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AMERICAN LEARNING WHEN PEACE COMES. "THE NATURAL SCIENCES"[1]

By Dr. GEORGE GLOCKLER

THE STATE UNIVERSITY OF IOWA

IN a consideration of the topic of American scientific learning in the post-war world, it must be understood that perhaps no other fields of human endeavor are as international in scope and attitude as are the natural sciences—astronomy, biology, botany, chemistry, geology, mathematics and physics. A great deal that can be said concerning these subjects goes far beyond the limits of national boundaries and is of importance to all human beings. However, it appears definitely worth while to consider specifically the problems of American scientific learning when peace comes so that the contributions to the natural sciences which must be made and, it may be predicted, will be made, by American scholars and workers, can be seen at least in outline and can serve as a goal to be attained. The problem of American scientific learning will be discussed on the basis of three factors: the world background as seen by scientific men, the basic qualities of the human intellect, curiosity and imagination, upon which depends all progress in the natural sciences, and the special tasks which American scientists must face in so far as these problems concern the position and growth of American scientific learning in the period following the present conflict.

In an endeavor to consider these questions one might well insist that the only problem of importance at the moment must be the winning of this global war, since failure in this task would make irrelevant any further discussion concerning the position of American scientific learning when peace comes once again. But such a negative attitude would certainly lead to no improvement in the lot of humankind and a more sensible, in fact, a desperately necessary view is to

[1] This is the second of a series of ten Baconian Lectures given under the auspices of the Baconian Club, State University of Iowa, Iowa City, Iowa, on October 8, 1943.

SIMPLE ADAPTERS FOR CONTINUOUS EXTRACTION OF AQUEOUS SOLUTIONS IN THE SOXHLET EXTRACTOR

THE problem of the continuous extraction of aqueous solutions by immiscible solvents is one that presents itself quite frequently. While many devices have been described for just this purpose, the construction of most, if not all, requires an expert glass-blower. Most laboratories are equipped with, or can readily obtain, a Soxhlet-type extractor. The present communication describes two simple adapters which have been found extremely useful in this laboratory which extend the versatility of the Soxhlet extractor

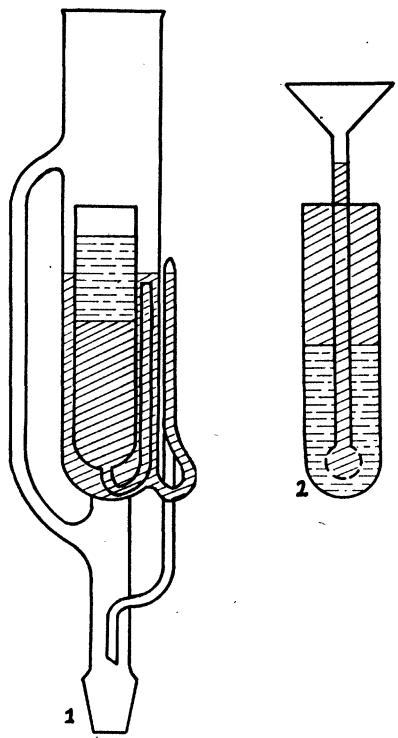

FIG. 1. Soxhlet apparatus equipped with an adapter for extraction of aqueous solutions with solvents heavier than water. The solvent is indicated by the sloping lines.
FIG. 2. An adapter for the extraction of aqueous solutions with solvents lighter than water. The solvent is indicated by sloping lines.

to include the extraction of aqueous solutions by immiscible solvents heavier or lighter than water. Both can be assembled by almost any laboratory worker.

Fig. 1 shows the Soxhlet extractor equipped with an adapter for the extraction of an aqueous solution with a heavy solvent such as chloroform. The adapter is constructed by sealing a length of glass tubing to the bottom of a test-tube of the desired width and then bending it around as described in the figure. The height of the bent outlet tube should be less than that of the body of the adapter. It need not be higher than the siphon of the Soxhlet extractor. To carry out such an extraction the heavy solvent is first introduced into the adapter to about the half-way mark and then the solution to be extracted is layered on top of this until the solvent comes out of the outlet side tube. The apparatus is now ready for use as in a regular Soxhlet extraction. When the chloroform which has condensed, percolated through the aqueous solution and has been forced out through the side arm reaches the level of the siphon it is returned to the extraction flask.

Fig. 2 illustrates an adapter for extraction with solvents lighter than water. This consists of a tube or vessel of any convenient height, depending on the amount of solution to be extracted, which will fit into the body of the Soxhlet extractor. The tube is equipped with a funnel whose diameter is slightly smaller than that of the extractor. For extraction the solution is introduced into the tube or vessel and the funnel is inserted. Extraction is now carried out as in the usual Soxhlet extraction. The condensing solvent drops through the funnel and percolates up through the solution. When the height of the solvent in the Soxhlet reaches that of the siphon it is returned to the extraction flask. The height of the vessel can be greater or less than the height of the siphon and is therefore adaptable for the extraction of small amounts of solution. For more effective extraction the funnel may be equipped with a perforated glass bulb in order better to distribute the solvent through the solution.

The adapters can be used in micro Soxhlet extraction apparatus as well as in the usual laboratory size apparatus.

BERNARD S. GOULD

DEPARTMENT OF BIOLOGY AND BIOLOGICAL ENGINEERING, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

BOOKS RECEIVED

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HOUGEN, OLAF A. and KENNETH M. WATSON. *Chemical Process Principles. Part One: Material and Energy Balances.* Illustrated. Pp. xii + 452. John Wiley and Sons. $4.50.

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