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NOTES.

The Distribution of Hydrogen Sulfide in a Large Laboratory and the Use of Aluminium Stopcocks.—The problem of supplying hydrogen sulfide to a large number of students working in a chemical laboratory, when the work is being done at a number of points widely separated, is usually a more or less difficult one. Any ideas that will simplify this condition may be of interest to those in charge of large laboratories. The hydrogen sulfide system which was installed in the new chemical laboratory at the University of Michigan a little more than a year ago has been working so satisfactorily that a brief description of the essential features will be given.

The generators are placed in a small room located in the attic, so as to be above the level of all rooms in which hydrogen sulfide is used. The hydrogen sulfide generator room adjoins the attic storeroom which is reached by means of an elevator, so that supplies of ferrous sulfide and hydrochloric acid may be easily taken up. The hydrogen sulfide generator room is supplied with a small exhaust fan operated by an independent motor, and the waste pipe for carrying away the spent solution from the hydrogen sulfide generators connects directly with the main sewer outside the building. These two devices prevent the escape of gas into the attic or into the rest of the building through the water waste risers. There are two generators installed, one to supply the hydrogen sulfide, the other being held in reserve for use when it is necessary to clean or fill the first. The generators used are substantially like the one described by A. W. Browne and M. F. Mehling in *THIS JOURNAL*, 28, 838 (1906).

The main generating bottle has been modified by the addition of one tubular at the top and of one opposite the bottom tubular. The extra top tubular is closed with a solid rubber stopper and is used for introducing fresh ferrous sulfide without the necessity of disturbing the glass connections.

As the amount of work done in this laboratory calls for the use of 500 kilos of ferrous sulfide per year, it is necessary to add ferrous sulfide about once a week and hydrochloric acid almost daily. On account of the large amount of ferrous sulfide used, a certain amount of finely divided, insoluble material tends to accumulate in the bottom of the generator. By introducing a rapid stream of water through the bottom tubular opposite the spent acid discharge, any finely divided material can be flushed out and the ferrous sulfide kept clean and active.

The hydrogen sulfide after leaving the generator is first passed through a water wash bottle and then through a tower of calcium chloride, before it enters the iron pipe distributing system. Two calcium chloride towers are installed. By means of two-way stopcocks either tower may be used for drying the gas while the calcium chloride in the other tower is emptied into a large evaporator, dried and regenerated for use. There is practically no loss of calcium chloride and a tower lasts from one to two weeks before it is necessary to empty and dry the calcium chloride.

The distribution of the dried hydrogen sulfide is effected by means of ordinary gas pipes. A $1\frac{1}{4}$ -inch main connects with the generator. The $1\frac{1}{4}$ -inch main extends across the building connecting at both ends with one-inch lines extending in the attic almost the length of the building on both sides. From various points in the one-inch distributing mains in the attic $\frac{3}{4}$ -inch risers lead down to the rooms in which hydrogen sulfide may be desired. Two feet below the ceiling of each room through which a riser passes, a tee is placed, the tees being plugged in rooms where hydrogen sulfide is not being used at present. By this system hydrogen sulfide connections are provided for in eight rooms on the first floor, twelve on the second floor, twelve on the third, and sixteen on the fourth floor. Where hydrogen sulfide is used in a room, a one-half inch pipe connects the tee with a similar pipe running along the top of the hood in which the hydrogen sulfide is to be used. From the one-half inch pipe running along the top of the hood, $\frac{3}{8}$ -inch pipes lead down to a convenient height for use. On the lower end of each $\frac{3}{8}$ -inch pipe is screwed a special aluminum stopcock. These stopcocks were made in the University Shops. A mixture of equal parts of No. 1 aluminum and No. 12 casting alloy furnished by the Aluminum Company of America was used for casting the blanks from which the finished stopcocks were made. These stopcocks resemble in form an ordinary laboratory gas cock, except that the hole in the tip is made small to prevent excessive loss of gas if the cock is left open. We have used a hole 1 mm. in diameter, but this seems to be too large and 0.5 mm. would probably be better.

By having the generating system placed well above the level of the highest point at which the gas is used no trouble has been experienced in getting a satisfactory gas pressure at any point in the system, and as the aluminum stopcocks are not acted upon by dry hydrogen sulfide, these stopcocks, if occasionally lubricated, give no more trouble than ordinary gas cocks with illuminating gas.

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