

evolved on heating with sulphuric acid is measured, and the second the phthalonic acid is oxidized by a volumetric solution of potassium permanganate.

First Method: The phthalonic acid, about 0.5 g., is placed in a thick walled hard glass test tube; and 5 cc. concentrated sulphuric acid is added. The tube is then fitted with a rubber stopper through which pass two glass tubes, one running to within three quarters of an inch of the surface of the acid and connected with a carbon dioxide apparatus, *B*, the other ending just flush with the bottom of the stopper and connected to the inlet tube of a Schiff's azotometer, *C* containing 30% caustic potash

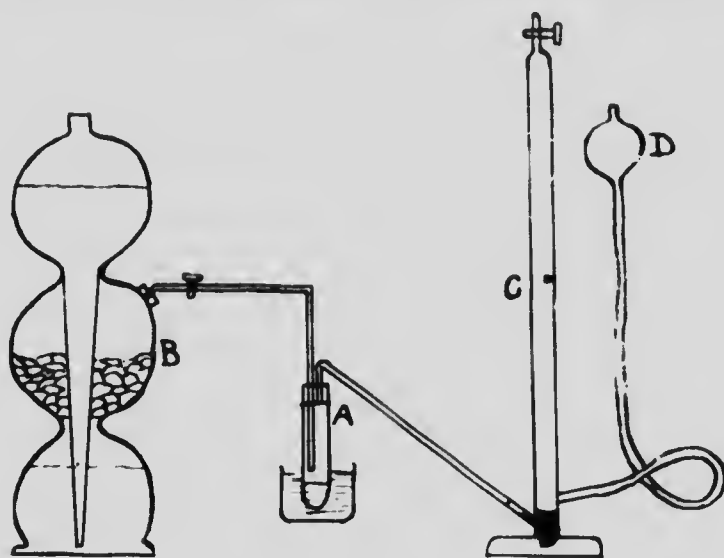


FIG. 1

solution. The air is completely expelled by allowing a rapid stream of carbon dioxide to pass through the apparatus, the potash solution during this operation being almost all in the levelling bulb *D*. When the air is all expelled the tube of the azotometer is filled with the potash solution, and the levelling bulb placed so that the surface of the potash in it is about level with the inlet tube of the azotometer, the mixture of phthalonic acid and sulphuric acid is gradually heated in a paraffine bath to 130° when carbon monoxide is quite rapidly evolved. This continues for about ten minutes when the evolution slackens. The temperature is now raised to 140° and in five minutes more the greater part of the carbon monoxide is evolved. At this temperature carbon monoxide would continue to be evolved very slowly for six or seven hours; but if the temperature is raised to 180° the remaining gas is quickly given off, and