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MUSEUM OF THE GEOLOGICAL SURVEY OF ALABAMA

DIRECTIONS FOR COLLECTING LAND SHELLS

The land shells, commonly called snails, have long been favorites with conchologists. They have a special interest in the study of geographical distribution, serving, perhaps, better than any other animals to mark zoological provinces and sub-provinces. This is because they cannot fly nor swim and, being sluggish in their movements, cannot easily extend their range. Many of those found on islands are peculiar, and this is also true of mountain groups and even valleys and plains. Some kinds are found over large areas while others are exceedingly local.

For many years American naturalists have been studying our species with special reference to their distribution. The Museum of the Geological Survey has undertaken to carry out this work in Alabama, and therefore wants collections, as complete as possible, from each county. We also propose to publish a catalogue or monograph of the Alabama species, and any additions to the known list will be especially valuable in connection with this work. Such a book is very much needed, especially by beginners; as it is, they are discouraged by the difficulty and expense of getting the necessary literature. Yet the collection and study of land shells is one of the most fascinating branches of natural history and it can be carried on, during leisure hours, by almost any one.

To increase the Museum collection in this branch we ask the cooperation of all our friends, and especially of teachers; by encouraging their pupils to collect shells they can aid us materially and, at the same time, promote a taste for nature study. Young people, especially boys, like the work and often become very proficient.

About 135 species of snails are known to live in Alabama and almost every year brings additions to the list. Careful collections from any one county will give from fifty to eighty species. Some kinds range all over the state and beyond, but

others are confined to particular districts, such as the "Black Belt," the coves of the northern plateaux or the coast region. Some of the rarest and most desirable are known only from one or two places.

Comparatively few species are over an inch in diameter; others are of medium size, and many very small. These tiny things are most valuable of all, and much more likely to be rare or new. If the amateur carries a pocket lens he will add greatly to his pleasure by examining the small shells, many of which are very beautiful.

The collector should take care to label every lot of shells with the locality; this is of the utmost importance and should never be neglected, even for a day. The label may state the mountain, valley or cove where the things were gathered, or the nearest town, and always the county; the collector's name should be added.

Samples of labels are given below:—

Lookout Mountain, near Valley Head,
DeKalb Co., Ala.
John Jones, Nov., 1912.

—
Near Wetumpka, Elmore Co., Ala.
William Brown, Collector.

—
Banks of Warrior River,
Holt, Tuscaloosa Co., Ala.
James Allen.

A label should be placed in each box of specimens and, as an additional precaution, it may be written on the lid. Never mix specimens from two counties and never label a lot unless you are SURE of the locality; a false or doubtful label is far worse than none at all. Occasionally, rare or desirable things may be preserved with approximate or probable locality; for instance, "Central Alabama," or "Probably from near Montgomery." But such labels should be avoided as much as possible.

Dead shells are generally useless, but may be preserved if they are fresh and retain their color.

The collector requires no apparatus except a few boxes of different sizes, which can be carried in the pocket or in a belt bag. Do not use metal cans or glass bottles; pill boxes are best for small things and thread boxes, flat wooden boxes or wooden pill boxes for larger species. A pair of fine-pointed forceps for picking up small shells is convenient, though not indispensable; it should be attached to the button-hole by a string to prevent loss. In collecting, put small shells in one box and large ones in another; it is also well to separate the large kinds, keeping those with thin edges in a different box, as they may be broken if left with the heavier ones.

Most snails are nocturnal, concealing themselves during the day; it is the collector's task to find their hiding places. Generally speaking, there are few or none on cultivated land or in pine woods or about pine lumber. The most productive places are shady, damp woods of hardwood trees, especially on steep hillsides, in ravines and along river banks. In such places turn over logs and sticks, looking on the lower side and on the ground beneath. With a stick rake over damp, decaying leaves, especially about rocks and logs and at the roots of trees and under bushes; small shells may be found among the leaves and larger ones on the ground beneath. It should be noted, however, that dry or very wet leaves are unproductive. Piles of half rotten brush may shelter large numbers of snails; drag away the brush and rake the leaves underneath. An old wood pile may be a treasure house and will often repay removal, stick by stick. The cut ends of such wood, as well as of hardwood logs which are beginning to decay, sometimes attract small species, or they may be found in crevices of the bark or under fungi growing on the wood. Loose bark should be stripped off to examine its inner surface and the rotting wood beneath; in some cases the latter should be broken up to uncover the species which hide in its crevices. Turn over stones and look at the lower surface and the sides; piles of stones and talus under a cliff are particularly good, especially if they are damp and moss-covered.

Boggy ground has its own species, which should be sought for at the roots of grass and under logs or brush; trees growing in such places often have small species in crevices of the bark,

especially near the roots. The delicate *Succineas* conceal themselves among grass and leaves and may often be found crawling up the grass stalks at nightfall.

Examine very shady and damp ground near streams; some of the very small, elongate species live in such places and may be found crawling over the surface or on and under stones.

Though plowed land is unproductive, lawns, vacant lots and the edges of fields may be very good; stones and rubbish should be searched, boards turned over and piles of weed, sticks or chips raked out. Shell-making snails require lime and are attracted by anything containing it, not only limestone, but old mussel or oyster shells, etc.; an old lime-kiln is pretty sure to be populated, and piles of old bricks with the mortar adhering are almost as good. Search along damp stone and brick walls and on the shady side of barns. A good many shells may be found under vines and blackberry bushes.

Forest on the flood-plains of rivers and creeks is often very rich in shells, but they should be sought for principally along the edges of the plains or where the ground is a little higher and less exposed to the floods. Piles of driftwood should be examined, and also the fine silt left by the highest freshets.

Open and dry land is generally poor hunting ground; but exceptions may be found on stony ledges and tops of cliffs. A few rare species live at the roots of grass in glades of the pine forest. In the flat southern pine forests there are often slightly lower places which are grassy and have few trees; several kinds of snails are found in such places, in the grass or under logs. On these grassy lands and elsewhere the presence of snails may often be detected by finding dead shells on the surface, the living ones being concealed near by. Near the seashore the most productive places are grass-land and woods just back of the sands, and many of the shore species do not range far inland.

In Alabama land shells may be found at any time, but spring and late fall are the best seasons.

Winter collecting is apt to be productive in the smaller species, which then gather under bark, stones and rubbish, and often under dried cakes of cowdung in a pasture. Some of the

minute kind cover themselves with clay, so that it is difficult to detect them.

Damp or wet weather brings the snails out ; after a heavy rain it is often possible to gather hundreds of specimens where hardly any were seen before. At such times they crawl over the wet rocks and logs, and on tree trunks, cedars being especially good.

The collector may occasionally find places where small shells are very abundant among the rotting leaves ; they may then be collected in quantity with a sieve. Use a flour-sieve with moderately coarse meshes, and have a white cloth to spread beneath it. Shake and crush the leaves in the sieve and the small shells will fall through, together with sand and fine rubbish ; pour these siftings into a box and repeat the process as often as desirable. The siftings, after drying, may be sent to us as they are ; this is better than an attempt to pick out the small shells, which would be tedious and difficult for a beginner. Another and often better way is to take home a large bagfull of the leaves, dry and then sift ; more specimens are obtained, as they are more easily detached from the dry leaves. Sifting is one of the best means of obtaining our minute species, and it can also be used with silt, moss, or any decaying rubbish.

Do not be afraid of getting too many of a kind ; we want a good many anyway, and the tyro might easily mistake two or three species for one, thus losing valuable things. The best rule is to keep right on collecting, no matter whether the shells are common or not ; but do not do too much work in one spot. A slight change in the collecting place—even a few yards—often adds other species to the "catch."

Snail shells have to be cleaned and the animals of the larger ones extracted before they are placed in the cabinet. This work requires some practice and can hardly be undertaken by a beginner. Fortunately, the snails can be sent to us alive, just as they are collected, and this involves no suffering to the animals, as many of them can live for weeks without food.

Put small ones, all together, in the bottom of a pill box and fill the box, rather loosely, with cotton—enough to prevent

shaking without much pressure. Pack large ones in spool boxes in the same way. Hairy shells may be covered with tissue paper instead of cotton, as the latter sticks to them. Each box should have a locality label inside, and this may also be written on the lid. If covers are loose, tie the box with string or wrap it in paper.

The boxes, large and small together, should be packed in cigar boxes with cotton or fine excelsior all around them. They can then be sent safely by mail or express.

If desired, a set of the species will be cleaned, named and returned to the collector; in fact, we shall be very glad to aid him in building up a collection of his own.

DIRECTIONS FOR COLLECTING THE FRESH WATER SHELLS CALLED PENNIWINKLES

This family (Pleuroceratidæ of conchologists) is confined to North America, and by far the greater number of species to Alabama, Georgia, Tennessee and North and South Carolina. In this region the number of species and varieties is astonishing; over four hundred have been named and as many more remain to be described. Each species has a very limited range, sometimes in one river or creek or even a small branch; in a river a species may be found on only one or two shoals. A whole genus, with nearly forty species, is confined to the lower Coosa, and there are other similar cases. It is therefore of the utmost importance to have collections from all streams where these snails are found, even the merest brooks. It is essential to get them now, because many species are disappearing; ducks may destroy those in the small streams, and dams, by deepening water on shoals, may make a river bed unsuitable for the snails which have lived on it.

The museum of the Alabama Geological Survey has one of the largest collections of Pluroceratidæ in the world, yet it is far from complete. Half of our smaller streams and many rivers and creeks have never been searched at all; others are known imperfectly. We are especially anxious to increase our collections in this group, because the Curator is studying it with a view to publication.

Any one can aid in the work with very little trouble, and any collector may obtain not only rare but unknown species. We therefore invite the cooperation of all friends of the Museum.

If desired, named zoological or geological specimens will be sent in exchange for penniwinkles. A named set of the latter may also be returned, but this cannot be done at once, because the species can only be worked out by long and careful study.

Penniwinkles are found in running water, some on rocks, others on mud or sand, some where the current is gentle and others where it is strong, even in the rush of river-shoals. In most cases they can easily be seen from the banks or detected

by their tracks on the muddy bottom. In river shoals some of the best kinds will be found on the lower surface of stones. A log or board in the water is often covered with them, both on top and underneath. When rivers and creeks are at their lowest, many will be found in pools along the sides, where they have been left by the retreating waters.

In most cases comparatively few can be obtained from the banks; the collector, to do good work, should wade in the shallows, and this is all the more important because some kinds keep to the middle of the stream while others may be found near the shores. A small bag attached to the belt is very convenient for collecting. If the collector gathers mussels and peniwinkles at the same time, it is well to have two bags, a large one, slung from the shoulder, for the mussels and a belt-bag for the peniwinkles, which would have their edges broken if put with the heavier shells. Most of the mud may be rinsed off, but no attempt should be made to clean the surface of the shells thoroughly; this is done later, when they are prepared for study.

Great care should be taken not to mix specimens from two creeks or from two localities in the same creek or river. Each lot should have a plainly written label giving the locality (name of river or creek and place where the things were gathered) with the collector's name.

Put the peniwinkles in boiling water and leave for about a minute; but do not put in cold water and then boil. The boiling water kills the animals quickly. Pour off the water and let the shells drain and dry a little on a board. Then spread on the bottom of a flat covered box, such as a shirt box, and dry for several days. The covered box may be placed in the sun, but the uncovered shells should not be exposed to sunshine. It is necessary, on account of the unpleasant odor, to keep the box in a barn, or some other place away from living-rooms. After a few days, pack the shells with good, clean sawdust, in cigar boxes. There should be five or six times as much sawdust as shells. First put a rather thick layer of sawdust on the bottom of the box, pressing it down; spread shells over this and cover with sawdust, again pressing down and

shaking. Continue this until all are in. Fill up the box with sawdust, shaking and pressing repeatedly; close the lid and strike the box sharply on each end and side; then open and fill in any vacant space. Finally, put the locality label in the top of the box, close and nail, or tie it up and write the locality on the outside. The box so packed should go on drying until it is sent to the Museum; the sawdust assists in the drying process and the closed box is not likely to give out any unpleasant odor. Several labeled cigar boxes may be packed in a larger box, with excelsior, and sent by express at our expense; or, a single box, if thoroughly dried, may be sent by mail.

Large numbers of the shells should be collected when possible; four or five hundred from one locality is not too many. This is all the more important because it is nearly impossible to distinguish the species until they are cleaned; though all the specimens of a lot may look alike, they may, and often do, include several kinds. The larger the collections the greater is the chance of rare species.

It is a mistake to collect only in part of a stream; each species has its haunt and places even a short distance apart may have quite different assemblages of shells.

DIRECTIONS FOR COLLECTING MUSSEL SHELLS

The Museum of the Geological Survey is making a collection of the fresh water mussels of Alabama. The objects are, first, to bring together all the species found within the state limits, second, to find the range of each species—that is, the rivers, creeks or lakes which it inhabits. Each kind has its special range, which may be extensive, covering many states, or limited to a single stream. By making tables of geographical distribution we are able to trace zoological provinces and sub-provinces. For this reason we wish to have collections, as complete as possible, from every river, creek and pond in the state. Alabama has more species of mussels than any other region of its size in the world; about 300 are already known and there are still others to be found and described.

The Museum will be grateful for assistance in this work;

it is very easy, can be carried on by any intelligent man or boy, and valuable collections may be made in almost any part of the state. Full credit will be given to the collector in our publications and catalogues. If desired, we will send, in exchange, shells, fossils and other specimens, all correctly labelled. In this way it is possible for a teacher to build up a collection for his school, or for an amateur to start a collection of his own. If a teacher does not wish to get the things himself he can generally induce his boy pupils to do so. In some cases a colored man or boy may be employed to advantage.

Where mussels are found at all they are generally most abundant on gravelly or rocky shoals and in moderately swift current. Good localities may often be detected by finding dead specimens on the banks. These dead shells are useless unless they are fresh and perfect. To make really good collections the live ones should be sought, and this is best done by wading when the water is low and clear. If much wading is done the feet may be protected with canvas tennis shoes or the so-called running shoes; these will last a long time, even when constantly wet, and they can be used for walking as well as wading.

Wade slowly up the stream, scanning the bottom, especially in gravelly places and crevices between rocks. The mussels can often be seen buried in the gravel with only the mouth or part of the shell out. Where, on account of the current or muddy water, they cannot be seen, they can be found by feeling with the hands. A hooked stick or small pick is useful for digging up the gravel. Many species are found under flat stones—the larger the stones the better—and others along the banks, under overhanging roots and sod, where they must be felt for with the hands. Some kinds, especially those with thin shells, live in still water, such as mill-ponds; when such a pond is drained for any purpose it will often yield a rich harvest of mussels and other shells. Deep-water species are more difficult to obtain, but are sometimes brought up by dredges or nets. When locks are drained for cleaning their floors should be examined, especially close to the side walls. In any river or pond mussels may be abundant in some places but rare or wanting in others.

Though old dead shells are useless, fresh ones, with both valves, are often good. Frequently piles of these are accumulated by muskrats on rocks or logs or along the shore. If such shells are dry they should be soaked for some time, then washed, and the valves closed slowly and carefully to prevent breaking the hinge. Often the best of these muskrat deposits are in the water about the burrows; In such cases the old, discolored shells should be rejected and only the fresh ones saved. But muddy shells are often the best, as the mud protects the surface and can easily be washed off.

Some of our species are large and heavy, others large but thin-shelled, others small, even less than an inch long. These small things are especially desirable.

It is very important to have the exact locality of each lot of mussels; in fact, collections are useless without them. Never mix specimens from two rivers or creeks and never leave them unlabeled. Labels should be plainly written with pen or pencil, and on good writing paper. They should give the name of the river, creek or lake, and the collector, thus:—

Buck Creek, Shelby Co., Ala.

John Smith, Collector.

July, 1912.

or

Bird Spring Lake,

10 miles south of Huntsville, Ala.

William Jones, Collector.

If the collections are made in large rivers the label should give the name of the shoal, some town in the vicinity, or, at least, the county, thus;—

Coosa River, Fort Williams Shoals,

Shelby Co., Ala.

or

Alabama River, near Selma.

It is easy to kill and clean mussels. First wash off the mud, using a small scrubbing brush. Have a pail or pot of boiling water over the fire; drop the mussels in and they will die instantly. Leave them until the shells open; then take them out or pour off the water and remove the animals, scraping away any flesh that may remain. If any shells do not

open, pass a sharp knife between the valves. Never put mussels in cold water and THEN boil; this would be cruel and, besides, does not effect the purpose so well. Rinse the shell in clean water, and it is well to dry the inside with a rag. Hold it so that the valves are closed, and wind tightly with string or ball cotton, about four times round; no matter what shape the shell is, the string should be wound over the hinge and far enough back so that it will not slip. Tie securely on the edge opposite to the hinge.

It is generally better to clean and tie up mussels when they are collected, and for this purpose the collector may carry a tin pail for boiling, small scrubbing brush, string and scissors, and a pencil and paper for labeling. A canvas bag with a strap to go over the shoulder is convenient for collecting, though any bag or basket will serve. Do not be afraid of getting too many of a kind; a hundred of one species from one locality is not too many. Besides, many of the species resemble each other closely, and a supposed single species may include several.

If large numbers of mussels are collected in one locality, they may be packed in layers with excelsior, the smaller and light things in cigar boxes which can be packed with the other shells in the larger box. Each box, large or small, should have a locality label inside, and the locality may also be marked on the box lid. If only a few specimens are to be packed, each can be wrapped separately in paper and the lot put in a cigar box with excelsior. If excelsior cannot be obtained, use hay or crumpled paper. Never send shells loose in a box, as they would be broken or injured. In packing, see that the box is quite full and pressed down. Small boxes from one locality, if properly labeled, may be packed with shells from another locality. Send all large boxes by express at the charge of this museum; small ones may go by mail. Address:—

MUSEUM OF THE GEOLOGICAL SURVEY,
Tuscaloosa, Alabama.

Letters relating to the collection should be addressed to

HERBERT H. SMITH,
Curator of Museum,
University, Ala.











