

WHITE

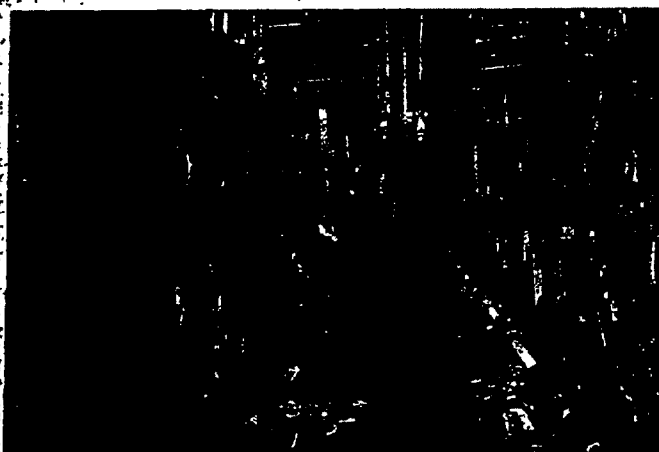
How modern methods have reduced
manufacture of this prime pigment
from four months to three days

M.R.S.
JUN 30 1950

Heavy bars of pure pig lead are
melted in special furnace as first
step.



Here, old-type cylinders, each six feet long, are being fed by overhead conveyor.



Operator injects water spray into cylinder as whole battery revolves;
reaction took eight days.

LEAD has been termed "man's most precious metal," although at first glance such claim may seem far from justified. However, down through the centuries lead has proven to be of ranking importance in all civilizations of later date than the primitive stone ages. Today it enters inextricably in to the fabric of modern life. It is used in the storage battery that powers the automobile; it forms an essential part of the protective covering for trans-oceanic telegraph and telephone cables; it forms the glaze of pottery and china; it protects the patient and the doctor from the radiations of the X-ray machine and it has a host of other uses.

Not least among these other uses is its importance in paint manufacture. For from lead comes the most widely used white pigment of all—white lead. And the protective coatings for bridges, for railway rolling stock and for countless other metal objects subjected to the hazards of corrosion are made from yet another derivative—red lead.

As A Pigment

White lead is undoubtedly the most important pigment of white and light colored paints. It has been known since the early Greek eras and has found a place in nearly all civilizations since then. Today a large proportion of Canada's annual production of 176,000 tons of lead is exported, while the most important domestic use is in the manufacture of white lead.

White lead is the whitest pigment in general use—the only pigment which is more white being titanium. However, white lead possesses characteristics that make it more useful for certain kinds of paint than titanium. It lasts much longer for one thing, and because it is

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LEAD

active chemically it reacts with the oils of the paint film to form a harder covering.

White lead is a carbonate of lead, and in the past its production has been a slow process, with little change for many years. The oldest known method of manufacturing was to bury lead metal in a manure pile, with vinegar or wine. It is doubtful if they knew exactly how, but they produced white lead. The wine or vinegar reacted with the lead to form lead acetate. This in turn reacted with carbon dioxide formed by the fermentation of the manure, forming white lead. The method was slow and the product impure.

Early Dutch Process

Next step in the history of white lead manufacture was the Dutch process. Here similar chemical reactions were applied on a grander scale and with better control of quality. Into earthenware pots somewhat similar to ordinary flower pots was placed a number of circular 'buckles' of lead metal—thin plates of lead about eight inches in diameter. These buckles were punched with a number of holes. In the bottom of the pot was placed a small amount of acetic acid (crude vinegar).

A layer of pots was placed in a square kiln-like structure called a stack. Over the layer of pots was laid a covering of tanbark (the bark of the oak tree after extraction of tannic acid), then another layer of pots and so on. A large stack might hold as much as 50 or 60 tons of lead, with a big white lead plant having a million pounds of lead in process at one time.

After 120 days in the stack the pots were uncovered to reveal the buckles of lead coated with a hard



This single cylinder, 97 feet long, cuts process time from eight to three days at Carter White Lead Company.



Operator here is at control panel at discharge end of "long cylinder" which allows continuous-flow production.

white crystalline substance. This was white lead in the rough. The acetic acid, acting on the lead, had formed lead acetate. This then reacted with carbon dioxide formed by the fermentation of the tanbark to form lead carbonate, or white lead. The buckles were then dumped from the pots, the crystals broken off and ground to a powder. White lead produced in this way was of better quality and economical to produce, but the process was too slow.

Next to be introduced was the cylinder method, whereby metallic lead was atomized and the resulting powder blown into wooden tanks laid on their sides. While the wooden cylinder slowly revolved, water and acetic acid were sprayed in. Then carbon dioxide, manufactured from coal or coke, was pumped into the

(Continued on page 28)



Dry white lead is being packed into 50-lb. bags; manufacture of lead-in-oil is also large.

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White Lead

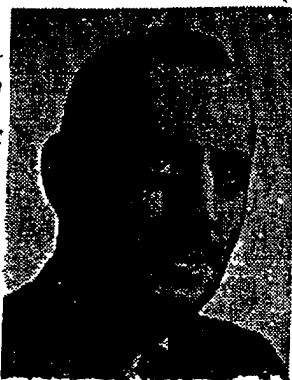
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cylinder. After five days of this processing the reaction was partially completed, but some metallic lead remained. The unconverted material was washed out and the partly finished product went back in the cylinder for another three days to complete the reaction to white lead. White lead plants at this stage consisted of large batteries of these wooden cylinders slowly revolving and subjected to the sprays of acid, water and CO₂. Many white lead plants of today are of this type.

Finally, today there is a process whereby metallic lead is converted to white lead within three days, in a continuous process and with a quality control quite unobtainable with any of the older methods. In Canada, production has just begun by this new process at the Carter White Lead Co. of Canada, Ltd. plant at Montreal, after an extensive expansion and re-equipment program.

At the Carter plant white lead manufacture has reached the limit of modern refinement. The cylinder method has grown up, until now one machine does the work of perhaps 50 of the older ones, and at the same time with a significant increase in quality control. A "long

Appointed Director



cylinder," built to exacting specifications, has just been completed. It is the only one of its kind in Canada.

Into one end of this machine, which is six feet in diameter and 97 feet long, is poured a continuous charge of lead. Three days later white lead emerges from the other end. The age-old chemical reactions which take place have not changed, but secret process refinements and meticulous electronic controls result in a product of exceptional quality. This control of the reaction rate,

the temperature and the quality and quantity of the acid and carbon dioxide affords minute control over the final composition of the white lead.

When the white lead leaves the long cylinder it is in the form of a slurry, or soup. In the preparation of either dry white lead or lead-in-oil, the water must be removed.

For dry white lead the slurry is passed through a vacuum filter which removes approximately half the water and results in a cake. This filter cake is then scraped from the

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filter drum and passed through a drying tunnel. Temperature and rate of passage are so controlled that the resulting dry white lead contains less than 15% water and is drier than the atmosphere. It is then ground and packed in bags and drums. We wouldn't suggest that you attempt to lift a drum of white lead. Even though it is less than half the size of a gasoline barrel, when full it weighs 600 pounds!

For white-lead-in-oil the method is quite different. The slurry is heated in a large tank under agitation. Linseed oil is added to the mixture. White lead has an affinity

for the oil, the two coagulate and drop to the bottom of the tank. The water is drawn off the top and the lead-oil paste remaining is then ground in special high-speed roll mills to form the finished lead-in-oil of common use.

Color Essence of Life Says Package Authority

Toronto—Importance of using color contrasts pleasing to the eye in the home and in the store was stressed by Vincent de Vita when he addressed a Toronto Paint Club luncheon meeting on "The Romance in Color."

"When I go into a store it sometimes

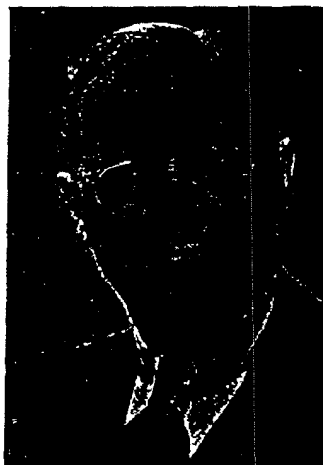
grieves me to see an array of contradictory color elements on a shelf," he said. "If I am in search of a can of pale green enamel, for instance, I may be upset by the kaleidoscope of color on the shelf. Some labels may be so cluttered up that one can see nothing."

Because color was, in reality, "the essence of life," Mr. De Vita recommended children receive instruction in its correct use at an early age. He suggested paint manufacturers would be performing a useful educational service if an elementary booklet on color harmony be made available for those in formative years.

"Color is the very essence of life today," he declared. "We may speak of color as a pigment, but we have color in personalities. We have color on the stage, but the actor, too, must have color. The child of today who learns about color harmony will be the housewife of tomorrow. That is a thought we should all keep uppermost in mind."

Formal announcement of the annual Toronto Paint Club golf tournament was made by Dick Young. He said it would be held at St. George's Golf and Country Club on June 23. Members may "start their spring plowing between 12 o'clock and 2 p.m.," he said.

Made Sales Manager



HARRY VAN ZANT

itself. When it is exposed to a hot fire it swells up to form an insulating mat, preventing the flame from penetrating to the inflammable material, and at the same time halts flame there is no fuel to burn. (fig. 1) Factors are finding these paints specified, and the trend will continue. In the number of lives lost, and the amount of property damaged by fire, shocked the public (Continued on page 40)

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