of teeth in the trains of the "Appleton, Tracy & Co." of the Waltham Company, lies between those of the first three and last three grades of the National Watch Company, but most nearly agrees with those of the "G. M. Wheeler," and the following. The Waltham watch has a quick beat, making 16,200 single vibrations per hour. But all those who ride upon railway trains, where the watch is subject to sudden jerks and jars, will at once recognize the advantage of increasing this number to 18,000 per hour, as is actually done in the "National Watch." Although the Waltham watch has, and still is enjoying a high reputation, and has gone into most successful competition with those of European make, yet may we not now unmistakably adopt the concurrent testimony of those who have tried the different timers, and then agreeably look to the Northwest for our real *National Watch*, and feel more than ever the truthfulness of the poetic conception, "Westward the star of empire takes its way."

University of Michigan.

ANALYSIS OF A NEW PIGMENT.

BY CHAS. P. WILLIAMS.

(Late Professor Analytical Chemistry, Polytechnic College.)

THE material from which this pigment—now largely sold in New York—is manufactured, is the mixture of zinc blende and galena from the washing buddles of the Silver Hill Mine, Davidson County, N. C. The activity of this mine (since the commencement of mining operations in 1838, under the name of the Washington Mine) has been somewhat intermittent, but when in operation the main object of its exploitation has been the silver and gold occurring in the galena which is associated in the vein with a large amount of blende, and with some iron and copper pyrites. The process of concentrating the galena for the smelting works by means of the circular buddles has accumulated several thousand tons of blende with a small per centange of galena, which, within the last eighteen months, have been utilized by a preliminary roasting at the mine, and by a subsequent treatment at Bergen Port, N. J., according to the method ordinarily pursued in this country for the manufacture of "zinc white" or oxide of zinc. The product thus obtained is, chemically speaking, an impure oxide of zinc, containing a considerable amount of sulphate of lead, and somewhat resembles in com-

position the condensed "fume" from lead furnaces in which a galena containing some zinc blende is treated.*

The following are the results of some analyses recently made of an average sample obtained from a barrel of the dry material. No. I. is by myself; No. II. by Dr. G. A. König, in my laboratory;

		I.	II.	
Soluble in water.	Insoluble in water.	Oxide zinc.....	72.083	71.680
		Oxide iron.....	trace.	trace.
		Oxide antimony.....	trace.	trace.
		Sulphate lead.....	23.968	24.610
		Oxide lead.....	.274	not estimated.
		Sulphate zinc.....	.810	.931
		Chloride zinc.....	.839	.965
		Chloride iron.....	.071	not estimated.
		Chloride antimony.....	trace.	
		Chloride cadmium.....	.256	.191
		Moisture at 212° Fahr.....	.898	.270
				98.699

The method produced in these analyses consisted in extracting the samples with *cold water*, and estimating the chlorine, sulphuric acid, etc., in the usual manner. The insoluble residue was then treated with a solution of hyposulphite of soda till the filtrate no longer gave the lead reaction with sulphydric acid. By this the sulphate of lead was dissolved out, and was afterwards precipitated by sulphydric acid gas, the resulting sulphide of lead being reconverted into sulphate of lead, and weighed as such. The residue was dissolved in nitric acid and was found to contain a small amount of oxide of lead, the oxide of zinc, and traces of oxide of antimony and oxide of iron.

This plan, though somewhat tedious, was followed to avoid as far as possible, all theoretical considerations in reference to the conditions of combination in which the various substances existed in the material.

* Compare Kerl's "*Handbuch der Hüttenkunde*," Vol. II., and Watt's "*Dict. Chemistry*," Vol. III., p. 526, for composition of "lead smoke" from various processes.