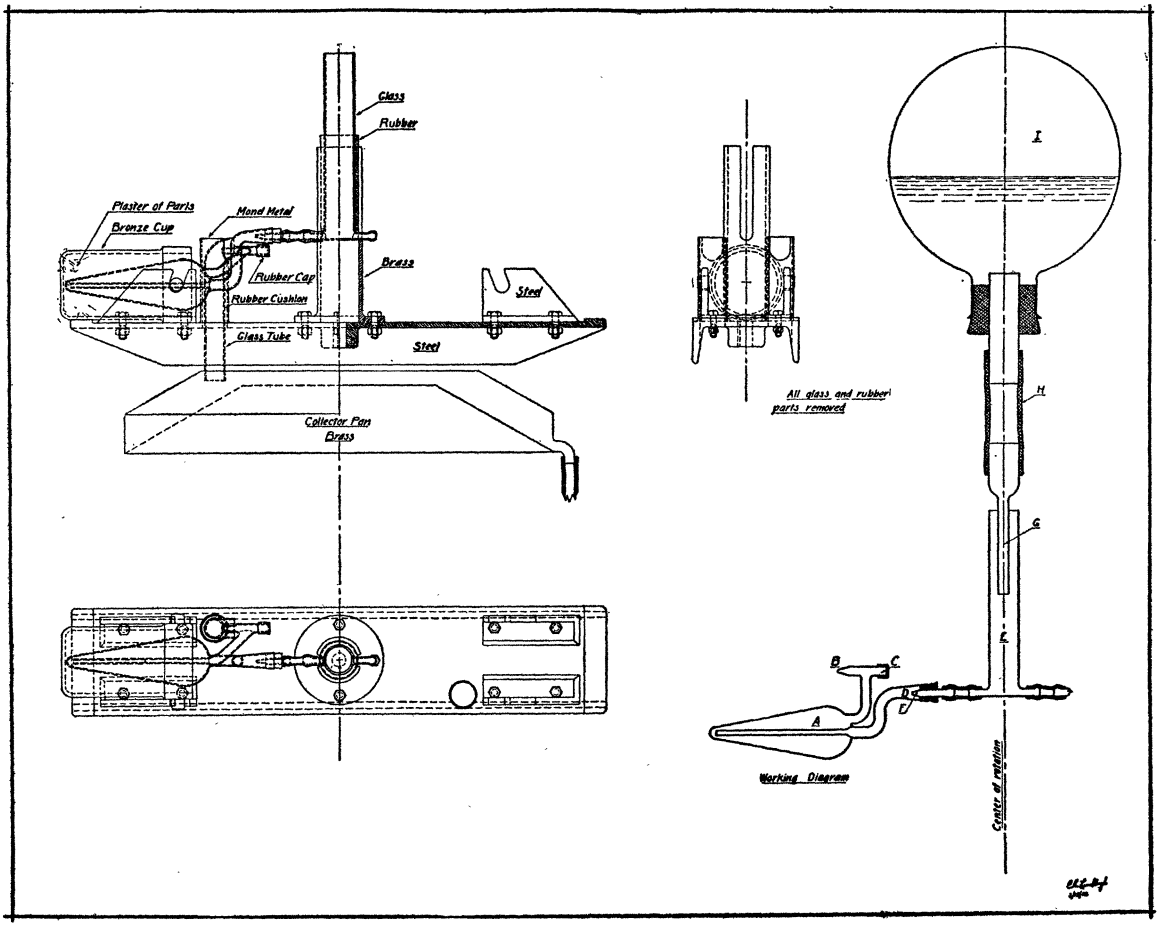

to the flask (I) prevents the fluid from flowing out. The centrifuge is started and run at full operating speed long enough to permit the corpuscles to settle away from the outlet of the chamber (A). The clamp on the flask connection is then removed and the replacement fluid permitted to flow into the intake chamber. The rate of flow to each conical chamber is regulated by the size of the jets (F) leading to them. The overflow is carried to a collector pan below the centrifuge head. When the desired washing or dilution has been obtained, the flow of replacement fluid is cut off and the centrifuge stopped by applying the brake. The conical chambers are removed from their guides and the suspension of corpuscles may be poured out through the vent tube (C). The corpuscles come in contact with glass only. All vessels and tubes which come in contact with the replacement fluid are glass and their connections rubber.

The rate of replacement and washing depends upon the suspension to be washed and the centrifugal force used. In a first test, a 90 cc solution containing corpuscles in suspension and .02 per cent. phenol red was centrifuged at approximately 650 times gravity at the maximum cross section of the conical chamber. After one minute, the replacement fluid was permitted to flow through the chamber at the rate of 60 cc per minute. At the end of fifteen minutes, the dilution of the indicator showed that only a fraction of 1 per cent. of the original fluid still remained.

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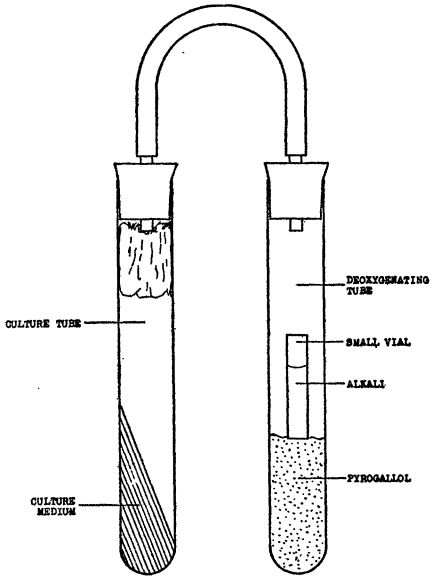
it is convenient to keep the mouth of the injector tube close to the top of the intake chamber. When one of the conical chambers is not in use the jet is replaced with a closed tube and the chamber filled with fluid of proper density to maintain balance.

A MODIFICATION OF THE BUCHNER METHOD OF CULTIVATING ANAEROBIC BACTERIA

THE apparatus illustrated in the accompanying diagram has been tested thoroughly in connection with our work and has been found very effective for the cultivation of microaerophilic bacteria, at the same time eliminating several of the difficulties involved in using the usual Buchner tube.



The diagram is almost self-explanatory. Deoxygenation is obtained by the use of an alkaline solution of pyrogallol. It has been our custom to use enough pyrogallol to form a solid block of about one and one-half inches in a $5 \times \frac{5}{8}$ test-tube. The alkali (sodium hydroxide or potassium carbonate) is pipetted into the small vial in the deoxygenating tube and the connections are made as shown. The deoxygenating tube is then tipped to allow the alkali to mix with the pyrogallol. In performing this procedure it is well to have the mouth of the deoxygenating tube low enough to prevent flow of the solution across to the culture tube.

It is possible to open the culture tube several times for examination without renewing the deoxygenating tube by clamping the connecting tube securely. We experimented a number of times with methylene-blue control tubes and found that this procedure could be followed from 4–6 times safely.

Unless the outfit is to be used continuously for more than a week, it is not necessary to seal the connections. When it is desirable to seal the apparatus, collodion is found to be the most suitable material. The collodion should be allowed to dry before deoxygenating the system, otherwise ether fumes may be drawn into the tube, killing the organisms.

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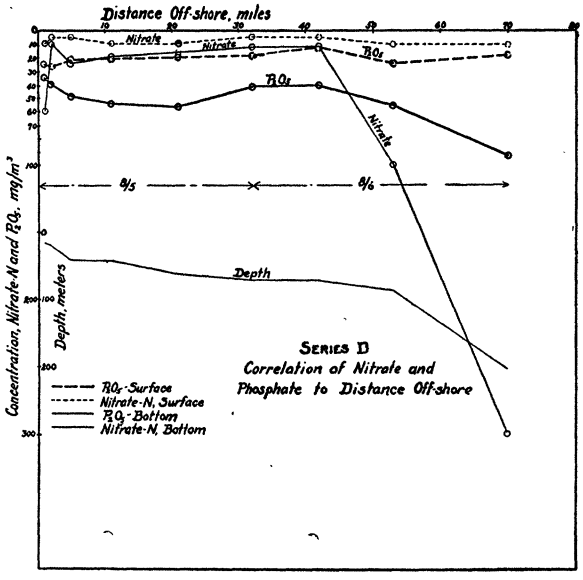
SPECIAL ARTICLES

PHOSPHATE, NITRATE AND NITRITE IN THE SEA-WATER OF REGIONS ADJACENT TO CAPE COD

THE first objective in the chemical program undertaken at the Woods Hole Oceanographic Institution, during the summer of 1931, was a general survey of the waters of the Woods Hole region with respect to their phosphorus and nitrogen content, and especially a comparison of the inshore or neritic waters with the oceanic water found at or near the Continental Slope. The broad shelf to the south of Martha's Vineyard and Nantucket offered a particularly favorable opportunity to study this latter point.

For this purpose two series of stations were established in this area: one, Series D, extending seventy miles to the south of Block Island to the edge of the Continental Shelf, and another Series A, to the south of Martha's Vineyard in a similar manner. Water samples were taken from the surface, bottom and intermediate depths at stations of varying distances from shore. Phosphate, nitrate and nitrite were determined by standard analytical methods.

The samples from Series D were taken on a single trip, covering a total time of less than two days. The results are shown in Fig. 1, correlating the phosphate and nitrate content, both surface and bottom,



with the depth of water and distance off-shore. The most significant feature is the increase in phosphate, and more particularly nitrate, found at the bottom as the Continental Slope is approached. The distinction between "oceanic" and inshore water, not only in this series of stations but in others as well, is to be found in the concentrations of phosphate, and more especially nitrate, at the bottom.