

SMITHSONIAN INSTITUTION.
UNITED STATES NATIONAL MUSEUM.

INSTRUCTIONS FOR COLLECTING MOLLUSKS,
AND OTHER USEFUL HINTS FOR
THE CONCHOLOGIST.

BY

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INTRODUCTORY.

Invertebrates of the molluscan type are found in all parts of the world and in nearly every situation. The highest mountains, the widest prairies, the least accessible oceanic islets, and even the desert of Sahara and the frosty moss of Arctic tundras, afford specimens of mollusks on careful and intelligent search.

For the purposes of the collector the group may be divided into three classes, including, respectively, land, fresh-water, and marine species. Each of these classes requires special treatment and will be discussed separately. Every land area which borders on the sea and contains permanent bodies of fresh water will be found to support representatives of each class. Geologically, each goes back to a remote antiquity.

LAND SHELLS.

From the standpoint of the collector this class includes gastropods both of the pulmonate and gill-bearing types, forms which are united in the amphibious *Siphonaria*, which possesses both gills and a true lung. They may be limpet-shaped or spiral; operculate or inoperculate; shell-bearing or naked; herbivorous or carnivorous.

HABITAT AND STATION.

They are found at all elevations, from the beaches moist with sea spray to the alpine heights of 14,000 feet in the vicinity of perpetual snow. Some, like *Testacella*, are subterranean in their habits, pursuing earthworms through their burrows and never visiting the light of day; or nestling in the cancellated recesses of bones in ancient graveyards (*Acicula*) where they browse on fungoid mycelium. Others are contented with the protection afforded by dead leaves, decaying logs, under the bark starting from rotting stumps, or in the shelter of loose stones and boulders. Other groups live on the leaves of sedges, grass, and shrubbery, retreating to the soil for winter quarters; while in the

lofty tree tops of tropical forests still others live permanently, never visiting the ground, and, in their airy domicile, exhibit colors almost as varied and brilliant as the arboreal flowers which surround them. In arid regions some seek the shade of stones or attach themselves to the stems of cacti or other desert plants, while others again adhere to the sunburnt surfaces of rocks so hot as to be uncomfortable to the touch, on which their white or rusty shells stand out conspicuously. It has been generally noted that the color of the shell bears a certain relation to its favorite station, the arboreal forms presenting the brightest and most varied colors; the moss lovers and terrestrial species being usually dull, horny, or greenish, though often with a brilliant, polished, or delicately sculptured surface; while subterranean forms are usually pale or pellucid. The slugs are usually nocturnal in their habits, retreating to holes and crevices at dawn; the cultivator, whose succulent vegetables they destroy, seeing his harvest ravaged without a visible enemy. On one of the Florida keys, built of the debris of coral, and as full of holes and crevices as a sponge, a settler raising early tomatoes for the New York market found to his dismay as the fruit began to ripen that every red one was immediately eviscerated, leaving nothing but the skin. There were no birds, worms, or mice to do such damage, which was not occasional but general over his whole farm. Finding nothing by day he took to scrutiny by night and was rewarded by the discovery of myriads of slugs which proceeded from the interstices of the coral and devoured every ripe fruit. The plague admitted of no remedy, the enemy was too numerous, and the unfortunate cultivator was obliged to abandon his undertaking and go into bankruptcy, ruined by *Veronicella*.

In general, limestone regions are most favorable for land shells and those of flinty rock least advantageous. Woods of coniferous or resinous trees are unsuited to their tastes, while those of deciduous soft wooded nature offer a congenial home for the mollusks. Certain pungent herbs, especially cruciferæ, are said to be obnoxious to slugs. Gardeners in Europe are said to protect their lettuce beds by a hedge of mustard or pepper grass. Nettles, on the other hand, are a favorite haunt of certain small land shells. Dry coal ashes, alkaline wood ashes wet or dry, sand and lime in a pure state, are more or less effectual in repelling the slugs, which they irritate mechanically. It is probable as far as the smaller species are concerned that the unfavorable nature of resinous trees is due more to the fact that they decay less easily and afford a less favorable nidus for fungi upon which the snails feed than to any direct influence of the resin upon the mollusks. Salt is inimical to most of the *Helicidae*, but the *Auriculidae* or many of them, *Truncatella* and *Polygyra*, seem to prefer the vicinity of the sea.

Spring is the most active season for snails as for most animals, they attain their fullest development toward midsummer, and as winter approaches they penetrate the ground or in warm regions attach them-

selves to the bark of trees or to stones for a period of hibernation. They close the aperture of the shell with a leathery secretion, sometimes strengthened by more or less limy matter, or if naked may surround themselves with it like a cocoon. This temporary defense, common to most of the inoperculate forms, is called the epiphragm, and, in the many whorled species, there are often several of these partitions between the retracted animal and the aperture of its shell. In the arboreal *Bulimi* the secretion is often of great strength, and the collector who finds them fastened to trees and attempts to pull them off will often see the shell or the bark break before the epiphragm will give way. In such cases it is better to cut off a thin slice of the bark with the adherent shell. On an immersion in warm water the mollusk will awake and soon release itself in the natural way. It is the habit of many snails on waking from their hibernation to make their first repast on their own epiphragm. The period of attachment is often marked by a band of color in harmony with the lines of growth, not elsewhere repeated on the shell, and usually bluish or dark brown. This indicates the formation of a special secretion at such times. The life of most land shells is probably short, a majority probably do not live more than a year or two, though, under suitable conditions, there would seem to be no reason why this period should not be much prolonged. The species of arid regions become accustomed to long periods of enforced hibernation and are the longest lived. Instances are known of their surviving four or five years without food in this state, and it is a common thing for them to survive transportation through long sea voyages to distant countries. These facts have an important bearing on their distribution. There would seem to be no doubt that in some cases the ancestors of a land shell fauna have reached oceanic islets by drifting on vegetation dislodged by freshets and carried out to sea, especially in the warmer regions.

COLLECTING OUTFIT.

The collector of land shells needs only a very simple and inexpensive outfit. For most purposes, in temperate and northern regions, the things needed may be easily carried in one's pocket. First in point of usefulness is a pair of spring forceps, which should have a delicate spring requiring no sensible exertion to make the points meet. The points themselves should be slender and the file cutting on their inner sides should not be coarse. These forceps, which any surgical instrument maker should furnish at a cost of \$1 or less, are indispensable in collecting the more minute forms, for which the fingers are far too clumsy. After a little practice the most minute *Vertigo* or *Hyalinia* may be picked up without injury, though the beginner is apt to crush a goodly number before he learns the necessary delicacy of manipulation. The forceps come into play almost as much in separating the day's collections as in making them; in fact, after a little, one feels lost without them.