NEW APPARATUS.

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DISSOLVING TUBE.

FIG. 1.

This apparatus (Fig. 1) is designed for dissolving solids which are difficultly soluble without the aid of heat or mechanical agitation, and filtering the solution at the same time. The tube as shown in drawing consists of a cylindrical tube (a) for containing the solid. From the bottom of this a tube is attached which is of proper length to reach to bottom of bottles in which the stock solutions are contained. From the side near the top a side tube (c) is joined which connects with the tube (d), which is a short extension of (a) and forms a jacket for (b). The apparatus has at (e) a cavity for holding a plug of cotton or asbestos wool for filtering.

The dissolving tube is held by a rubber stopper which has an air vent cut on the side. The bottle is filled with water and the proper amount of crystals are placed in (a), a plug of cotton or asbestos wool having previously been packed in (e). A suction by pump or the mouth is applied at a stopcock (f) in a light rubber stopper and the liquid from the bottle is drawn to fill (a) over the crystals. The stopcock (f) is now closed. The solution immediately travels down tube (b) because of its greater specific gravity and the water being lighter travels upwards through side tube (c). This will continue until all the crystals are dissolved or until the solution becomes saturated. The cotton or asbestos

plug serves to catch any sediment which may occur with the crystals.

Those laboratories which keep up stock solutions for general use find that there is no little labor in preparing these. Copper sulphate and potassium bichromate, etc., must be heated in an evaporating dish or agitated by shaking frequently in order to cause solution. By means of a tube of the above description a bottle of a solution of the strength ordinarily used may be prepared with little labor by allowing to stand a few hours.

DROPPING GENERATOR.

FIG. 2.

The drawing (Fig. 2) will show readily how the apparatus is constructed. It may be used for dropping some liquid upon a solid or liquid contained in the Erlenmeyer flask, in order to generate some particular gas. With the ordinary dropping funnel difficulty is nearly always met in obtaining pressure enough to force the gas through the wash bottles and further train used in the operation. With this apparatus the pressure of the flask below is transmitted to the dropping funnel above.

The stopcock at side is intended to prevent escape of gas if refilling the dropping funnel bulb should become necessary. This cock may be omitted very satisfactorily. Where a solid is used in lower Erlenmeyer flask it is desirable to have it in the form of paste if possible, especially if it be necessary to heat the Erlenmeyer flask. The heating should be done with a very small flame. The apparatus is very quickly set up and one will be found convenient for generating many gases. The following may be prepared with this generator very readily:

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The first chemical in each of the above list used for generating the gas should be in the dropping funnel and those following should be in the Erlenmeyer flask. It will often be found desirable to use this apparatus for generation of CO_2 , H_2 and H_2S in preference to the ordinary Kipp apparatus. For lecture work a Kipp has the great disadvantage that one is unable to know whether it may not become exhausted during the time for the lecture. Consequently rather than take chances a Kipp should be refilled very frequently with much loss of good acid.

OSMOTIC PRESSURE TUBE.

FIG. 3.

This tube (Fig. 3) is made from barometer tubing about five feet long, with an enlargement and stopcock as shown by drawing. A parchment tube made by Carl Schleicher and Shull (No. 579 Diffusion Hulsens size 100x16 mm.) is fastened on the lower end. This may be made tight to the glass by applying a soft wax or a stopcock grease on ends of both parchment and glass tube and tying after many turns by strong linen thread; and then by means of a cork borer slightly larger than either tube, a short rubber tube may be stretched over the joint. The rubber tube should be stretched over the cork borer (or a simi-

lar brass or glass tube) ; then with safety it may be brought over the parchment tube and slipped from the cork borer onto the junction of this tube with the glass. When this is done a leak is very improbable, even though the solution may run over the top of the barometer tubing. By means of the stopcock a strong sugar solution, which has been colored by some red dye, may be introduced. The parchment tube then being placed in water in a beaker, the sugar solution will rise rapidly owing to the small bore of the barometer tubing, and the large surface of the parchment. The barometer tubing however magnifies the bore and the red solution may be observed at a distance by a large class. By allowing the parchment tube, after rinsing out sugar solution, to stand in a bottle of water, the whole apparatus may be kept intact and ready for use for a long time. The first one made did not need the parchment tube renewed for eighteen months and was used probably on the average once per month. This makes very easy a lecture experiment, otherwise difficult because of trouble of preparation and danger of leaks.

The total production of crude petroleum in the United States in 1905 was 134,717,580 barrels, as against 117,080,960 barrels in 1904, 100,461,337 barrels in 1903, 88,766,916 barrels in 1902, and 69,389,194 barrels in 1901, an increase of 17,636,620 barrels, or 15 per cent over the production of 1904, and of about 34 per cent over that of 1903.

The increase in 1904 came from Kansas and Indian Territory, and Oklahoma, Louisiana, Texas, California, Kentucky and Tennessee, and Illinois, in the order named. In round numbers, the gains in 1905 over 1904 were as follows: Kansas and Indian Territory and Oklahoma, 6,395,000 barrels; Louisiana, 5,950,000 barrels; Texas, 5,890,000 barrels; Kentucky and Tennessee, 219,000 barrels; and Illinois, 181,000 barrels. The largest decreases in production in 1905, as compared with 1904, were in Ohio, which showed a decrease of about 2,529,000 barrels; West Virginia, 1,066,000 barrels; Pennsylvania, 688,000 barrels; Indiana, 374,000 barrels; and Colorado, 125,000 barrels. It will be observed that the greatest gains were in the South and West, and that, relatively, the Appalachian field lost heavily.

The value of crude petroleum produced during 1905 was \$84,157,399, or an average price of 62.47 cents a barrel, as against \$101,175,455, or 86.41 cents a barrel in 1904, as against \$94,694,050, or 94.26 cents a barrel in 1903.—*U. S. Geol. Survey Bulletin 260.*

* All of the above glass apparatus may be secured from W. J. Boehm, glass blower, 17¹ Randolph Street, Chicago, Illinois.