

KURT BUCH. Die *pH*-Bestimmung des Meerwassers. Studien über Eigenschaften und Gebrauch einiger hierfür geeigneten Farbenindikatoren. Merentutkimuslaitoksen Julkaisu Havsforkningsinstitutets Skrift. N:o 53. Helsinki, 1928.

The extension of work on the *H*-ion concentration of the sea has necessitated methods which will be applicable to seas in which the range in *pH* value is greater and the fluctuations in salinity more considerable than in the open sea. The author of this paper has worked out suitable methods for use in the Baltic.

There is unfortunately no single dyestuff which covers the whole range of *pH* values met with in the Baltic as satisfactorily as cresol red does for the open sea. Phenol red is fairly suitable and the author, by using suitable mixtures of this dye with brom thymol blue has been able to improve its utility in the acid range (6.8—7.9). The alkaline range (7.75—8.30) needs no admixture. The buffer tubes are considerably larger than are commonly used and the interval between successive tubes greater (0.15) than is necessary with cresol red (0.05).

A method has also been devised for the measurement of the *pH* value of samples of sea water either over- or under-saturated with carbon dioxide. Generally it is only samples from deep water which require such precautions.

In addition to discussing the suitability of other methods and other indicators, the author has made a thorough investigation of the keeping power and salt error of phenol red. In alcoholic or aqueous solution, phenol red does not keep well, there being an appreciable change in a few days and a 50 per cent. change in ten days. This change is not simply fading, and in the acid range there is actually an increase of colour caused by the formation of another dyestuff which does not act as an indicator though it has much the same tint. If, however, the salt of the indicator is formed by dissolving in water and adding the requisite amount of caustic soda, the dye keeps unchanged for months. For use at sea, where the tubes cannot be kept under ideal conditions, it is advisable to change them every month.

The salt error which is a factor of considerable importance in the Baltic has been worked out, and curves are given showing this for phenol red as well as for  $\alpha$ -naphthol phthalein using different buffers. His results differ from those of SÖRENSEN and PALITZSCH, but as BUCH took precautions to avoid contamination by the carbon dioxide of the air while SÖRENSEN and PALITZSCH did not, his results should be accepted. The spectrophotometric method he used as compared with the colorimetric one of SÖRENSEN and PALITZSCH does not explain the discrepancy since the spectrophotometric method gives similar results to the colorimetric method. Working from the theoretical point of view, he is able to formulate the relationship between salt error and ionisation and the results are in agreement with the practical findings except at the limits of the curves.

The methods should prove of use for other seas than the Baltic and should be applicable to inshore and estuarine conditions. A. P. O.