

1841. Fremy, *Compt. Rend.*, **12**, 23: Recherches sur l'action des peroxides alcalins sur les oxides métalliques.

1841. Poggendorff, *Ann. der Phys. Pogg.* **54**, 371: Bildung der Eisensäure auf galvanischen Wege.

1841. J. Denham Smith, *Phil. Mag.*, [3] **19**, 302: Experiments on the alleged conversion of carbon into silicon.

1842. Fremy, *Comp. Rend.*, **14**, 442: Recherches sur les acides métalliques.

1843. H. Rose, *Ann. der Phys. Pogg.*, **59**, 315: Über die Zusammensetzung der Eisensäure.

1843. J. Denham Smith, *Phil. Mag.* [3] **23**, 217: On the Composition of an Acid Oxide of Iron (ferric acid).

1844. Fremy, *Ann. de Chemie*, [2] **12**, 365: Recherches sur les acides métalliques.

1844. *Ann. der Phys. Pogg.* **62**, 288: Wer hat die Eisensäure zuerst gesehen?

1844. *Prakt. Chem.*, **32**, 448: Wer hat die Eisensäure zuerst gesehen?

1879. W. Foster, *Ber. d. chem. Ges.* **12**, 846: Notiz über die höhern Oxide von Eisen, Chrom, Mangan, und Wismuth.

1886. Bloxam, *Chem. News*, **54**, 43: Lecture Experiment. The Ferrates.

THE COLUMBIAN UNIVERSITY,
WASHINGTON, D. C.

[CONTRIBUTION FROM THE LABORATORY OF THE LOUISIANA SUGAR
EXPERIMENT STATION AND SUGAR SCHOOL.]

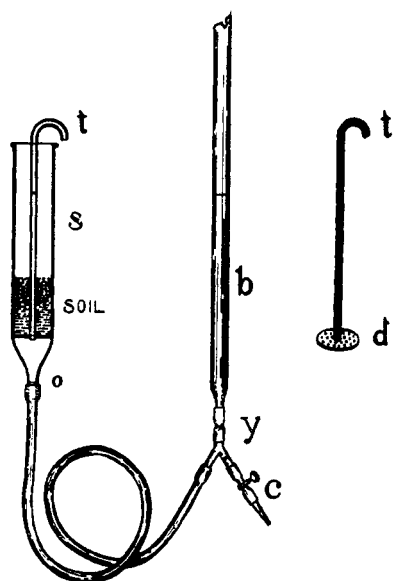
A SIMPLE AND CONVENIENT APPARATUS FOR ESTIMATING THE WATER-HOLDING POWER OF SOILS.

BY J. L. BEESON.

Received June 3, 1895.

TO a fifty or 100 cc. plain burette is connected a glass Y tube by means of a piece of rubber tubing. To one of the forks is attached a bit of rubber tubing carrying a pinch-cock, and the other fork is connected with a small Stutzer extraction tube, having a zero mark scratched on its neck, by means of a stout piece of rubber tubing about two and one-half feet long. The apparatus is fastened in the clamp of an ordinary clamp-stand. A metallic disk, which will about fit the larger tube, is perforated with many small holes, the center with a larger hole that will admit the end of a piece of glass tubing, which is made firm by

fusing into the glass by means of a burner or blast lamp. The upper end of the tube, d t, is bent over so that the soil will not fall into it while filling the larger tube. Disks of filter-paper, of convenient size, are perforated with a cork borer, and one of



these is slipped over the glass tube down against the perforated disk, and held down by means of a rubber washer cut from a piece of small rubber tubing. The edges of the paper are folded under the disk so as to make it fit the tube well, and the whole slipped down to the bottom of the large tube. The apparatus, which is now ready for use, is very simple, and much more rapid and convenient, it is believed, than the one devised by Mr. Feulling as described in Dr. Wiley's book on soil analysis. The apparatus is filled with water, the

burette raised so as to cover the disk and filter-paper and then lowered. The excess of water will now run out of the filter-paper so that the reading will become constant within five minutes. Then by means of the pinch-cock c water is slowly drawn off until it stands at the zero mark on the neck of the tube o, and at zero on the burette. From twenty-five to fifty grams of soil, according to the water-holding power of the sample, is added to the large tube S, which is gently tapped until the soil is level. The burette is raised and the water gently forced into the soil from below until it forms a level above the soil. From the height of the column of water in the air-tube t the amount of pressure may be seen. The burette is then lowered and the water runs out of the soil by gravity alone since the space below the disk is supplied with air through the tube t. When there is no more rise of water in the tube, which requires about fifteen to

twenty minutes, the burette is raised until the water stands at the zero mark *o* in the tube, when the number of cc. of water absorbed by the soil is read on the burette. The whole time for an analysis need not exceed thirty or forty minutes. The pinch-cock on the Y tube is most convenient in bringing the water to the zero marks on the tube and burette before adding the soil. The apparatus may be obtained of Kähler and Martini, Berlin.

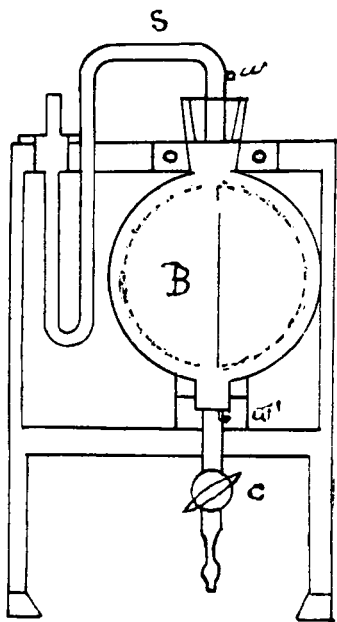
A MODIFICATION OF HINMAN'S EXPLOSION PIPETTE.

BY AUGUSTUS H. GILL.

Received August 7, 1895.

THIS pipette was devised to permit the use of all the residue, sixty cc., remaining after an illuminating gas had been analyzed by the Hempel apparatus, in mixing with oxygen for explosion.

It consists of a bulb, *B*, eleven to twelve cm. in diameter, of about 250 cc. capacity, with walls at least twelve mm. thick, provided with two tubulatures; at the bottom a stop-cock, *C*, is ground in for regulating the flow of mercury; to the top one is fitted the capillary stem, *S*, which must be very carefully ground in. These joints are first vaselined, care being taken that none gets inside the apparatus, and cemented in with a sealing wax having nearly the same coefficient of expansion as glass. Metal clamps hold the bulb upon the stand, similar to that for the simple pipette,¹ the weight of the bulb being sufficient to keep it in the lower one; the upper one is provided with screws to hold the neck of the bulb. To render the stem-joint more nearly tight the upper tubulure is made with a mercury seal an inch deep. As thus constructed, the apparatus is



¹ Gill, *Am. Chem. J.*, 14, 231.