extraction with boiling water is thorough. Filtrates and washings are united, the barium removed by adding potassium carbonate until alkaline, the solution filtered and the filtrate concentrated to crystallization. The yield obtained is about 60 per cent. of the theoretical. The salt may be easily purified by recrystallization from water. This method is suggested provisionally until a better one has been devised.

To prepare the standards, the recrystallized salt thus obtained is dissolved in distilled water and the solution compared in a colorimeter with a known weight of potassium nitrate treated with the reagent in the usual manner. From the value obtained the proper dilutions for a series of standards are calculated.

Carrying the purification of the tripotassium salt to a point where the theoretical amounts might be weighed out for a set of standards is not recommended, since the products must be dried in a current of carbon dioxide.[1]

Standards prepared as above described were checked repeatedly, both with the C. P. salts and with potassium nitrate standards, during many months and have as yet shown no tendency to change. During most of this period they have stood in clear glass bottles in diffused daylight. The authors therefore believe that such standards may be recommended as convenient, reliable, and as doing away with the very strongly alkaline standards formerly employed.

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NOTE.

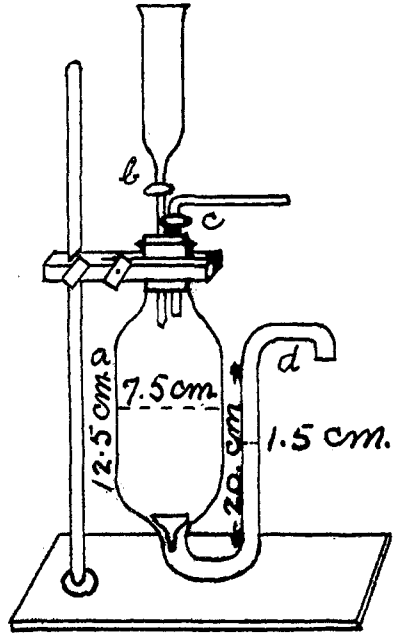
A Simple Hydrogen Sulfide Generator.—Many generators have been devised for hydrogen sulfide and I offer no apology for adding one to the number. Chemists have suffered so much at the hands of this bad-smelling gas that they will be ready to welcome anything which promises to alleviate their discomfort. The simple apparatus which I here submit will be of great service in small laboratories and to chemists who want moderate quantities of the gas from time to time at a moment's notice.

There are two principles involved in the various forms of hydrogen sulfide generators. In the one the acid in bulk is applied to the sulfide repeatedly, thus becoming weaker and weaker, and must finally be removed before it is fully exhausted. This is the principle of the long used and popular Kipp generator. In the other form a small quantity of acid is applied to a large quantity of the sulfide and when spent flows away automatically. This is the principle of the generators of Parsons, Dudley and others and is the one used in the apparatus here described.

The sulfide is placed in the body (*a*) of the apparatus. The acid, best

[1] THIS JOURNAL, 32, 635 (1910).

hydrochloric acid, is admitted from the funnel tube through the stopcock (*b*), just enough to serve the purpose, generally a few drops. The gas passes out through the delivery tube (*c*) which may be connected with a wash bottle if desirable. On closing the stopcock in the delivery tube, the acid is driven away from the sulfide up the waste tube and the excess overflows at (*d*) into a bottle or through a rubber tube to the sink or to the outside air. The apparatus is placed in a convenient support and can be carried from place to place with perfect ease.



The waste tube is 20 cm. long, which gives pressure enough for ordinary purposes. If a greater pressure is desired, the tube can be closed with a cork, or lengthened with rubber. The apparatus is equally well adapted to the generation of hydrogen or carbon dioxide.

The advantages of this apparatus are as follows:

1. The quantity of acid in the generator is always small, generally less than 50 cc.

2. If the acid is added drop by drop and not in large excess, it will be practically exhausted before it passes out through the waste tube.

3. When the stopcock is closed in the delivery tube, the acid is driven away from the sulfide at once and the generation of the gas ceases. At most only a few bubbles pass out and these go through the waste tube into the outer air.

4. No large quantity of gas is in the apparatus to be wasted by the student in passing it rapidly through his solution.

5. The apparatus cleans itself, being emptied every time the stopcock in the delivery tube is closed. To wash out admit water through the funnel and force it out through the waste tube by blowing into the delivery tube.

6. It is simple, cheap, always ready, wastes no gas, if properly treated needs no attention except when it must be refilled.

The apparatus was made for me by Eimer & Amend, of New York. I have had one in use for four months with perfect satisfaction.

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January, 1911.