A Surface Sampler for Temperature Observations.

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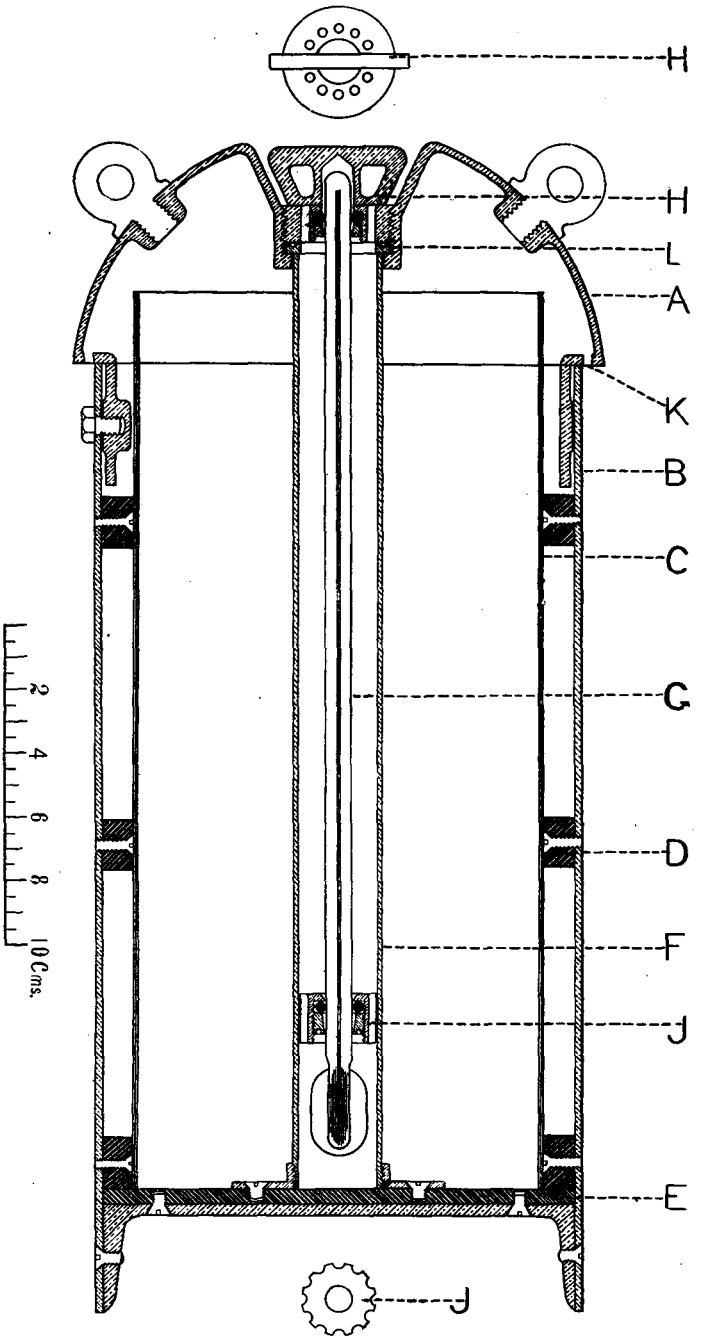
Two models of the Surface Sampler for use from commercial ships have been described previously in this Journal[1]). The first model was intended principally for the purpose of bettering the collection of water samples intended for subsequent chemical analysis ashore, by providing for automatic washing of the sample bottle, which was contained in the apparatus. The second model combined the improvement already made in the collection of the sample with increased accuracy of temperature observation. In addition to the sample bottle, a thermometer was made part of the instrument, and the water sample was insulated. The model now to be described was designed for use when temperature observations alone are the object, and samples are not required for analysis ashore.

In general, the new type of Surface Sampler is similar to the second type mentioned above, in which both the sample bottle and thermometer are included. It consists, as before, of head (A) and body (B), which are now bolted together. The observations can be made without removing the head from the body, and it is only necessary to do so for cleaning or repairs. The water sample is insulated by means of a celluloid liner (C) kept in place by ebonite distance pieces (D). The insulation is completed at the bottom by means of an ebonite sheet (E) to which a brass tube (F) containing the thermometer (G) is screwed, The upper end of this tube fits into the opening in the casting forming the head.

The thermometer is held by two glands, which compress rubber washers on to the thermometer tube. The upper gland (H) is furnished with a thumb-piece by which it can be handled. It is screwed into the casting of the head and keeps the thermometer in place. Holes are pierced through this gland, which allow water to flow into the tube (F) containing the thermometer. The lower gland (J) which is free to slide in tube (F) is also cut to allow water to flow past. The total area of the cross sections of the channels in the upper gland is nearly twice the cross section of the pipe through which the water entered the glass bottle in the other, earlier models.

[1]) Journal du Cons. II. 3. 1927 & III. 3. 1928.



The water flows round the bulb of the thermometer and passes through ports in the tube (F) and so into the cavity of the body. When this is filled, the water leaves the apparatus through a series of ports (K) on the under-side of the head.

The apparatus is towed in precisely the same manner as the models previously described. When it is brought inboard, all that is required is merely to unscrew the upper gland and raise the thermometer until the mercury column can be seen. A ring (L) screwed down below the upper gland, checks the lower gland, and prevents the bulb of the thermometer being withdrawn from the water, accidently or otherwise. Since there is no necessity to wait for the thermometer to reach the temperature of the water, as with an ordinary bucket, there is little opportunity for the temperature of the water sample to alter. The insulating liner is an additional safeguard against this event.

The price of a Surface Sampler of this type would be approximately £5. The price of a Surface Sampler fitted to contain both glass bottle and thermometer is about £8, while the non-insulating type, to contain the glass bottle alone, costs about £3. The makers are Messrs. ELLIOTT & GARROOD, Beccles, Suffolk.

A word may be said here as to the economy of using these instruments, the initial cost of which is, in comparison with an iron or canvas bucket, admittedly high. In the first place, more reliable observations can be obtained with this apparatus than with an ordinary iron or canvas bucket, and the standard of accuracy can be raised so as to make the observations comparable with research ship observations. Moreover, iron buckets do not last very long under the rough treatment they have to undergo in use from fast ships. One Surface Sampler was used weekly from a 20 knot ship for nearly three years. At the end of this time, it was withdrawn in favour of the improved model: it had evidently received very severe buffeting, yet it required very little attention to make it fit for use again. Since all the ships observing for the Ministry of Agriculture and Fisheries were furnished with Surface Samplers in October 1928, only one Sampler (out of 17 in use) has been so damaged as to need more than trifling repairs. Since first writing, accidents have occurred to two of the Samplers in use (containing both bottle and thermometer) which point to a failure of the spring safety catch, owing to one of the screws shearing. In future models, therefore, this part of the apparatus will be strengthened. Loss of the body can always be further guarded against by fitting a preventer wire from the head to an eye-bolt in the base.

In conclusion, I have to acknowledge my thanks to Mr. W. JOHNSTON for preparing the diagram accompanying this text.