

NOTES

Intensive Drying.—One or two papers published in America record failures to obtain results which their authors expected from the drying of liquids.¹

The explanation appears to be that while expending a great deal of trouble in obtaining the liquids in the pure state, the glass of the apparatus was not sufficiently dried.

As far as can be made out from the published papers, the phosphorus pentoxide was entirely submerged in the liquid. The glass therefore obtained very little drying effect after the apparatus was sealed up. In my original experiments as described² a side tube or bulb containing phosphorus pentoxide was always introduced for the sole purpose of drying the glass while the separate drying of the liquid by phosphorus pentoxide was taking place. I have recently pointed out³ that the deep-seated moisture in glass is very difficult to remove and, in my experience, this removal to the degree necessary for these experiments is only possible by very long exposure to an atmosphere dried by phosphorus pentoxide. It is obvious that the dryness of a system is only the dryness of its wettest part.

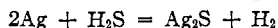
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Note on the Reaction between Hydrogen Sulfide and Mercury.—

In a recent communication [THIS JOURNAL, 52, 885 (1930)], Lilienfeld and White reported the results of a study of the reaction between hydrogen sulfide and silver, and showed that the metal is attacked by hydrogen sulfide at room temperature only in the presence of oxygen and moisture; the reaction commonly supposed to occur with the production of hydrogen, *viz.*



was found to be endothermic and not to take place at ordinary temperatures. The following observations, which show qualitatively that the reaction between hydrogen sulfide and mercury is analogous to that of the gas and silver, were noted during the preparation and purification of hydrogen sulfide in an apparatus containing several H₂S/Hg interfaces. Work to be carried out involved the measurement of pressure with a manometer, the mercury of which would be in continuous contact with pure hydrogen sulfide, hence it was necessary to determine whether any reaction took place.

¹ Lenher and Daniels, *Proc. Nat. Acad. Sci.*, 14, 606 (1928); E. Juanita Greer, THIS JOURNAL, 52, 4191 (1930).

² Baker, *J. Chem. Soc.*, 123, 1223 (1923).

³ Baker, *ibid.*, 1663 (1929).

Hydrogen sulfide, prepared by the action of dilute hydrochloric acid upon "Analytical Reagent" ferrous sulfide *in vacuo*, was passed over powdered ferrous sulfide, dried over phosphorus pentoxide, condensed in liquid air and subjected to fractional distillation. Rejected fractions were discharged at open mercury surfaces, which soon became coated with sulfide. A sample of the pure gas finally obtained was sealed up in contact with pure mercury for three months. No trace of blackening of the surface could be seen, but at the end of this period the introduction of a trace of moist air into the tube caused the mercury surface to be covered with a black film in a few hours.

Ample confirmation of the immunity of mercury from attack by hydrogen sulfide free from air and moisture was evident as the work progressed; the gas could be safely stored in tubes over mercury, and pressure measurements could be carried out without risk of contamination of the meniscus.

In their paper Lilienfeld and White mentioned that phosphorus pentoxide could not be used to dry hydrogen sulfide as it oxidized the gas to sulfur dioxide. To investigate this point the tests employed by these authors were used in an examination of the gas prepared as described. Analyses of samples of the gas showed sulfur dioxide to be absent, while no sulfur residue was left by the evaporation of a carbon disulfide extract of the contents of a phosphorus pentoxide tube through which about 25 liters of gas had passed.

It is probable that the phosphorus pentoxide used by the American workers contained lower oxides of phosphorus, which were responsible for the oxidation of the hydrogen sulfide. The drying agent used in this work was tested according to the method described by Whitaker [*J. Chem. Soc.*, 127, 2219 (1925)], and was found to be free from lower oxides.

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The Construction of a Flexible Glass Diaphragm for a Clicker Gage.—The utility of the glass clicker gage for measuring pressure changes in gas reactions has been emphasized by several investigators, in particular D. F. Smith and W. W. Taylor.¹ The essential part of this gage is the glass diaphragm. It must be strong enough to withstand a considerable pressure difference on the two sides, thin enough to have high sensitivity, and must click audibly at a definite pressure difference. As Smith and Taylor point out, the construction of a good diaphragm is very tedious. The following method is simpler and requires fewer trials to make a satisfactory diaphragm.

¹ Smith and Taylor, *THIS JOURNAL*, 46, 1393 (1924).