

absorbed and may afterwards be communicated to other surfaces.

The importance of this discovery can scarcely be over-rated, and there is no doubt but that it will work an era in the matter of carbon printing. We need secure but one single photograph printed in the sun in order to obtain a large number of copies, all of which shall be as delicate and vigorous as if they had been printed by sunlight. A sheet of gelatine sensitised with bichromate of potash is put under a negative and printed; it is withdrawn from the printing frame and immersed in a weak solution of bichromate of potash which swells up those portions of the surface that have not been attacked by light, and thus produces a picture in relief. The sheet of gelatine is then put into a press and impressions from it taken on sensitive carbon tissue, the block being moistened from time to time with bichromate solution. The copies thus produced upon the tissue are not fully printed and cannot be developed at once; they are simply incipient, or nascent, pictures, it must be mentioned, and they require preservation in the dark for some hours to allow the action of the light to continue, exactly in the same way as if the carbon tissue had been exposed to sun-light for a few minutes. When the prints have been kept sufficiently they are developed in warm water, and fine vigorous copies are the result. Naturally enough if the tissue is kept too long after, the mordant action of the light continues rendering the film insoluble, and then the development of the image in warm water obviously becomes impossible.

Another application of the same principle has been made by M. Marion, in which carbon printing is assimilated to silver printing, to such a degree, that those accustomed to the ordinary method of printing photographs on albumenised paper, would find no difficulty in adopting it.

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ON THE METHOD OF COLLECTING AND PRESERVING ENTOMOSTRACA AND OTHER MICROZOA

CONSIDERING the varied interest which attaches to the Entomostraca, it has long seemed to me that they attract a remarkably small share of attention from microscopists. In the case of so widely distributed and numerous a group, this cannot arise from any real difficulty in procuring materials for study; but I believe it does arise in great measure from a want of information as to the best means of capturing and preserving specimens. I propose, therefore, briefly to point out some of the methods which in my own hands have best answered these ends.

Classification.—The Entomostraca constitute, as all microscopists know, a division of the class Crustacea, and for the purposes of the present paper we may with sufficient approach to accuracy consider them as forming four groups—*Cladocera*, of which the common *Daphnia*, or water-flea, is the type; *Ostracoda*, typified by the little hard-shelled, bivalve, mollusc-like *Cypris*; *Copepoda*, represented by the well-known *Cyclops*; and the parasitic species, *Pacilopoda*, commonly known under the name "fish-lice."

Respecting the last-named group, I shall have nothing to say here; the mere knowledge of their mode of life indicates the method of capture.

Habitat.—All collections of still-water, large and small, from the mere road-side pool to the mountain lake and the ocean, support, with scarcely an exception, their quota of entomostracan inhabitants; nor is purity an essential condition of their existence, for sometimes they are found in great numbers when one would think the foulness of the medium too much for animal existence of so high a grade. Doubtless, however, a moderate purity of water is necessary to the presence of any great variety

of species; a luxuriant aquatic vegetation is also very favourable to the growth of most Entomostraca, affording them probably not only food, but shelter. For this reason the weedy margins of lakes are as a rule much more prolific than the clear central portions, where, indeed, but little microscopic life usually exists. Rapidly flowing water is of course unfavourable to the existence of these organisms, but the sea, both between tide-marks and in the open, abounds with them. Ostracoda, except the fresh-water Cyprides, live for the most part on the bottom, and are therefore to be obtained chiefly by dredging. The brackish water of salt-marshes and estuaries supports its own peculiar species, some of which often occur in prodigious numbers; and even the highly saline waters of brine springs and salt lakes have been found to contain Entomostraca.

Methods of Collecting

1. *Freshwater.*—An ordinary "ring-net," made of "hard muslin," or "crinoline," from six to twelve inches in diameter, and fitted to the end of a walking-stick, will be found the most convenient apparatus for the capture of such swimming species as haunt the weedy margins of ponds and lakes. For such shallows as are matted with a growth of *Littorella*, *Lobelia*, or other dwarf ground-plants a "horse-shoe" net, with a frame made after the fashion of a Dutch hoe, is very serviceable; while in working from a boat in the centre of a lake the ordinary ring-net on a stick will be quite sufficient. In this way the net will, after working for a few minutes, usually be partially filled with fragments of weed and other *débris*, amongst which there will also be found a fair sample of the Microzoa inhabiting the locality. The coarsest fragments, such as stems of rushes and portions of water weeds, may conveniently be picked out with the fingers, and thrown away, while the rest of the contents of the net must be transferred to a bottle of clear water, an eight-ounce being a convenient size for the purpose. The Microzoa may then be readily separated by filtering into another bottle through a net of sufficiently wide mesh to allow of their passage through it: "mosquito-netting" I have found to answer well for this purpose. Having thus obtained our Entomostraca in a condition tolerably free from admixture with extraneous matter, they may easily be collected in a patch on the centre of a piece of fine muslin by passing the whole through a piece of that material, arranged over a funnel. They should then be transferred at once (if it be not wished to keep them alive) to a small phial of some preservative fluid. This may be effected easily by a penknife, but a very convenient instrument for the purpose is an ordinary quill toothpick. This process, which appears somewhat cumbrous in writing, is in reality very easily performed, but it may be still further simplified, according to the fancy of the collector, by fitting an outside funnel with a muslin net, and having a small inner one of perforated zinc, so as to do all the filtering at one operation. The collecting net may also be protected from the entrance of very coarse rubbish by a light, moveable wire grating. The species obtained by these means will often include numerous representatives of all three orders, Cladocera, Ostracoda, and Copepoda. For the capture of such Ostracoda as haunt the bottom in parts too deep to be reached by a walking-stick, a small hand-dredge is required: this will be more particularly noticed in the marine section.

2. *The Sea.*—The free-swimming species, the great majority of which belong to the order Copepoda, may be most conveniently captured by the walking-stick net held over the side of a row-boat in gentle motion. Care should be taken that the lower end of the net is as wide or wider than its mouth, and that the material, while close enough to retain the Entomostraca, is yet open enough to allow a free current of water through it: if those points be not attended to the result will be a back-wash, carrying back out of the net much which should have been retained.

