TABLE 1

Sample No.	Description	Time of irradiation	Micrograms per liter: Ammonia-nitrogen	Nitrite-nitrogen	Ammonia loss
1.	Distilled water	0	890	0	
	+ NH_3	2 hr.	940	0	
2.	Distilled water	0	980	0	
	+ NH_3	2 hr.	940	0	
3.	Surface sea water	0	1000 ±	0	
	+ NH_3	1 hr.	....	112	
4.	Same	0	980	0	
		2 hr.	490	335	490
5.	Same	0	970	0	
		2 hr.	740	166	230
6.	Same	0	970	0	
		2 hr.	600	270	370
7.	Same, but radiated				
	through Uviol	0	960	0	
	filter	3¼ hr.	780	35	180
8.	Surface sea water,				
	same as 3, 4, 5, 6, 7,	0	68	0	
	but no added NH_3	1½ hr.	26	++	
9.	Sea water from	0	850	0	
	wharf + NH_3	1 hr.	670	125	180
10.	Deep sea water	0	940	0	
	+ NH_3	1 hr.	740	270	200*

* Nitrate content of this water was 265. All other samples nearly nitrate-free (10–25).

quantitatively, either before or after radiation. In Sample 8 so much of the solution had to be used for the ammonia analysis that there was only enough remaining for a qualitative test for nitrite, which was very distinctly positive. No. 10 was from a mixed sample taken from a number of sources, all below 1,000 meters in depth, and consequently with a high nitrate content. The fact that the nitrite produced exceeded the ammonia lost in this sample is evidently due to simultaneous reduction of nitrate.

It is to be observed that the photochemical oxidation of ammonia takes place in sea water but not in distilled water, confirming in quantitative form ZoBell's earlier observations.

Passing the radiation through a Uviol filter in No. 7 reduced its efficiency considerably, and the questions arising from this fact will be the subject of further study.

With the exception of this sample and No. 10, already mentioned, a relatively constant proportion (68 to 73 per cent.) of the ammonia is transformed into nitrite.

This whole work must be considered preliminary to a more complete study of the extraordinary conditions surrounding photochemical actions in sea water.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

STOP-COCKS FOR MECHANICAL OPERATION

GLASS stop-cocks have been incorporated in mechanical devices, but they are not well suited to this type of service because the amount of energy required to turn them is not constant but increases as the film of sealing compound wears thinner, which in turn may interfere with the operation of the device or may break the stop-cock. When a glass stop-cock is operated mechanically some provision must be made constantly to press the core inward as it is turned. Finally, the fact that glass stop-cocks are so subject to breakage when used as part of mechanical devices makes them unsuited to this kind of use.

A metal stop-cock,[1] used as part of a mechanical device, has been described. This stop-cock is used under conditions which are such that slight leaks are of no consequence.

The stop-cocks shown in Fig. 1 are of mild steel with the exception of the cores. Chrome steel is used in the cores to avoid the excessive friction which is produced when two surfaces of the same metal move against each other.

[1] C. F. Winchester, SCIENCE, 78: 2035, 607, December 29, 1933.

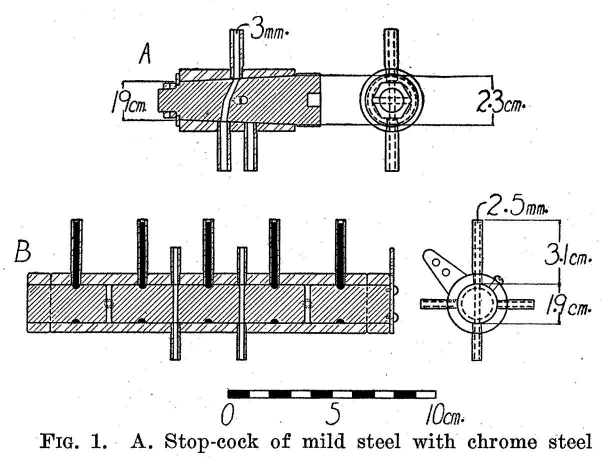

FIG. 1. A. Stop-cock of mild steel with chrome steel core held securely in place by nuts and a washer. B. Four mercury-sealed two-way stop-cocks in one unit. Core is of chrome steel, other parts are of mild steel.

The stop-cock shown at A in Fig. 1 differs in two respects from the conventional type, aside from the fact that it is of metal. The core is held in place by nuts and a washer just tightly enough to prevent leaks, but not tightly enough to cause undue friction. Holes in the core are not parallel, but as shown in the end view of the device are at right angles to each other.

Thus it is necessary to turn the core through a ninety degree arc only. This has been found to be of decided advantage when the stop-cock is operated mechanically. A similar stop-cock with a bronze core has been made. The advantage of the steel core is the fact that it can be used in positions in which there is a possibility of its coming in contact with mercury. These stop-cocks are used in gas analysis apparatus.

The device shown at B in Fig. 1 consists of four, two-way stop-cocks, in one unit, each sealed by mercury under a pressure of about three centimeters. Over a period of about a year it has given satisfactory service as part of a device for obtaining aliquot samples of air.

The core and shell of the mercury-sealed stop-cock were machined until a very close fit was obtained and were then run together in the lathe, well lubricated with a light grade of oil, until the parts were worn enough to permit reasonably free movement. Taper of the core is 0.003 mm per cm length.

When sealed with graphite, no leaks could be found in the mercury-sealed stop-cock under pressure of 30 cm of water.

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FIXATION OF SESSILE ROTATORIA

THE sessile Rotatoria have long been notorious as difficult to narcotize and fix extended in a life-like manner. The proper use of Zenker's fixing solution gives a greater percentage of well-extended specimens than any other method known to me.

The rotifer, with a small piece of the plant to which it is attached, is removed with a pipette to a very small amount of water in a watch glass. When the animal is well extended, a large amount (one or two cc) of boiling Zenker's solution is poured into the watch glass. The specimen should be immediately rinsed in clean water. Boiling water is not as satisfactory as the Zenker's fixative, for fewer specimens remain extended, and those that do are generally distorted.

This method usually works well with *Stephanoceros*, *Collotheca* and the smaller Floscularⅰidae, but it generally fails with the genera *Floscularia* and *Limnias*.

I am working on a taxonomic monograph of the sessile Rotatoria (families Collothecidae, Conochilidae and Flosculariidae) and am eager to see material from any part of the world. Such material will be acknowledged in the monograph.

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SIMPLE AID FOR COUNTING CROWDED PLATES

RECENTLY we have had occasion to completely count all the bacteria colonies on a large number of moderately crowded plates (400 to 600 colonies per plate). This was done with the aid of a Lumi-lens type illuminator, having a Jeffers Plate Counter card and a 3X lens. The count was recorded with a hand tally.

The method of procedure was to count the colonies in each of the ten pie-shaped sectors in turn, starting at the apex and working back and forth, section by section within the sector out towards the edge of the plate, moving clockwise around the plate from sector to sector.

Since all the dividing lines on the Jeffers Plate Counter were white, we had to be continually on the alert that in our concentration on spotting each of the many colonies our eyes did not occasionally and accidentally pass over the sector boundary line, giving us a double count on some colonies. This became especially troublesome when counting near the edge of the plate where there are a multiplicity of radial lines.

By a simple device this error due to eye confusion was eliminated and the counting of the plates made less tiring and more accurate. The ten radial lines from the center to the periphery of the chart were lightly colored with green ink (almost any contrasting color but black will serve as well). Each pie sector was then outlined from apex to outer edge in green. Thereafter in counting a plate one's entire attention could be devoted to spotting colonies, since the eyes, approaching the colored boundary line, would be warned and turn back into the sector being counted rather than wander erroneously into the adjacent sector.

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BOOKS RECEIVED

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ECKLES, CLARENCE H., WILLES B. COMBS and HAROLD MACY. *Milk and Milk Products.* Second edition. Pp. xiii + 386. 92 figures. McGraw-Hill. $3.50.

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