NOTE

A METHOD FOR MEASURING TIME-RATE CARBON DIOXIDE PRODUCTION

The usual method of determining the rate and amount of CO₂ produced under varying conditions is to absorb the gas in an alkali solution and titrate. The alkalies generally employed are the hydroxides of Na, K, or Ba. It is generally conceded that the latter is the most efficient absorbent, but, due to its great affinity for atmospheric CO₂, is difficult to manipulate. Ba(OH)₂, however, differs from the other alkalies in the fact that the carbonate is insoluble, hence settles out as a white flocculent precipitate. This fact suggested the possibility that the volume of precipitant might be taken as a measure of the rate and amount of CO₂ production. Preliminary experiments indicate the feasibility of more or less accurately measuring the amount of CO₂ being produced from a given source without titration, also that a continuous record of the time-rate of production may be secured.

The apparatus employed differs from the usual absorption tower only in the fact that it is of much greater height and is equipped with an automatic air control. The apparatus and important details are illustrated in Fig. 1. The large absorption tube is approximately 21 inches long. The lower end is gradually tapered to a diameter of \( \frac{3}{8} \) inch. Provision is made for a nipple to which is attached a tube \( \frac{3}{8} \) x 16 inches. This smaller tube will hold approximately 45 cc. The arrangement is such that the liquid in the upper portion of the tube is continually disturbed by the passage of air bubbles from which the CO₂ is absorbed. A certain amount of BaCO₃ will remain in suspension, but the larger crystals will tend to grow to such a size that they will settle out. They settle into the undisturbed liquid in the tube below where the amount of floc may be readily measured on the graduated scale. The usual guards are employed to prevent contamination of the CO₂ source with atmospheric CO₂, also to prevent back suction, but are not illustrated. It will be noted that the number of external, or exposed, connections are reduced to a minimum, thus tending to reduce dangers from leaks.

The amount of vacuum in each tube is automatically regulated by the air-flow control apparatus shown in the figure. This consists of two U tubes connected in such a manner that the air is forced to flow directly through one arm. Interposed between the connection is a...