

flask, a constant stream of air being drawn through all the time. The great bulk of the carbonic acid comes over in the first 30 to 40 cc., and during this time, and occasionally throughout the whole operation, it is well to shake the receiver gently, so that fresh baryta-water shall always moisten the walls. When this is attended to, only a slight turbidity appears in the first U-tube, and the second remains perfectly clear. When sufficient water has been distilled over, air is allowed to pass for some time, and the contents of the U-tubes and the receiver are collected in the latter, and the alkalinity determined by means of tenth-normal hydrochloric acid, the point of neutralization being indicated by rosolic acid.

A very important subject for investigation in the chemistry of the ocean is the nature and quantity of the atmospheric gases dissolved in the water. These are extracted by boiling *in vacuo* in the apparatus already described, and at the end of the operation are obtained, hermetically sealed in glass tubes, in which they may be preserved for an indefinite time. Of course it is, as a rule, more convenient to retain such specimens until they can be carefully analyzed on shore; but in a long cruise it may sometimes be of importance to make an approximate analysis, as the composition of the dissolved gases, particularly in volcanic regions, may bear upon other questions. The apparatus represented in Fig. 5 was designed by Mr. Buchanan, to fulfill this purpose. It consists essentially of two U-tubes. The one, A, which according to precedent we may call the "laboratory tube," is wholly of glass; the other, the eudiometer, B, has the legs of glass united by an india-rubber tube of suitable length. These two parts are connected by a capillary portion (*g, f, b, d, a*), of which the part (*b, d, a*) belonging to A is shown separate in section in Figs. 6 and 7. The stop-cock *a* is pierced with two tubes, the one (Fig. 7) affording direct communication upward between the two portions of the capillary, the other (Fig. 6) communicating with the atmosphere through the prolongation