PRACTICAL PAINTING.

CERTAIN PROPERTIES OF OIL PAINTS.

Painting is done with two objects in view—either to change the natural color of the surfaces of various articles, or to protect those articles by rendering their surfaces less easily altered by air, rain, dust, &c. Three conditions must be fulfilled :

1. The paint must possess sufficient fluidity to spread with a brush, and also be viscous enough to adhere to the surface without running, and to leave coats of equal thickness when the surfaces are inclined or even vertical.

2. The applied paint must become hard.

3. After hardening it must adhere firmly to the surface on which it has been applied.

To secure these conditions under all the conditions which must be met in the practical work of house painting, requires some knowledge of the chemistry of the materials used and the reactions induced by their exposure to light and air. M. Chevreul, the eminent French chemist, has lately given the subject much intelligent attention, and we are able to give our readers the following interesting synopsis of his conclusions, which will be found full of practical information and replete with good suggestions :

I have proved that the hardening of white lead or zinc-white paints is due to the absorption of the oxygen of the atmospheric air. And since pure oil hardens, we see that the hardening is the effect of a primary cause which is independent of the drier, white lead or zinc white. Besides, my experiments demonstrate that white lead and oxide of zinc manifest a drying property in many cases, and that this property exists also in certain substances which are painted—lead, for instance. The painter, therefore, who is desirous of knowing, at least approximately, the length of time necessary for his work to become dry, will have to consider all the causes which produce that effect. Consequently a *drier* will not be considered as the *only cause* of the drying phenomenon, since this phenomenon is assisted by several substances having also the property of drying under circumstances. Moreover, there is this remarkable fact, that the *resultante*, or sum of the activities (drying powers) of each of the substances entering into the composition of the paint, cannot be reckoned by the sum of the activities of each substance. Thus, pure linseed oil, the drying power of which is represented by 1,985, and oil treated by manganese, with an activity of 4,719, will, when mixed, possess an activity of 30,828. If there are substances which increase the drying properties of pure linseed oil, there are others which act in an opposite direction. For instance, if one coat of linseed oil is applied upon glass, it will dry after seventeen days ; but if the same oil is mixed with oxide of antimony, it will take twenty-six days to dry. In this case the oxide of antimony acts as an anti-dryer. Linseed oil, mixed with oxide of antimony, and applied upon a cloth painted with white lead, will dry after 14 days ; the same oil, mixed with the arseniate of protoxide of tin and applied upon the same cloth, will not harden for 60 days. Oak appears to possess an anti-drying property to a high degree, since, in an experiment made 22nd December, 1849, three coats of oil took 159 days to dry. In an experiment made 10th May, 1850, a first coat of linseed oil was dry only on the surface after 32 days. Poplar seems to be less anti-drying than oak, and Norway fir less than poplar. In the experiment of 10th May, 1850, three coats of linseed oil took 27 days to dry for poplar, and 23 days for Norway fir. If there be a drying activity and a contrary one in certain substances, I have no doubt that there are also circumstances under which linseed oil is not influenced by the nature of the surface on which it has been spread. For instance, in the experiments of 10th May, 1850, one coat of linseed oil was given upon surfaces of copper, brass, zinc, iron, porcelain and glass, and in every case the oil was dry after 48 hours. I hasten to say that I do not pretend to classify all the substances, when in contact with linseed oil, or any other drying, anti-drying, and neutral, because the circumstances under which these substances are placed may cause variations in their properties. I believe that a substance may be drying or anti-drying under different circumstances—whether it be due to the temperature, or the presence or absence of another substance, &c. For instance, metallic lead is drying towards pure linseed oil, whereas white lead, which is well known to possess drying properties, is anti-drying toward linseed oil applied upon metallic leaf. If painters desire to understand their operations well, they must consider the drying of their painting in the same manner as I have just pointed out. By so doing, and in certain determined cases differing one from the other, they will be enabled to modify and improve their ordinary methods. Linseed oil is naturally drying, and this property increases almost always by its admixture with white lead, and in certain cases with oxide of zinc. If the mixture be not sufficiently drying, resource is to be had to an addition of oil boiled with litharge or manganese. At the same time it is necessary to consider the nature of the surfaces painted over—whether it be a first, second or third coat, the temperature of the air, the light, &c. From our present point of view, drying oil, boiled with litharge or manganese, loses part of its importance, because it may be dispensed with for the second and third coats, and even for the first one if the natural drying is aided by the temperature. Moreover, pigments themselves may act as substitutes, as in the case of light colors, which are altered by yellows or browns, if the painter has derived profit from some of the observations indicated in this article. Thus linseed oil, exposed to the air and to light, becomes drying and loses its color ; it may, therefore, be employed with white lead or zinc white, without impairing the whiteness of either. Since by associating oixde of zinc with carbonate of zinc it is possible to dispense with a drier, we have a new way of avoiding the inconvenience of colored driers, at the same time it gives a hope that new combinations of colorless substance will be found, presenting greater advantages than those just noted. My experiments demonstrate that the processes generally followed by color manufacturers for rendering oils drying—that is, by heating them with metallic oxides—are open to objections of waste of fuel and coloration of the product. Indeed I have shown—(1) that oil kept at a temperature of 70° C. for eight hours had its drying powers considerably increased ; (2) that if peroxide of manganese be added to the oil kept at this temperature it becomes sufficiently drying for use ; (3) that a very drying oil will be obtained by heating linseed oil, for three hours only, with 15 per cent. of metallic oxide, and at the temperature generally adopted by the color merchants. My experiments explain perfectly well the effect of linseed oil, or more generally speaking, of drying oil in painting. Indeed, when oleic acid is mixed with metallic oxide, it passes instantaneously from the liquid to the solid state, and there is no uniformity in the *ensemble* of the molecules of the oleate. The effect is different when a drying oil, absorbing oxygen, passes progressively to the solid state. The slowness with which the change takes place allows of the symmetrical arrangement of the oily molecules, which would appear transparent if there were not opaque molecules between them. But if the latter do not predominate, the arrangement is such that the painting is glittering, and even brilliant, because the light is reflected by the dry oil as by a looking-glass.

TURPENTINE NOT A DRYER.

Oil, or Spirits of Turpentine, is generally supposed to be a dryer, and is used as such, while in fact it is only a thinner and has no drying properties in itself. This has been repeatedly proved in various ways, but the following simple experiment will suffice : In two vessels of equal size and shape put equal quantities of linseed oil, and with one mix a quantity of spirits of turpentine. Allow both to be exposed to the same atmospheric influences and watch them. Very soon you will find the quantity in each vessel to be alike, showing that the turpentine has entirely evaporated, after which, if you can perceive any difference in the rapidity of the drying between the two, it will be in favor of what was originally the pure oil. When a mixture of linseed oil and spirits of turpentine is spread out over a surface, the effect is produced which has led so many to call turpentine a dryer.

The turpentine rapidly flies off, and the oil is left in a much thinner body than if it had been applied pure, and the air has so much the better chance to operate on it, but the turpentine has left nothing behind to aid the hardening or drying process. Painters like to use it because it makes the paint flow more readily, work easier and spread out better. For inside work it is desirable, because as the rule the object is to apply to the surface covered as little oil in proportion to the pigment used as possible, while for outside work the reverse is the case. Turpentine and benzine are almost identical in their mode of action, the benzine being the more volatile and escaping the more quickly. Neither should be used for the outside of a house, but for the inside they answer not only the purpose spoken of above, but, as they evaporate a " flat " surface, as it is technically called, is formed, and this is generally more highly esteemed.

THE population of all the States in the Union, as compiled by the New York *Herald*, amounts to 49,302,144. The population of six of the territories, given at 563,990, swells the total to 49,865,142. The population of the four remaining territories will undoubtedly bring the grand total up to 50,000,000.