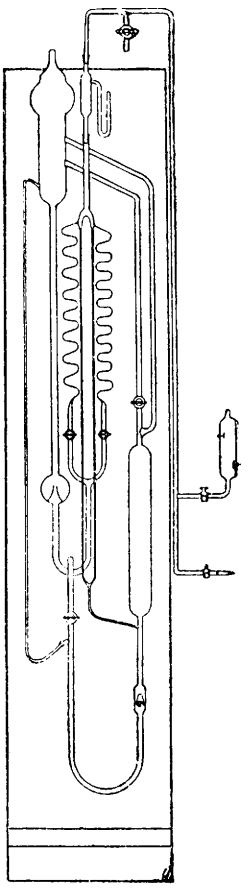
APPARATUS, ETC.



New Form of the Von Babo-Krafft Continuous Mercury Pump. C. Hansen. (*Zeit. angew. Chem.*, 1909, **22**, 337-338.)—The pump shown in the figure is rendered more rapid than the ordinary form by branching the mercury supply tube and providing two tubes through which the mercury drops. Each supply tube is provided with a tap. The main mercury supply tube is provided with an air-trap, consisting of a glass bulb, into which the lower prolongation of the tube extends nearly to the centre. A valve, consisting of a glass float weighted with mercury, is provided in the tube through which the mercury is returned to the reservoir, and prevents the entry of an undue amount of air. The pump requires about 70 c.c. of mercury. It is constructed by Desaga of Heidelberg, at a cost of about 100 marks. A. G. L.

An Electrically Controlled Gas Regulator. E. E. Reid. (*Amer. Chem. Journ.*, 1909, **41**, 148-152.)—A glass U-tube of about 8 mm. internal diameter is provided with a side-tube, and is enlarged at the top to hold a small rubber stopper. Through this stopper passes the gas-delivering tube, with an external diameter 1 mm. less than the bore of the U-tube, and this tube is inserted so that its lower end is below the side-tube. The U-tube is filled with mercury to a point a little more than half-way up to the side-tube, and so that there remains a space of 1 mm. between the surface of the mercury and the end of the gas-delivery tube. In the other arm of the U-tube a weight, of very soft iron-rod, 7 mm. diameter and 15 to 20 mm. long, is suspended freely from a hook on the armature of an electro-magnet, and the iron rod acts simply by its weight on the mercury. The armature is held up by a spring which is fastened rigidly at its other end, and this spring is adjusted to support the weight, but to yield quickly to the magnet. If the sudden motion be rigidly and suddenly transmitted to the mercury, the latter may splash into the side-tube.

The gas enters by the above-mentioned delivery-tube, and flows under the lower end of the tube, up through the space between the tubes, and out at the side-tube. When the electro-magnet is actuated, the lowering of the iron weight causes a corresponding elevation of the mercury in the other arm, partially or wholly closing

the space between the bottom of the delivery-tube and the surface of the mercury, and so shutting off the gas. The delivery-tube is provided with a pinhole opposite the side-tube, through which sufficient gas passes to the burner to keep it lit. In constructing the apparatus, two or three very small pinholes may be made, and closed with wax. One or more of these, as the size of the burner may require, can be opened with a hot needle to allow the passage of gas for a pilot flame, or the burner may be provided with an independent supply to maintain a small flame.

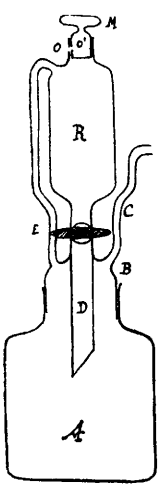
For the electro-magnet an ordinary electric bell may be used, the vibratory make-and-break being short-circuited and the bell removed. The magnet may be wound up to 20 ohms to economise current. With this resistance, a single storage cell will give good results, while with less resistance an ordinary dry cell suffices.

Instead of being suspended, the weight may be floated on the mercury, the amount of the latter being adjusted to allow of the proper passage of the gas. In this case the electro-magnet is dispensed with, and a coil of wire wound round the limb of the U-tube containing the weight. The resistance of the coil should be between 5 and 20 ohms, according to the battery used, and the coil should be placed somewhat below the centre of the weight. When the current is passed, the weight is drawn down and the gas-supply cut off as before. The apparatus may be controlled by an electrical regulator, by which a contact is made when a certain temperature is exceeded, and broken when the temperature falls.

A modified form of this regulator, in which the whole apparatus is encased in a block of cast iron, is recommended on the score of compactness and safety.

A. R. T.

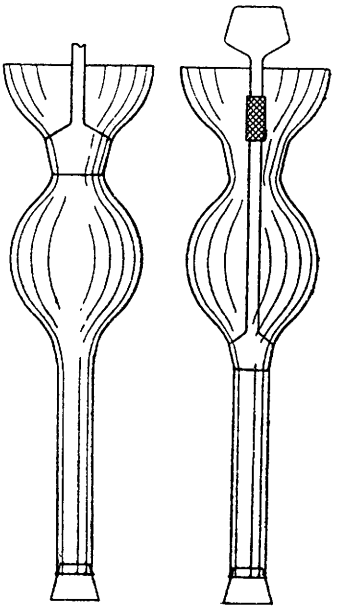
A New Automatic Ureometer. E. Pozzi-Escot. (*Ann. Chim. anal.*, 1909, **14**, 52-53.)—The author describes a new ureometer flask which obviates the inconvenience of measuring out each time the necessary quantity of hypobromite solution.



The apparatus (see figure) consists of a reaction-flask, A, of suitable size, with a wide neck. Into this neck is ground a stopper, B, carrying three tubes. C is the gas-evolution tube, connected with the gas burette; D is a dropping-tube fitted with a tap, and connected with the cylindrical funnel R, containing the hypobromite solution; E is a tube connecting the flask A with the upper part of the funnel R, enabling the liquid to run easily from the one vessel to the other. The funnel R is closed by a stopper, M, through which communication can be made with the outside air when necessary. The whole apparatus measures 120 to 150 mm. in height; the capacity of A is 30 to 60 c.c., and that of R, 20 to 30 c.c. When in use a measured quantity of urine is placed in the flask A, and an excess of hypobromite in the funnel R; the pressure is adjusted, and, the apparatus being closed, a measured quantity of hypobromite solution is allowed to pass through the stopcock D. The apparatus is, of course, applicable to the analysis of many other substances by the gas-evolution method.

J. F. B.

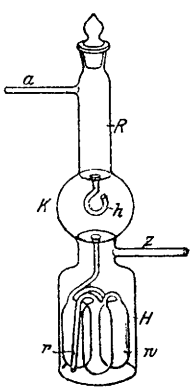
Apparatus for the Examination of Flour. E. Schaffnit. (*Zeit. Untersuch. Nahr. Genussm.*, 1909, **17**, 86-88.)—The apparatus is shown in the accompanying figures; the ends of the central glass rod are so shaped that they may be used as stoppers for the upper and middle parts of the apparatus respectively. About 30 grams of the flour to be tested are placed in the apparatus, the lower end having been closed with a rubber stopper, and the lower bulb is about one-third filled with chloroform. The glass stopper is inserted, as shown in Fig. A, and the contents are well shaken; the stopper is then raised, and the apparatus is filled with chloroform almost up to the edge of the upper funnel-shaped bulb. The latter is then covered with a glass plate, and the apparatus is set aside for a time. Fragments of husk, hair, and other impurities rise to the surface of the chloroform, and, after the stopper has been inserted in the upper part, may be decanted into a beaker for further examination. The remaining contents of the apparatus, after a further period of about twenty-four hours, will be found to have separated into a thick emulsion which fills the bulb, whilst below this, and in the neck of the apparatus, is a layer of chloroform having a more or less yellowish colour. At the bottom of the neck will be found a yellow precipitate (gluten cells). By inserting the stopper, as shown at Fig. B, these layers may be separated from one another. The apparatus is also useful for the detection and separation of mineral adulterants in flour; these settle rapidly to the bottom of the neck, and may be removed by opening the rubber stopper.



A B

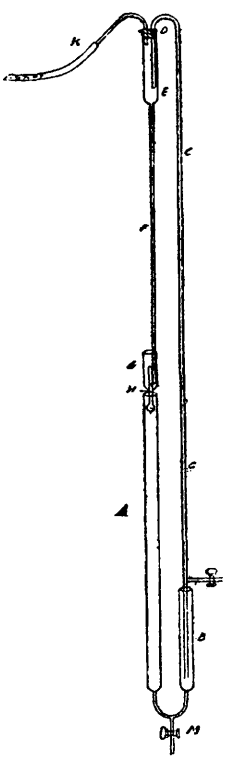
W. P. S.

A New Potash Absorption Apparatus. M. S. Losanitsch. (*Ber. deut. Chem. Ges.*, 1909, **42**, 237-238.)—An improved modification of the well-known Geissler potash bulb is shown in the figure. The entry-tube z is fused into the neck of the bottle H, which is filled with glass-wool and the series of three potash bulbs, w. The exit from the bottle H communicates with the ball K, and this in turn communicates, by way of the hooked shaped tube h, with the vertical tower R, whence the gas escapes through a. In order to charge the apparatus, the potash solution is sucked through z into the bottle H, and is then drawn through the tube r into the three bulbs w, in which it is uniformly distributed. The tower R is plugged at the bottom with glass-wool, and then charged either with ignited, sifted soda-lime or with potassium hydroxide and calcium chloride in the usual manner, and a plug of glass-wool is placed before the exit. The whole apparatus weighs about 25 grams



empty, and 50 to 60 grams charged; it is self-contained, and all joints, with the exception of the stopper, are fused; it is stable, and can easily be wiped before weighing. The main bulk of the absorption takes place in the bottle *H*, in which a large surface of potash solution is exposed to the gas by the glass-wool with which it is packed. As in all apparatus of this class, it is necessary to attach a guard-tube at the exit to retain any moisture carried through by the current of gas; the hooked shape of the narrow tube *h*, however, reduces the loss of moisture to a minimum. J. F. B.

Apparatus for the Purification of Mercury. L. J. Desha. (*Amer. Chem. Journ.*, 1909, **41**, 152-155.)—The figure shows an automatic apparatus for the purification of mercury, which is continuous in its action and can be used for large or small quantities. A and B are tubes, 22 mm. in diameter and 90 cm. and 35 cm. in length respectively, connected at their lower ends to a U-shaped tube carrying a stopcock, M. C is a thick-walled glass tube, 1·5 mm. in bore and about 200 cm. long, and to which a side-tube with stopcock is fused just above B. Its lower end hangs loosely in B near the constriction, and the upper end passes through the rubber stopper D into E, which latter is 20 mm. wide and 15 cm. long, and terminates in the thick-walled capillary F, 76 cm. long, extending to the bottom of the mercury-trap, G. The capillary-tube H is fused into G; its upper end is expanded and extends 25 mm. above the outlet of F, while its lower end, extending 10 cm. into the liquid in A, is blown into a small bulb containing several very small holes. A second tube leads from E through D to the suction-pump.



Mercury is poured into A or B in any desired quantity, but at least sufficient to cover the end of the tube C in B. A is next filled with 1 per cent. nitric acid or other purifying solution. The trap G is filled with mercury to the level of the top of the tube H, and the suction-pump started. Under the diminished pressure produced in C and E mercury is drawn from B into C, and the stopcock L is so adjusted that alternate small portions of mercury and air are drawn into E. Mercury is also simultaneously drawn from G into F until the pressure in F and C is equalised. The mercury coming from C into E runs down the tube F into G, then into H, and is finally discharged through the minute openings in the bulb into the cleansing solution in A. The purified mercury is withdrawn at M.

By adjustment of the stopcock L the maximum efficiency for any given pump may readily be ascertained. The author proposes to further increase the efficiency of the apparatus by combining an electrolytic cleansing action with the above automatic principle. To effect this, a platinum plate will be hung in A beside the bulb of H, and surrounded by a silk bag, and a small platinum wire will make the electrical connection with the mercury in H (the anode). A small current passed

between it and the platinum plate in the nitric acid will serve to electrolyse out the impurities in the charged small globules of mercury issuing from H, and the bag will prevent any deposit on the cathode from again contaminating the mercury.

A. R. T.