THE TECHNIQUE OF FRACTIONAL FERMENTATION.—BY PROFESSOR E. GORDON YOUNG, Ph.D., Department of Biochemistry, Dalhousie University, Halifax, N. S.

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The course of a bacillary fermentation is rarely if ever revealed by an analysis of the end products. Such end products are the result of countless generations of the organism, not as yet proved to be identical in their chemical activity. Moreover the chemical transformations of a single life span of the bacillus have likewise never been shown to be without change. The reason for this lack of knowledge of most species lies in the inadequacy of the technique. The apparatus described below was designed for such studies and arranged so that growth could be carried on either aerobically or anaerobically and samples of any volume withdrawn when desired for analysis. Figure 1 represents the arrangement.

The fermentation flask may be of any desired capacity. The author has been using 500 to 1000 cc. round bottomed pyrex flasks which must be blown specially as drawn. The flask is sterilised separately and filled with the various constituents of the medium and bacterial emulsions, or sowings, through the open arm. It is then placed in a thermostat at the desired temperature and connected up with the gas collecting apparatus chain as shown. The first collector is a specially blown gas wash bottle capable of containing 125 cc. of NaOH (5N) for the absorption of CO_2 gas. The lower part of this wash bottle contains a tap to allow the removal of small samples for analysis. The second collector is an aspirating bottle of a capacity equal to the expected gas production other than CO_2. The author uses a three litre volume for *B. coli communis* studies. This gas collector is filled with water and is connected to another of equal volume for displacement. A two way tap is inserted in the stopper of the first bottle for gas sampling purposes.

For removing samples from the fermentation mixture the free end of the flask, which is kept sterile, is attached to a sterile vessel of appropriate size. The fermentation fluid is withdrawn by suction and the fluid driven back by air or nitrogen as the case may be.

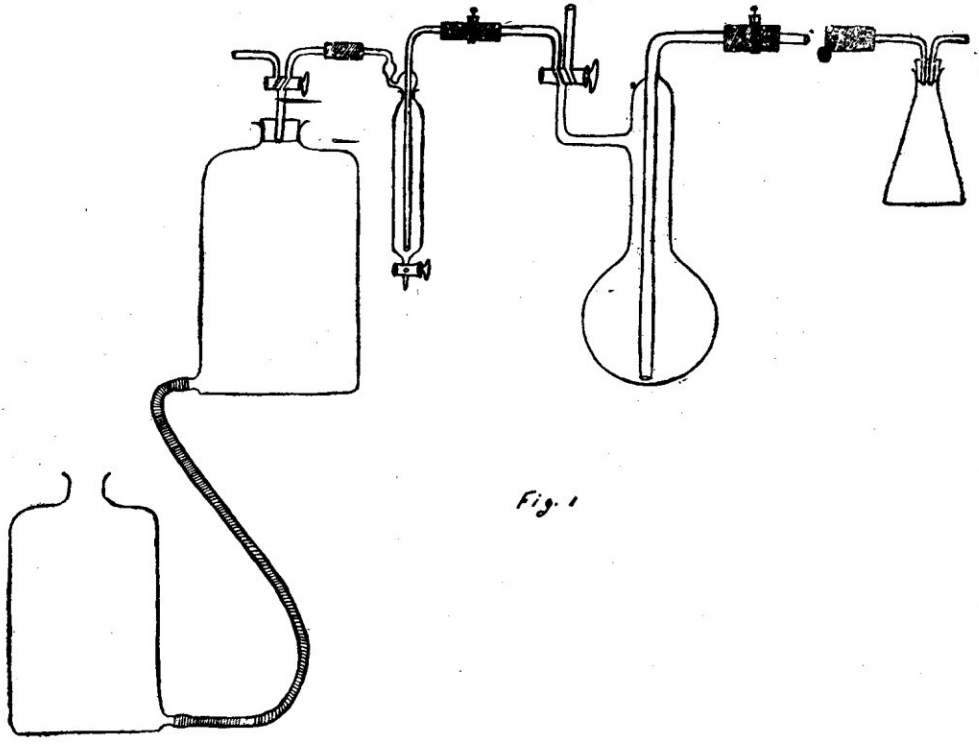

Fig. 1