

and from six to twenty inches long, by two to six wide. They are made like pillow-cases, open at one end, and sewed around the other three edges with coarse stitches. The specimens, on being gathered, may be put into a bag of proper size, and the mouth closed by tying a piece of thread. A number may be marked on the bag with a pencil, or with ink on a parchment label, placed inside or tied to one corner. These bags are of incalculable service on a march, or in transporting collections, the individuals of which are to be kept separate for any purpose whatever.

2. **VERTEBRATA.**—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.

With regard to the *sharks* and *skates*, it will be best to take the jaws and vertebral column as well as their skins. But, as it very often happens that bodies in a state of decomposition are met with upon the beaches or shores, it should then never be neglected to take these hard parts. The tail of *skates* is also desirable. If convenient, some vertebrae and teeth may be preserved in spirits for microscopic examination.

Reptiles, as already observed, should be preserved in liquids when their size does not forbid this mode of preservation. Persons at leisure may find pleasure in preparing the skins of many small kinds as a double series.

A collection of birds in alcohol or spirit would be a valuable acquisition to a public collection, as much is still to be learned with regard to their anatomical structure. There are no birds, with the exception of the large ostriches, which could not be collected for that purpose. This is a matter to which the collector should be especially attentive. Skins, however, of the first few individuals of rare species should be secured. And on a march it will not often be convenient to preserve specimens in spirit, as the space allotted for collections in alcohol is generally required for reptiles, fishes, small mammalia, and invertebrata.

3. **INVERTEBRATA.**—*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.

It will frequently be found convenient to preserve or transport insects pinned down in boxes. The bottoms of these are best lined with cork or soft wood.

The traveller will find it very convenient to carry about him a vial having a broad mouth, closed by a tight cork. In this, should be contained a piece of camphor, or, still better, of sponge soaked in ether, to kill the insects collected. From this, the specimens should be transferred to other bottles.

Ether will be found most effective in killing all insects that cannot or ought not to be immersed in alcohol. All those that can support the immersion in this liquid without injury may readily be killed in this way.

The camphor should always be fixed in the box containing insects, as it would break the feet and antennae of the latter if in a loose and crystalline state. It may be kept in a piece of muslin or canvas, and then pinned at the bottom of the box.

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.

The hard parts of corals, and shells of mollusca, may alone be preserved in a dried state. The soft parts are removed by immersing the animals for a minute or two in hot water, and washed clean afterwards. The valves of bivalve shells should be brought together by a string.

Spiders, scorpions, centipedes or thousand-legs, earth-worms, hair-worms, and generally all worm-like animals to be met in fresh waters, either clear and running, or still and putrid, cannot be better preserved than in the strongest alcoholic liquor, and in small bottles or vials.

§ IV. EMBRYOS.

Much of the future progress of zoology will depend upon the extent and variety of the collections which may be made of the embryos and fetuses of animals. No opportunity should be omitted to procure these and preserve them in spirits. All stages of development will be equally interesting, and complete series for the same species are of the highest interest. Not only the domestic mammalia, as horse, cow, sheep, hog, dog, &c., should be collected, but also any of the wild animals, as deer, bears, wolves, foxes, antelope, and any and every species. Whenever any females of such mammalia are killed, the uterus should be examined for embryos, and the smaller or more minute, in many cases, the more interesting. When eggs of birds, reptiles or fish, are emptied of their young, these should be preserved. It will be sufficiently evident that great care is required to label the specimens, as in most cases it will be impossible to determine the species from the zoological characters.

§ V. NESTS AND EGGS.

Nothing forms a more attractive feature in a museum, or is more acceptable to amateurs, than the nests and eggs of birds. These should be collected whenever they present themselves, and in any amount procurable for each species, as they are always in demand for purposes of exchange. Hundreds of eggs of any species with their nests (or without, when not to be had) will be gladly received.

Nests require little preparation beyond packing so as to be secure from crumpling or injury. The eggs of each nest, when emptied, may be replaced in it and the remaining space filled with cotton.

Eggs, when fresh, and before the chick has formed, may be emptied by making a minute hole at each end, and blowing or sucking out the contents. Should hatching have already commenced, an aperture may be made in one side by carefully pricking with a fine needle round a small circle or ellipse, and thus cutting out a piece. The larger kinds should be well washed inside, and all allowed to dry before packing away. If the egg be too small for the name, a number should be marked with ink corresponding to a memorandum list. Little precaution is required in packing, beyond arranging in layers with cotton and having the box entirely filled.

The eggs of reptiles, provided with a calcareous shell, can be prepared in a similar way.

The eggs of fishes, salamanders and frogs, may be preserved in spirits, and kept in small vials or bottles. A label should never be omitted.

§ VI. SKELETONIZING.

Skulls of quadrupeds may be prepared by boiling in water for a few hours. A little potash, or ley, added, will facilitate the removal of the flesh.