

Thoughts

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Paint and its Solid Constituents—The Pigments.

SUBLIMED WHITE LEAD AND ZINC WHITES.

BY JOHN COLLET.

With all its good and desirable qualities, White Lead, the basic carbonate of lead, has, however, one great fault, and that is, as I said, it is considered of only fair durability. Its chemical composition and constitution is for itself very loose, and in fact, on exposure to weather or to gases ordinarily occurring in the atmosphere, it is somewhat quickly discolored and acted upon. In other words, it is short lived, minute cracks soon appear on the surface of the paint and these cracks deepen until they reach the material covered, and the paint, in case the White Lead was not exactly up to the standard, drops off in minute scales or in form of a very fine white dust. But, nevertheless, under normal conditions and applied in a proper way, we can say that White Lead is a good pigment; however, as soon as these normal conditions are changed, or the White Lead is used in or near localities where it is exposed to the fumes of sulphurous gases, especially sulphurated hydrogen and ammonia, which gases are present everywhere where gas or coal are used for lighting or heating purposes, the White Lead will rapidly lose its white color and will be more or less darkened or blackened. This discoloration is caused by the combination of the sulphur in these gases with the lead by the formation of the black lead sulphide.

Another fault of this white pigment, the basic carbonate of lead, is that it is to a certain extent poisonous, and there was a time when only the old Dutch process alone was in use, when the White Lead works were called with good right: "White cemeteries." Most of you have heard of lead poisoning, and perhaps one or more know from experience, either directly or indirectly, what it is. The fact is, that White Lead leaves its mark more or less wherever it goes, and its path is indeed a very broad one, for its use enters largely into many industrial processes, and is general, as we know, in the making of paint and for paint-

ing. In these respects it produces what is known as painters colic, paralysis and other diseases.

The unhealthy nature of the White Lead maker's and user's calling has long been recognized and efforts have been made to discover and invent a pigment like the carbonate of lead, but in a practically innocuous form, as a basis. These efforts led to the suggestion of using the White Lead sulphate as a pigment.

This lead composition is much less easily decomposed and is therefore capable of resisting the chemical change which the carbonate undergoes in the stomach and system, so as to render it absolutely non-poisonous. As a matter of fact, in cases of lead poisoning, diluted sulphuric acid is administered by means of which the soluble carbonate becomes converted into the insoluble and harmless sulphide.

The white pigment sulphate of lead as it is met with on the market is, however, not the straight chemical composition of lead oxide and sulphuric acid, but contains, according to the manufacturing process, more or less lead and zinc oxides, and is sold under various names, thus, abroad as "Patent White Lead," "Non-poisonous White Lead," and here in America under the trade mark "Sublimed" or "Fisher White Lead," the latter is our so-called "A" lead.

However, in the beginning of the period when a great number of inventors and lead manufacturers endeavored to find a better substitute for White Lead, the only way and means of accomplishing this task was thought to be by precipitation, and in fact the patents taken out on this subject are innumerable.

Each and every one of these patents, for the production of sulphate of lead, were no good, and the manufacturing of sulphate of lead as a pigment was very soon abandoned. The cause is, the precipitated sulphate of lead is too crystalline in order to give to the final product body and covering capacity enough to serve as a pigment, substituting White Lead in regard to these properties.

The principle of these processes, as a whole, were the precipitation of the lead in form of sulphate, from a lead acetate solu-

tion, obtained by dissolving lead oxide or metallic lead in acetic acid, by means of sulphuric acid, the reformed acetic acid to be used over again for the manufacturing of a fresh solution of lead acetate or sugar of lead.

As I said, all these processes were soon abandoned, until in 1860 here in America a vein of ore containing both lead and zinc was discovered, being a mixture of galena and blende, that is, a sulphur combination with lead and zinc.

The proportion of zinc in this ore made it, however, very unfit for the smelting and refining process for the production of lead metal, and as this "galena" is reduced by the regular smelting process into partly lead, lead oxide and partly lead sulphate, it was used as the basis for the manufacturing of sulphate of lead according to patents taken out by G. T. Lewis and Bartlett.

These patents, or at least their principles, are operated at the present time by the Fisher Lead Co., in Joplin, Mo., whose product is known in the market as "Fisher Sublimed White Lead."

The process in its principle is as follows: When lead ore as "galena," the sulphide of lead, is heated in a furnace with access of air, it undergoes oxidation; it is, as I indicated, transformed into lead oxide and sulphate, the degree of the oxidation depending upon the amount of air which comes in contact with the ore. The temperature also has some influence on the result, in fact it is probably the chief factor in the process.

Both the access of air and the degree of heat are to be regulated in such a manner that the main product is the sulphate and not the oxide. This is accomplished in specially arranged furnaces, in which the ore, in connection with the proper fuel, as slack, is operated on, and converted by a proper degree of heat into the so-called "lead fume," consisting of lead sulphate, lead oxide and oxide of zinc.

The plant consists of several furnaces which are connected by flues with an efficient system of condensers, in which the lead fumes are collected.

TO BE CONTINUED

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