absorption with acid, using an indicator neutral to NaHS or Na_2S . The arsenic I found was completely expelled, so that not a trace could be detected in the combined residues from a number of experiments.—*Chem. News.*

APPARATUS FOR THE CONSTANT GENERATION OF GASES.

By R. ULBRIGHT and O. FOERSTER.

THE authors are in the habit of drying feeding cakes, and their ethereal extracts, in a current of carbonic anhydride. As the Kipp's apparatus requires a good deal of attention, and wants often recharging, they have now constructed an apparatus which will be found to answer better, and can be left for a long time to itself.

Fig. 1 represents the apparatus. A is a glass cylinder 1 meter in height and 10 cm. in diameter, filled with small lumps of marble. The top of the cylinder is fitted with a treble perforated ground glass stopper A_1 , and the lower part is connected with the tube b . Through tube a (see Fig. 2), which can be closed by the stopcock, and the lower part of which is drawn out into four points, hydrochloric acid contained in the reservoir B is allowed to slowly drop on to the marble. Having to traverse such a long distance, the acid is almost completely spent before it reaches the bottom. The solution of the calcium chloride flows through the tube b into the flask C, which must contain sufficient fluid to prevent escape of gas. The tube must have a sufficiently large diameter so as never to be filled, and consequently not to act as a siphon. The cylinder A is connected with the reservoir B by means of the tube β (Fig. 2), which in turn is connected air tight with c by means of an India rubber tube, in order that the pressure of the gas in both tubes shall be the same.

FIG. 2.—A CONSTANT GENERATOR OF GASES.

The carbonic acid finally escapes through the tube γ (Fig. 2), and is passed through a wash bottle. If the marble wants replenishing, all the analyst has to do is to remove the stoppers a and c .

The same apparatus may of course also be used for generating other gases, such as hydrogen sulphide.—*Chem. Zeit., Jour. S. Chem. Ind.*

THE PIERCE PROCESS FOR THE PRODUCTION OF CHARCOAL, WOOD ALCOHOL AND ACETIC ACID.

By W. L. DUDLEY.

THE special advantages of this process, which was devised in its original form in 1876, consist in the larger yield of charcoal which is obtained from the wood carbonized, and in the far smaller loss of by-products, the charcoal being also of better quality than any other-wise prepared. The average amount of charcoal obtained by the other processes is 17.5 per cent. of the wood employed, while the yield in this case is shown in the table:

	Per Cent.
Charcoal	25.30
Methyl alcohol.....	0.75
Acetic acid.....	1.00
Tar.....	4.00
Water.....	45.95
Permanent gases.....	23.00
	100.00

The wood is heated in brick kilns, shaped like a beehive, of 32 feet diameter, and 16 feet height in the center, by means of the combustion of the permanent gases produced during a previous operation. During the drying, the steam is allowed to escape through a hole in the top of the kiln, but when the carbonization begins, the hole is stopped up, and the products of distillation are drawn away by an exhaust fan into a large main leading into a series of condensers, where the acetic acid, tar, and alcohol are deposited. The uncondensed gases are then forced back into the kilns, where they are mixed with the requisite amount of air, by means of a steam jet, and burned in the furnaces. In this way, the carbonic acid gas and the water vapor being decomposed into carbonic oxide and hydrogen respectively, more gas is accumulated than is needed for carbonizing, and in fact more than sufficient to yield steam for the engines driving the fans, etc., and for the stills in the alcohol house. The liquor from the condensers is allowed to stand in tanks, and when the tar has subsided, it is drawn off and

neutralized with milk of lime. The neutral liquor is distilled in wooden stills by dry steam to obtain the alcohol, which is afterward twice rectified, and the residue is evaporated and the crude calcium acetate sold as such. The tar is chiefly employed in painting the gas mains, condensers, etc.

A complete plant on this system consists of 48 kilns, which hold 55 cords of wood each, and take from 12 to 18 hours for drying, and six to eight days for carbonizing. The kilns are set in three batteries of 16 each, each battery having its own fan and set of five condensers in series, the fan being placed after the first condenser. These are wooden boxes about 4 feet square and 14 feet long, filled with copper tubes, in which the condensing water circulates. The alcohol house contains eight "primary" stills, for the first distillation, four "intermediate," and two "shipping" stills. Of these, the primary are made of wood, the other being of sheet iron, and fitted with "weak liquor" condenser, consisting of a worm passing through a trough filled with water at a temperature of 80° – 95° C., to strengthen the alcohol as much as possible. The alcohol having to pass through two of these baths, often becomes of as much as 90 per cent. strength, in which case it is diluted with water to 82 per cent. for shipment.—*J. Analyt. and Applied Chem.*

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