

But many species live always below low-water mark, and to take such a dredge is required. The latter may be of the same pattern for all depths. It consists essentially of an iron frame, about eighteen inches long by six broad; the long sides are scraping jaws of thin flat iron, somewhat diverging; the short sides are simply round bars connecting the scraping pieces. From the sides slender bars run convergingly forwards for the attachment of the rope, and behind drags the bag (made of *very* coarse canvas, or, better, fine netting), which is to catch all that is loosened by the scraping jaws.* The dredge is to be dragged behind a sail boat, and the student will learn in a surprisingly short time all the proper methods, places, precautions, difficulties, pleasures and uses of dredging, which it would take many pages to set forth here.

There are two principal ways of preserving Echinoderms, dry or in a preserving fluid. The first method is much the less expensive and in many ways the more convenient, but is not suited for specimens which are to be used for the study of the internal organs or other soft parts. The only preservative fluid of value is alcohol, the ordinary spirits of wine of the druggists. Methyl alcohol or methylated spirits, which is cheaper, may be used for temporary storage and the like, but it is not so well suited for permanent preservation of valuable specimens. But no specimen should be plunged directly into the strong alcohol from water, for great shrinkage would result. They should be placed first in alcohol which has been diluted with nearly its own bulk of fresh water, left three or four hours and then be transferred to the stronger grade. Bottles with ground glass stoppers should be used for the permanent preservation of alcoholic material, as they reduce to a minimum the amount of evaporation.

For preserving specimens dry it is only necessary to fix in some way the tissues so that the animal will keep its shape, and then to dry it, preferably by artificial heat. A few Echinoderms do not need this preliminary fixing but may be dried at once.

*The limits of our space will not allow of a full description of the dredge or dredging; such may be found in almost any work on seashore animals, such for instance as J. H. Emerton's "Life on the Seashore," [Salem, Bates.]

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