe similar to the one figured, in neat case, can be had for about \$3. Those in nickel-plated metal case (the "Phenix," for instance) are to be preferred.

13. Stringed labels (see fig. 5, page 10).

14. Cheese cloth for wrapping. Use only white cloth for wrapping as any dye is sure to be extracted by the alcohol, discoloring the specimens.

15. Knife, or scalpel, and a pair of pointed scissors (see Directions for Collecting Birds, pp. 9-10).

16. Fine metal thread, twine, and cotton thread.

17. Note-book.

18. Ridgway's "Nomenclature of Colors" (see page 9).

19. Adhesive shipping labels (see page 13).

FIG. 2.—Bond's Forceps.

FIG. 3.—Hypodermic Syringe, three-quarter natural size.

GENERAL REMARKS.

I wish to impress upon the collector that one well-labeled and well-preserved specimen is worth more than ten mutilated or half decomposed specimens without labels. A man who is not willing to take the trouble of properly labeling his specimens need not go to the trouble of collecting them, for in our days specimens without data as to the exact locality, at least, are not worth the alcohol they are kept in. Follow, therefore, explicitly the directions relating to labeling given further on.

In any given locality try to collect specimens of all the species occurring there, no matter whether they are common or not, and invariably preserve the first specimen of any species whether bad or good. But do not be satisfied with one specimen of each kind; if they are not too large try to get at least six specimens, and, if any kind shows great individual variation or you happen to know that it is a rare species in collections, two dozen are not too many.

As a general rule the largest and most conspicuous species are the least interesting. Small and insignificant forms of secluded habits, particularly those living in holes or burrows in the ground, are most likely to be novelties or great desiderata of our museum.

If you can not, for one reason or another, preserve all the specimens you are able to procure, make your selection of individuals in the following way: Of the largest species select individuals of medium and small size; of the smallest species take care to get most of the largest specimens. Be sure that the individual variation exhibited among the specimens caught is well represented in the series selected.

WHEN AND WHERE TO COLLECT.

While reptiles and batrachians may be found occasionally at any season, spring is *the* time for systematic collecting, the beginning of the collecting season depending of course upon the meteorologic conditions. In a climate not too severe batrachians may be looked for on the first mild days signaling the breaking up of winter, while the reptiles, as a rule, require warmer weather to rouse them from their hibernation.

The differences between these two classes manifest themselves not only in their structure, but quite as much in their habits, and their collecting is therefore essentially different. The batrachians, generally, prefer dark and damp places, and the best time for collecting them is, therefore, very early in the morning or late evenings. Many of them will be found in dense woods or swamps, among decaying leaves, in old stumps, under fallen logs or stones, and in wet moss, while the purely aquatic species have to be looked for in springs, ponds, rivers, or lakes.

Most of the reptiles, on the other hand, love the light and the heat of the sun, and usually no locality furnishes more species and specimens than the hot and sandy desert or the sun-baked rocks on the southern slopes of a mountainous country, though in the tropics the dense forests abound with their own particular species. The aquatic reptiles, chiefly snakes, will have to be looked for in their own element. A number of reptiles are more or less nocturnal in their habits, for instance many of the poisonous snakes, and these may often be gathered in numbers on warm moonlight nights. A fire or lantern may then be used to advantage. They are also often found after a mild thunder shower, as are likewise many of the inoffensive, particularly the burrowing species.

The latter are usually the most interesting as well as the rarest species in collections. Special care should therefore be taken to obtain as many of them as possible, and the collector should always be on the lookout whenever any digging of ditches or plowing of ground goes on in his neighborhood.

In very warm and dry climates the best time for collecting reptiles is just after the first summer rain.

SECURING SPECIMENS.

A good many reptiles and batrachians are easily enough secured by simply picking them up with the hand. A quick grab with five or ten fingers, as the case may be, will bring many others in the collector's power, though sometimes he will find himself the possessor of only the wriggling tail, while the rest and more important portion of the lizard scampers away and disappears in the nearest crevice. But other animals are either too quick in their movements, or they are too shy, or they live among the thorny cactus, or in the water, and for these other means of capture are to be devised.

The latter have either to be caught with line and hook, baited with raw meat, as certain turtles, or with a dip-net; but as to the others I know of no better way to secure them than to shoot them with the .32 or .22 caliber auxiliary barrel or collecting pistol, or to catch them with a slip-noose.

As to the arms mentioned I refer to what Mr. R. Ridgway has said in the *Directions for Collecting Birds*, with the only addition that for shooting reptiles I would not advise the use of "wood" powder. I am not thoroughly satisfied that this powder is reliable under all circumstances, and the greater noise of the black powder is of no consequence in this kind of collecting. The latter fouls the gun more, but the auxiliary barrel is so easily cleaned that but little is gained by using "wood" powder.

Specimens are often badly mutilated by shooting, but more specimens are so easily obtained in this than in any other way, and the collector can therefore make his selection for preservation from a greater number of specimens.

During my collecting trip in Arizona, in 1889, most of the lizards obtained were shot, as well as all the frogs. The latter would sit motionless along the border of the river, but as soon as they caught a glimpse of my dip net they jumped into the creek and immediately disappeared in its muddy waters, and not until I learned that a light charge of No. 12 shot would cause them to turn their white bellies up without even a kick did I secure a specimen.

Very often a snake or lizard, if caught alive, will turn upon its captor and bite him furiously; but with the exception of the distinctly venomous kinds their bite, even though it may draw blood, will cause no harm. A stout leather glove is in such cases of great service.

The poisonous snakes, of course, require more care in handling. They may either be shot, or if it is preferred to capture them alive, a long stick bifurcated at the end may be used in pinning them to the ground by placing the fork over their neck just behind the head. They are also sometimes secured by spearing with a long stick, to the end of which is fastened a stout fishhook straightened out. This instrument may also be found useful in reaching specimens which have taken refuge in some otherwise inaccessible place.

Another method not uncommonly adopted by collectors is to slip a noose over the head of the unsuspecting lizard or snake as illustrated by fig. 4. Formerly a noose of horsehair was considered the best

FIG. 4.—Catching Lizard with a slip-noose.

thing for small animals, but Mr. Benedict, who has had a good deal of experience in collecting reptiles when resident naturalist of the U. S. Fish Commission steamer *Albatross*, has demonstrated to me the superiority of fine annealed iron wire, such as is usually sold in hardware

stores wound on spools. Various sizes, from Nos. 22 to 34, may be found useful; the larger sizes might probably be quite as serviceable if of copper. For larger snakes a noose of waxed twine will be found to work well in many cases, and is to be recommended to persons who are too nervous to grab a live snake with an unprotected hand.

The noose should be fastened to the end of a long stick, or a light switch, as the case may require, and if a few leaves are left at the end so much the better, as they will attract the reptile's attention from the noose. Slip the noose gently over its head and a sharp jerk towards the tail will usually put the prize in your possession.

The specimen as soon as secured should be immediately transferred to one of the small cheese-cloth bags which the collector carries in his pockets. A good supply of these bags of various sizes, from 2 x 4 inches to 4 x 10 inches, each one with a string for tying it up, should be laid in before starting, enough to average one bag for every three specimens. A paper label with the exact locality written in lead pencil should be slipped into the bag with the specimen. If the collector carries with him a small glass or metal jar with alcohol the bag with the specimen may be placed in it at once, if not it is put in the pocket or in whatever receptacle the collector carries for that purpose. I have found a medium-sized fishing basket or a botanical collecting box of tin to answer every purpose. The live specimens are also put in bags, but are not transferred to alcohol until the day's collecting is over.

Frogs, toads, and salamanders, when brought in alive, should be kept moist by wetting the bag occasionally or wrapping it in wet moss.

TAKING CARE OF THE SPECIMENS.

Having returned to his quarters the collector gets ready for "curing" and labeling his specimens, attending first to those which were killed.

The blood should be washed off in water, and while the specimen is soaking there is time for making the necessary entry in the notebook and for preparing the label.

The entry in the notebook should contain (1) the running number of the specimen; (2) the exact locality where captured, besides county and state; (3) if possible the altitude above sea; (4) the character of the soil and vegetation where the specimen was found, whether on sand, among rocks, under logs or stones, in holes, in a swamp, meadow, desert, forest of pines or deciduous trees, among sagebrush, cactus, or any other observations of a like nature; (5) date of capture; (6) color description of fresh specimen (it is not necessary to describe the pattern, as that is usually preserved in alcohol, but the exact shade of the ground color and of the markings should be carefully determined by actual comparison with the standards in Ridgway's *Nomenclature of Colors**); (7) local vernacular name, if determinable with certainty; (8) other remarks.

*A *Nomenclature of Colors for Naturalists, etc.*, by Robert Ridgway. Boston: Little, Brown & Co., 1886.

From the entry in the notebook the label is now made up. The most satisfactory label is made of first quality strong parchment paper and the writing should be done either with a No. 2 lead pencil or with good fluid India ink, care being taken in the latter case not to immerse the label in alcohol until it is perfectly dry. It saves a good deal of work to have the labels printed, cut, and stringed before starting on the trip; the printing may to great advantage contain the general locality where the collections are to be made (as for instance name of state or country) as well as the name of the collector. In addition to the exact locality and date the label should contain the collector's running notebook number. On the back may be written such additional information or notes as may be deemed desirable. A label of good size and shape is shown in the accompanying cut (fig. 5) which also indicates how to string it.

FIG. 5.—Sample label; natural size.

In tying the label on be careful not to fasten it tighter than necessary to prevent the label from slipping off. Never tie a label round the neck of a specimen; in lizards and salamanders fasten it round the body just behind the fore leg; in frogs and toads in front of the hind legs; in snakes round the body at about the anterior third; finally, in turtles tie the string to one of the legs, and only in this case is it necessary and permissible to draw it very tight.

Before finally placing the specimen in alcohol the preserving fluid should be made to enter the body cavities, as the specimens are almost sure to spoil if the alcohol is only allowed to act on the outside. To prevent its decomposition from the inside I have found it most useful to inject a quantity of strong alcohol by means of a hypodermic syringe. The point of the latter is run down the throat and under the scales into the alimentary canal, in one or more places according to size, and in large specimens it will be found advantageous also to inject alcohol into the larger muscles. In this way the appearance of the specimens is not injured in the least and the preservation is perfect. If a syringe is not at hand the abdominal cavity should be opened with a pair of pointed

scissors to allow the fluid to enter; by this process snakes should be cut open in several places along the middle of the under side across the wide ventral plates, the so-called gastrosteges. Should a large lump indicate that a snake contains food not yet digested, the belly should be opened and the contents of the alimentary canal removed—or preserved separately, if desired.

Before placing turtles in alcohol head and feet should be drawn out from the shell, the mouth should be opened, and a small piece of wood placed between the jaws so as to prevent the mouth from closing. If the mouths of lizards, snakes, salamanders, and frogs can be kept open without injuring their teeth so much the better, as some of the most important systematic characters are derived from the dentition and the shape of the tongue, and it is very difficult to open the mouths of specimens which have become hardened in alcohol. A wad of cotton or paper may be found useful for this purpose.

The specimen is now ready to be placed in *alcohol*, the only really effective and reliable preserving fluid. When starting out the collector should provide himself with alcohol of about 95 per cent strength, but he should *not* use alcohol of this strength. The full strength alcohol should be kept in stock in the large tank, while the specimens themselves are kept in the smaller tank in alcohol of about 75 per cent. But the best result will be obtained, if the collector has opportunity to put his specimens in still weaker alcohol during the first 24 hours, so as to allow the preservative fluid to penetrate the tissues thoroughly before placing them in the 75 per cent alcohol. It should also be remembered that this strength only applies to reptiles, as 50 to 60 per cent alcohol will do better for batrachians, which are apt to shrivel up entirely in too strong alcohol.

If the specimens can remain undisturbed in the same place for some time no further precautions are necessary, but if the collector is traveling all the time each specimen should be placed separately in one of the cheese-cloth bags, so as to prevent it from being rubbed during transportation. However, quite a number of smooth-skinned specimens, or such with scales which do not come off easily or are provided with spines, may be accommodated in one bag. In default of bags they may be wrapped in cheese cloth, mosquito netting, or any other suitable material at hand.

Specimens brought home alive may be sent to the museum in that condition, if the prospects for their safe arrival are favorable. This will be found especially practicable with turtles, which can usually be kept a long time without food. If the specimens, however, are to be killed this can best be done by drowning them in strong alcohol. For that purpose they should be placed in an empty vessel and the alcohol poured into it through a narrow opening. The vessel should be so full as to exclude every particle of air from it and then be covered up to prevent the animal from breathing. Even with these precautions some kinds require a long immersion before they die.

The above directions apply chiefly to small and medium sized specimens which can be accommodated whole in an ordinary collector's outfit. He will occasionally, however, come across large specimens, which have to be treated in a different way.

Crocodiles, alligators, and very large lizards may be *skinned* in the same manner as indicated for large mammals, only that no attempt is made at removing much less mutilating the skull. The crocodiles and alligators may be dried or salted, while the lizard skins are better placed in alcohol, in which case the entire head and the limbs are left in the skin.

Snakes too large to be preserved in alcohol should be skinned in very much the same manner. After having noted the total length of the specimen carefully in the note book make a longitudinal section *along the middle line* of the entire underside from a little behind the head to a few scales from the anal opening, taking great care not to injure the last scale in front of the vent. The skin is now removed from the body by gradually loosening it on each side from the cut toward the median line of the back. The body is cut off behind the skull, and a little in front of the anal opening, and the tail, like the head, left in the skin. Properly labeled, the skin is then placed in alcohol.

For skinning chelonians the old "Smithsonian Directions" (Misc. Coll. 34) contain the following:

Turtles and tortoises are more difficult to prepare in this way, although their skinning can be done quite rapidly. "The breastplate must be separated by a knife or saw from the back, and, when the viscera and fleshy parts have been removed, restored to its position. The skin of the head and neck must be turned inside out as far as the head, and the vertebræ and flesh of the neck should be detached from the head, which, after being freed from the flesh, the brain, and the tongue, may be preserved with the skin of the neck. In skinning the legs and the tail, the skin must be turned inside out, and the flesh having been removed from the bones; they are to be returned to their places by redrawing the skin over them, first winding a little cotton or tow around the bones to prevent the skin adhering to them when it dries."—RICHARD OWEN.

Another way of preparing these reptiles is as follows: Make two incisions, one from the anterior end of the breastplate to the symphysis of the lower jaw, and another from the posterior end of the breastplate to the vent or tip of the tail; skin off these regions and remove all fleshy parts and viscera without touching the breastplate itself; apply the preservative, stuff, and sew up again both incisions.

TRANSPORTING.

The collector should make it a point to transmit his specimens to the museum *as soon and as often* as possible, and not allow them to accumulate on his hands when in the field.

If he is within reach of a United States post-office the question of transportation is a comparatively easy one. His specimens after an immersion in alcohol of one to two weeks duration, according to size, will be found hardened, and once in this condition they will stand transportation in a nearly dry state for considerable time.

A cigar box, an old tomato can, or better still, an empty baking-

powder can, answers the purpose very well. Take some cotton batting, soak it in alcohol and squeeze it nearly dry; then wrap each individual specimen up and pack them solidly in the box or can; when the can is full add so much alcohol as the contents will hold without dripping; wrap the parcel in several thicknesses of strong paper, and tie a string securely around the whole; finally, paste on a Smithsonian frank label, which will be supplied upon application, and the package is ready for the mail without the sender having to go to any expense for postage.

The specimens may also be packed in their original cheese-cloth bags or wrappings, in which case it will only be necessary to fill up the vacant space with cotton saturated with alcohol.

Specimens thoroughly cured and packed in this way will arrive at the museum in good shape even after the lapse of weeks. They can, therefore, also be sent from foreign countries, not too remote, through Express Companies with but little risk or trouble. It is doubtful if they could be sent through foreign parcel post on account of the written labels.

For long distance transportation it may be necessary to employ sealed tin cans, screw-top collecting tanks, or wooden kegs, which will allow the use of more alcohol. But even in this case the specimens should be packed dry and as closely as possible without crowding, and the vessel filled entirely so as to admit no rubbing of the contents. If there are not enough specimens, fill the vacant space with cotton or other suitable material, being careful not to employ any from which the alcohol will extract any discoloring matter; alcohol is then poured in until all vacant space is filled, and the vessel sealed hermetically. If a metal vessel is used it should be inclosed in a solid wooden box. Glass jars should be avoided, if possible, as too liable to break.

“DON’T.”

Finally, to sum up a few of the more important things to be avoided—
Don’t tie a label around the neck of the specimens.

Don’t forget to give the alcohol access to the interior of the specimens.

Don’t slit the specimens open with a knife, but, if you have no hypodermic syringe, use pointed scissors.

Don’t forget to label the specimens properly.

Don’t wrap the specimens in dry cotton, but soak it first in alcohol.

Don’t use glass jars, if you can possibly help it.

Don’t put sealing wax on the cork.

Don’t be satisfied with one specimen of a kind, if more can be obtained.

Don’t let your hypodermic syringe dry up; keep the top screw tight with ample packing between.

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