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A SIMPLIFIED ZOOPLANKTON-NET COD-END

C.P. Duncan

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C.P. Duncan

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Marine Sciences Group
Earth Sciences Division
Lawrence Berkeley Laboratory
University of California, Berkeley
Berkeley, California 94720

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C.P. Duncan
Marine Sciences Group
Lawrence Berkeley Laboratory

ABSTRACT

A simplified plankton-net cod-end has been field-tested in the tropical Atlantic Ocean and has proved to be both easy to use and effective in reducing the time needed to complete a net-station. The model tested was attached to a 75 cm net of 202 um mesh hauled vertically, but modifications to suit other needs are slight.

The older style of cod-end of the 'Discovery' type which comprised a turned brass bucket with an inset of mesh supported by a brass frame had the disadvantages that it was expensive, heavy and a nuisance to repair if the mesh window broke. Some of these disadvantages still survive in the modern plastic version. The advantages of a simple solid plastic bucket of the type generally available are that it is much cheaper and light, but it has a severe disadvantage in that there is no flow of water through the bucket to concentrate the plankton in the cod-end, and the wash-down around the neck where the net joins the cod-end is awkward. A modification of a mesh sleeve inside a perforated PVC bucket was described by Hopkins et al. (1973) but the attachment of the sleeve with a hose-clamp requires the use of a screwdriver and is also awkward. Aldred and Wild (1979) point out that "in cold, wet conditions --- gear that requires a degree of manual dexterity to operate can be a

hindrance" and they devised a system of interlocking tubes machined to fit, and held together by four toggle clips. After the original equipment was damaged in bad weather, a stronger version was made which was heavier. A perforated toggle-clip bucket with a removable screen is now on the market. A cod-end of soft impervious plastic which zippers on to the net collar is commercially available, with a net liner, but the unitary construction makes washdown over the teeth of the zipper a tedious task. To avoid these problems on a cruise with untrained personnel, the modification illustrated in Figure 1 was devised.

A solid plastic cod-end ("bucket") was perforated with a number of 1/4" holes, care being taken that the edges of the holes were smooth, with no projections or sharp edges. An inner sleeve of the same fabric as the net (202 um nylon) was sewn so that it would fit snugly inside the polyethylene bucket and the sleeve would fold back over the threads of the bucket, as shown in Figure 1. A nylon cord was sewn to the outside of the sleeve to prevent it being forced entirely into the bucket by the pressure of the water when the net was hauled up. All sewing was done with rot-proof polyester thread, and the selvage was on the outside to avoid plankton being caught in the seam. The lines of the sleeve were smoothly curved for the same reason.

Repeated testing before sea-trials showed that the sleeve folded back over the threads could be screwed into the collar of the net repeatedly, without damage to the sleeve. This was possible because the threads on the bucket were a loose fit in the collar, and the materials did not cut each other the collar was made of molded PVC, the sleeve was nylon, and the bucket itself was made of polyethylene. A test was

made with a variety of nets, buckets and fabric and no tearing of the sleeve was found. With adequate back-up of cod-ends made by General Oceanics Inc., in case of problems, the new equipment was taken to sea.

In use on the O.S.S. Researcher in the tropical Atlantic Ocean in February-March of 1980, the method was found to work very well.

- o The same perforated bucket and inner-sleeve were used for 32 vertical hauls (0-25 meters and 0-200 meters) without loss of equipment.
- o The inner-sleeve was not cut by the threads of the bucket.
- o The inner-sleeve did not pull through the threads into the bucket.
- o Neither the sleeve nor the bucket clogged, but this is probably a measure of the small samples which were obtained in a region of low fertility.
- o Washing-down the net was easily done with a sea-water hose with the net hanging vertically, and careful inspection showed no plankton caught at the joint where net meets cod-end.

On a rolling ship the most difficult part of the sampling procedure on this cruise was washing down the bag into an enamel tray, and then decanting the tray into a sampling bottle. On one occasion the sample was lost when the ship lurched while this was being done, necessitating another net haul. Another method consists of decanting water from the bucket through the net itself to concentrate the sample, then washing down the ring of plankton around the collar with a little water. This method is clumsy and takes up ship-time because the net cannot be deployed while it is being used on deck as a filter, and while its

collar is being washed down. These problems can be avoided by having a number of sleeves available, and preserving the sample with the sleeve in a sample bottle of formalin and sea-water. This would speed up operations considerably, because two entire steps would not be necessary, washing down the sleeve into the tray and then washing down the tray. The potential loss of organisms in these transfers would be avoided, too.

Although this method of preserving the sample together with the sleeve has not yet been field-tested, the advantages seem many and the disadvantages few. A field-test of the idea is being prepared.

A patent application has been filed by the Department of Energy citing the author as inventor. Information about licensing the invention should be obtained from the Licensing Section, General Counsel's Office of the Department of Energy.

REFERENCES

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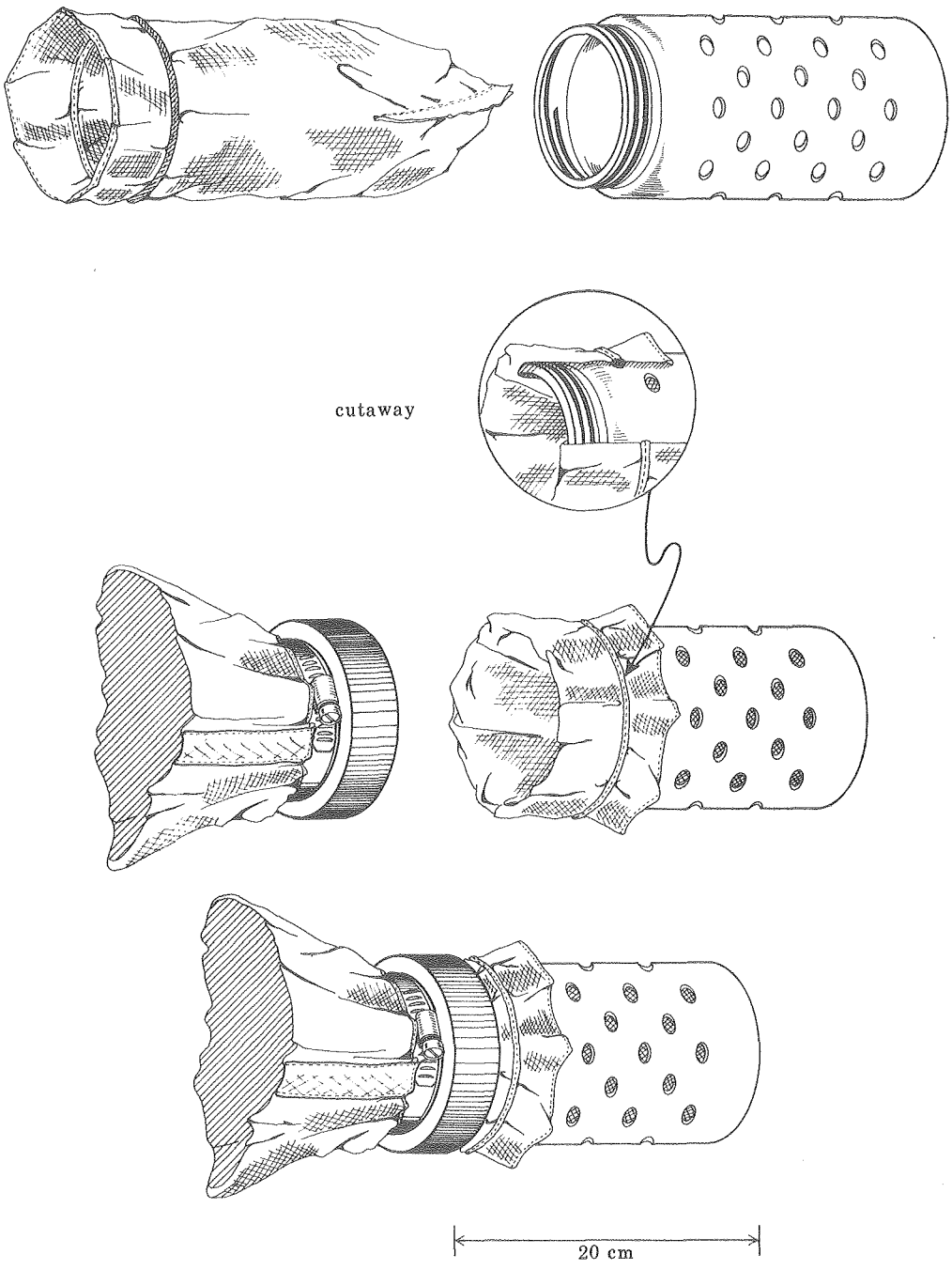

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FIGURE 1 : CONSTRUCTION AND ASSEMBLY OF SIMPLIFIED ZOOPLANKTON-NET COD-END.