

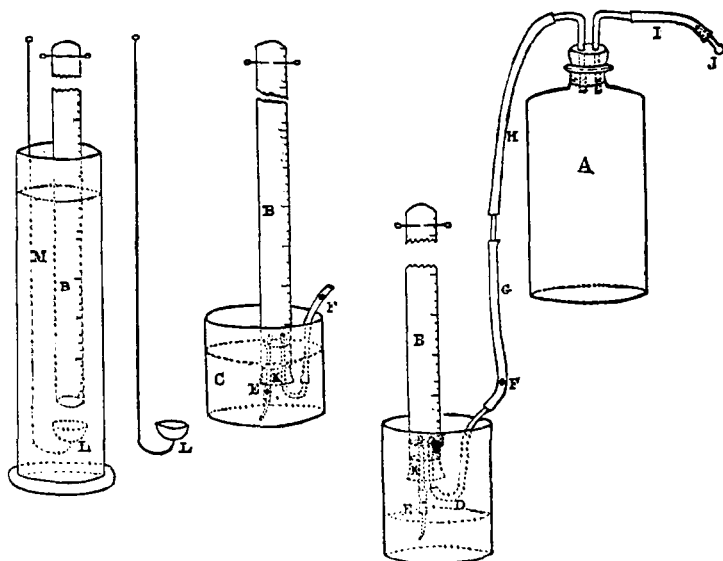
mm precipitated amounted to nearly 5 mgrms. In other words, in badly polluted waters the reduction of the platinum salt in sun-light might be employed as a means for estimating the relative amounts of those organic bodies which are capable of effecting such a reduction in sun-light. It was noted, however, that 100 c.c. of a solution of 1 part of platinum iodide in 500,000 parts of a very dilute solution of potassium iodide in *distilled* water became perceptibly lighter in tint when exposed along with the others for the same period of 48 hours. Inasmuch as the solutions were somewhat warmed by the sun-light, and heat has some effect in the removal of the color, this disturbing element would have to be guarded against.

Since this time, an actinic method of determining the putrescible organic matter in potable waters has been regularly employed, and proven so satisfactory, that further experiments with platinic iodide in this direction have been abandoned. But the new ground broken by Field in the domain of water-analysis, deserves to be sedulously cultivated, and the search for specific tests for particular contaminating substances should be carefully followed up.

ON AN APPARATUS FOR RAPID ANALYSIS OF GASES.

BY A. A. BRENNAN, S. B.

The apparatus here described is designed for rapid analysis of gaseous mixtures where only a moderate degree of accuracy is required. It is possible nevertheless to secure very good results with it, if it be carefully handled and if its known source of error be guarded against. As an example of the results that may be obtained with it, two analyses of air may be quoted which yielded respectively 21.04% and 21.13% by volume of oxygen instead of 20.96% which is probably a fair average for the most accurate analyses. The oxygen was absorbed by a solution of pyrogallie acid in caustic potash, in the proportion of 2 grms of the solid acid to 5 c.c. of a solution of KHO (sticks) in twice its weight of water and 10 c.c. of water were further added to the solution. The absorption of oxygen in each case, occupied about 12 minutes. The excess of oxygen indicated is probably to be accounted for by the solution of part of the gaseous mixtures in the water used for rinsing, but the error belongs to all absorption-methods of analysis, where the gas is measured over water.



The apparatus and its use will be readily understood from the accompanying diagram. A is a bottle holding a liter or more. It is closed by a soft rubber stopper carrying two tubes, one of which communicates with a water air-pump, the other with the gas burette. After exhausting the bottle at the pump, the tube I is closed by the stopper is already closed by a bit of stirring rod, plugging the rubber tube G at F and serving also as a valve. It is opened by simply pinching up a portion of the rubber tube about it, thus forming a channel around the plug. The gas burette B is closed by a rubber stopper K, carrying two tubes, one of which connects with A, the other carries a valve at E and a pointed tube of glass at its end.

The gas burette is filled with gas over the pneumatic trough C, the cork K being removed. It is then transferred by means of the deep spoon L to the measuring cylinder, the volume of the gas is noted with the existing temperature, the burette is again brought to the trough, K is inserted and then by opening the valve F the level of water in the burette is brought to the inner surface of the cork K, the water passing into the exhausted bottle L. This bottle is used in the same way, subsequently, to receive all drainings and rinsing water from the burette.

The absorbing liquids are introduced by bringing the point of the tube below E into the liquid and opening E; liquid rushes into the partially exhausted tube to replace the water previously withdrawn.

The burette is shaken to distribute the liquid over its sides and more of the liquid is introduced as the absorption proceeds. When absorption is complete the liquid is withdrawn as before, the tube is rinsed with successive small quantities of water, and the gas finally measured again over water in the cylinder M.

The obvious errors of the apparatus are the entrance of air about the cork K, and separation of gases from the liquids used in the burette when the level of the liquid in the latter is reduced. A soft, well fitting rubber stopper will remove the first objection and as an additional precaution the mouth of the burette is kept below the surface of the water whenever it is not necessary to manipulate the burette. In practice the entrance of external air through leakage is inappreciable during the time of the analysis.

The second source of error is avoided by using such quantities of absorbing liquids that the diminution of pressure within the burette may be slight. During the time of greatest exhaustion, that is during the withdrawal of liquids, the current tends to carry minute bubbles, that may separate downwards and into the bottle, and with a good vacuum (20-25 inches of mercury) in the latter, the time is too short to permit of any important volume of gas separating from the liquid.

THE CONVERSION OF CARBON MONOXIDE TO CARBON DIOXIDE BY ACTIVE (*i. e.* NASCENT) OXYGEN.

BY DR. ALBERT R. LEEDS.

In the early part of the year 1879, I was led by certain theoretical considerations to regard it as eminently probable that carbonic oxide would be converted by nascent oxygen into the highest stage of oxidation, and that by properly devising the nature of the experiments, and adequate precautions in the execution of their details, the direct oxidation of carbon monoxide to dioxide by nascent oxygen at ordinary temperatures could be demonstrated. Repeated trials amply justified these anticipations. The final experiment, some account of which will be found in the Jour. Amer. Chem. Soc., I, 232, was performed as follows: A 5-liter jar, containing 5 sticks of phosphorus and a little water, was filled with 2500 cc. of carbonic oxide, and the remaining space with air. The carbonic