

adding the reagents as above. A blank should always be made on the distilled water used for dilution, especially if it has stood for any length of time in glass vessels.

The method as just described will be sufficient for ordinary work. If a more exact determination of the phosphate is required a slight correction should be applied in each case. These corrections were determined by making a number of determinations by the method. The results are shown in the following table. The first two series had 2 cc. of standard silica solution added to each test ; the others had only the phosphate.

Phosphate added.	Phosphate found.						Average.	Correction.
0.1	0.07	0.09	0.10	0.10	0.09	0.09	0.09	0.01
0.5	0.46	0.47	0.46	0.45	0.43	0.45	0.45	0.05
0.7	0.63	0.64	0.64	0.65	0.64	0.66	0.65	0.05
1.0	0.85	0.85	0.86	0.86	0.84	0.83	0.85	0.15
3.0	2.55	2.65	2.50	2.50	2.60	3.65	2.60	0.40
5.0	4.55	4.55	4.45	4.45	4.50	4.50	4.50	0.50
7.0	6.65	6.60	6.55	6.55	6.60	6.65	6.60	0.40
10.0	9.60	9.65	9.55	9.60	9.60	9.55	9.60	0.40

Since organic life is present in greater numbers and is more active in surface waters than in ground waters, it is evident that the determination will be of greatest value for the examination of wells. Well waters are usually colorless, and to them the method may be applied directly. It is not yet suitable for colored waters. The determination of phosphates is at present being carried on in this laboratory as a routine determination and the results will be published as soon as sufficient data have accumulated to render a discussion of the entire question of value.

BOSTON, MASS., December 20, 1900.

[CONTRIBUTION FROM THE JOHN HARRISON LABORATORY OF CHEMISTRY,
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EXPERIMENTS ON CHALCOPYRITE.

BY LEONARD P. MORGAN AND EDGAR F. SMITH.

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AT various times experiments have been made in this laboratory looking to the determination of the constitution of certain natural chemical products. Thus, the state of oxidation of the iron in pyrite, marcasite, and arsenopyrite has received

considerable attention, and in the present communication it is desired to give the results of similar experiments made upon the mineral chalcopyrite. Weighed portions of the latter were exposed in porcelain boats to the action of dry hydrochloric acid gas. As the mode of procedure has been sufficiently detailed in former papers, it may be omitted here. It will suffice to note that the heat was obtained from a single Bunsen burner with a wing top. The period of heating covered one hour, beginning of course with a gentle heat and increasing finally to a full red heat. The boat and contents were allowed to cool in the gas. On their withdrawal from the tube they were placed in a beaker containing distilled water. The combustion tube was also washed out carefully with water. The aqueous solution of the iron salt was strongly diluted, acidified with sulphuric acid and the liquid titrated with potassium permanganate.

RESULTS.

	Chalcopyrite. Gram.	Iron found. Gram.	Iron found. Per cent.
1	0.2112	0.06489	30.72
2	0.2039	0.06231	30.56
3	0.2007	0.06164	30.70
4	0.1996	0.06128	30.67
5	0.2089	0.06398	30.63
6	0.2140	0.06553	30.62

In several instances the liquid in the receiver placed at one end of the combustion tube showed traces of ferric iron when the thiocyanate test was applied. This might readily occur when it is remembered that the quantity of ferrous chloride thus volatilized was exceedingly small and that its exposure during the time required for the completion of the experiment would be enough to cause its oxidation. However, the quantity of ferric iron was extremely small.

The formula generally assigned the mineral is CuFeS_2 , which would require 30.5 per cent. of iron. The results given above therefore indicate a complete decomposition of the material by hydrochloric acid, and also show that all of the iron is in the ferrous state. This proved to be the case with marcasite. As hydrochloric acid gas does sometimes act as a reducing agent, there was a possibility that perhaps it might have transformed any ferric iron present in the mineral into the ferrous condition.

To render the results as certain as possible, portions of the mineral were carefully heated in sealed tubes with a solution of copper sulphate, as had been done with marcasite. The evidence gathered in this way corroborated the first experience and it can safely be asserted that chalcopyrite contains all of its iron in the ferrous form, and that the mineral is, perhaps, nothing more than a substituted marcasite, in which copper has replaced its equivalent of iron.

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ON TRIPHENYLCHLORMETHANE.

BY M. GOMBERG.

Received January 12, 1901.

THE recent publication by Norris and Sanders¹ on the same subject induces me to make a few remarks at this time. It is far from my intention to enter into any controversy whatever. I merely wish to call attention to the following few points :

(1) My paper on "Triphenylchlormethane"² was first presented by me at the Columbus Meeting of the American Association for the Advancement of Science, August, 1899. Norris and Sanders state that they have been at work on this subject for about a year. Hence this subject must have been undertaken by them after my paper was presented. It was, however, entirely natural that they should have overlooked the first mention of my paper, since it was given in the Proceedings³ only by title.

(2) The difference in procedure between my method and that of Norris and Sanders consists in that the latter used, instead of benzene as a solvent, carbon disulphide,—a diluent first introduced by Anschütz⁴ for Friedel and Crafts' reaction in general. The application of this solvent in the present instance enabled Norris and Sanders to isolate the important intermediate product, the double salt of aluminum chloride and triphenylchlormethane, which was not obtained by me at all.

(3) Norris and Sanders state⁵ that the action of sodium upon triphenylchlormethane is entirely negative, even on two weeks'

¹ *Am. Chem. J.*, **25**, 54.

² This Journal, **22**, 752.

³ Proceedings American Association for the Advancement of Science, **48**, 152 (1899).

⁴ *Ann. Chem.* (Liebig), **235**, 341.

⁵ *Loc. cit.*, p. 59.