Making White Pigments

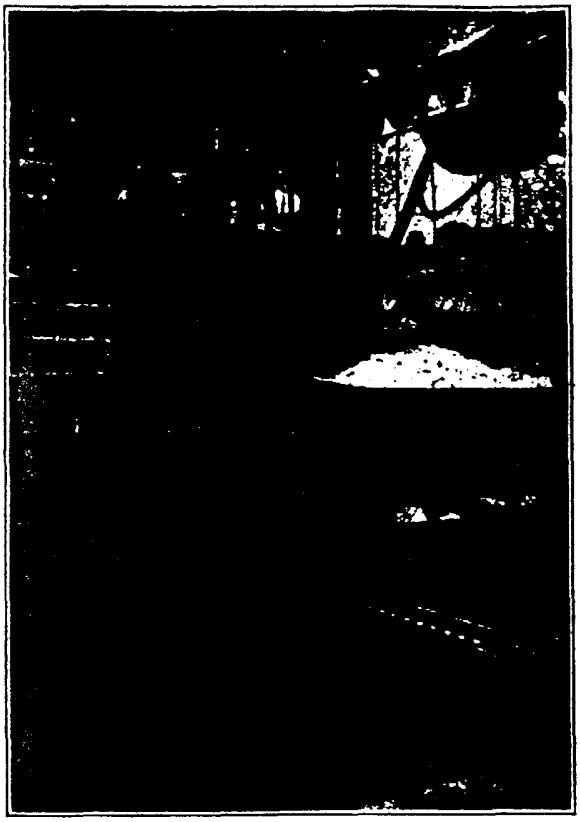
THE first step in the making of paint is the selection and preparation of the pigments. Upon the care and skill with which this is carried out depends in large measure the excellence of the finished product.

Paints are mixtures of solid particles or pigments and a liquid or vehicle. Pigments are finely ground metallic, earthy or animal substances which give to paint body, hiding and covering qualities, and color. The vehicle is a liquid in which the pigment particles are held in suspension, with the object of producing a durable paint film, uniform in color and consistency.

In making a good paint many different pigments are used, and it is only by their most careful selection and mixing that the best results can be obtained. One pigment may have good covering qualities but lack durability. Another may be much more durable but lack the necessary hiding qualities. Still a third may have the property of neutralizing elements in the paint film that would otherwise impair its stability or shorten its life. The very highest order of skill on the part of the paintmaker is required in order to select and combine those pigments best adapted for the purpose.

The oldest and most frequently used pigment is white lead, which was used as a paint material before the Christian era. The Romans called it "ceruse" and made it by exposing lead over sharp vinegar, which differs only slightly from the modern practice. Progress has been chiefly in the direction of greater fineness, higher purity, and more efficient methods of handling.

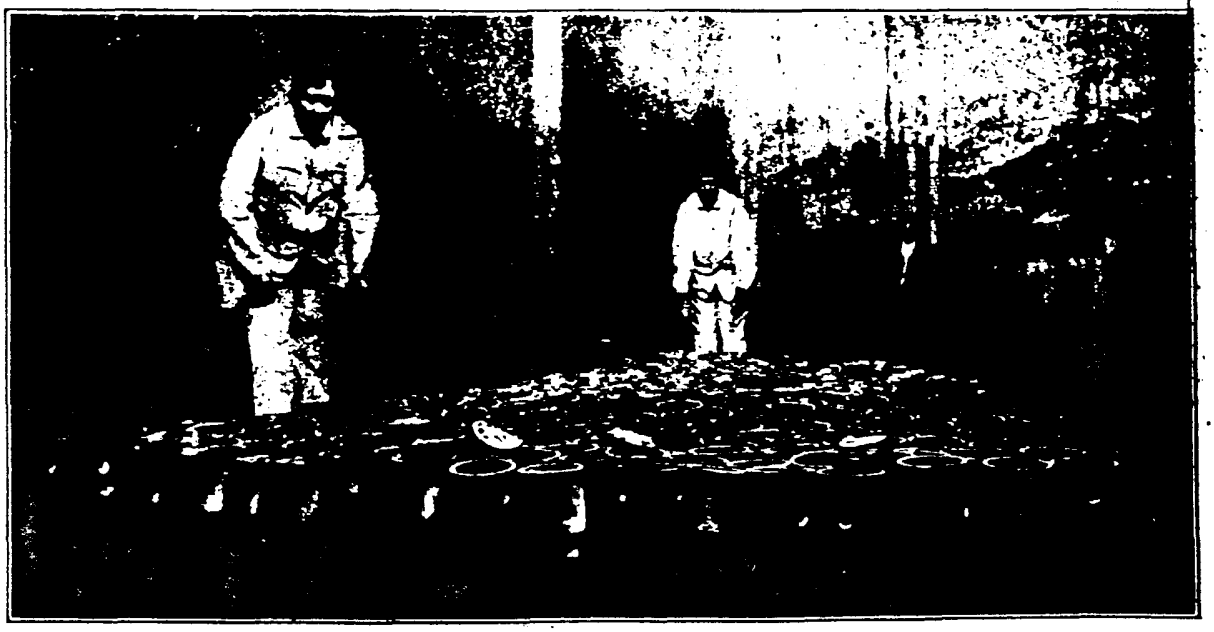
The metallic lead from which white lead is made occurs in nature as an ore, which must, of course, be mined and refined before it can be made into a pigment. The ores of lead occur in veins and pockets far under the surface of the ground. They are associated with other minerals which must first be removed. The lead is then cast into bars or pigs and is ready to be made into the white lead of commerce.



A Modern Crane Used for Removing Corroded Lead from the Stacks

The Dutch are credited with being the originators of the process by which most white lead is made and which is called after them—the Dutch Process. In this process the lead is first melted and cast into "buckles," so called because of their fancied resemblance to the shoe buckles of colonial times, but which look much more like the round waffles of the present day. These buckles are then placed in earthen jars over a small quantity of weak acetic acid—which is practically our domestic vinegar. The pots, filled with buckles, are then piled twenty or thirty feet high in huge sheds in what are known as "corroding stacks." Each corroding stack, which is as big as a house, is built up of alternate layers of corroding pots and spent tan bark, which is nothing more than oak bark that has been used in tanneries.

In the corroding stacks, which are



Inside a Corroding Stack

closed tight except for small openings for ventilation, the tan bark begins to slowly decompose and give off carbon dioxide gas, which is the same thing that our lungs give off when we breathe. In fermenting, the tan bark also generates heat, which warms the acetic acid until it forms vapor. The vapor rises up through the lead buckles and gradually turns them white, for acetic acid has the power of corroding lead. It is the nature of lead to turn white when it corrodes just as iron turns red and copper green. The white substance is lead acetate.

But that is only half the story. As fast as the lead is corroded the carbon dioxide which is constantly being given off by the fermenting tan bark attacks it. A chemical change takes place and converts the lead acetate into basic lead carbonate, or, as we call it, white lead. The complete process so briefly described takes from three to four months. The stacks are then torn down and the particles of white lead ground in linseed oil. The resulting product is the finished pigment—the white lead in oil of commerce.

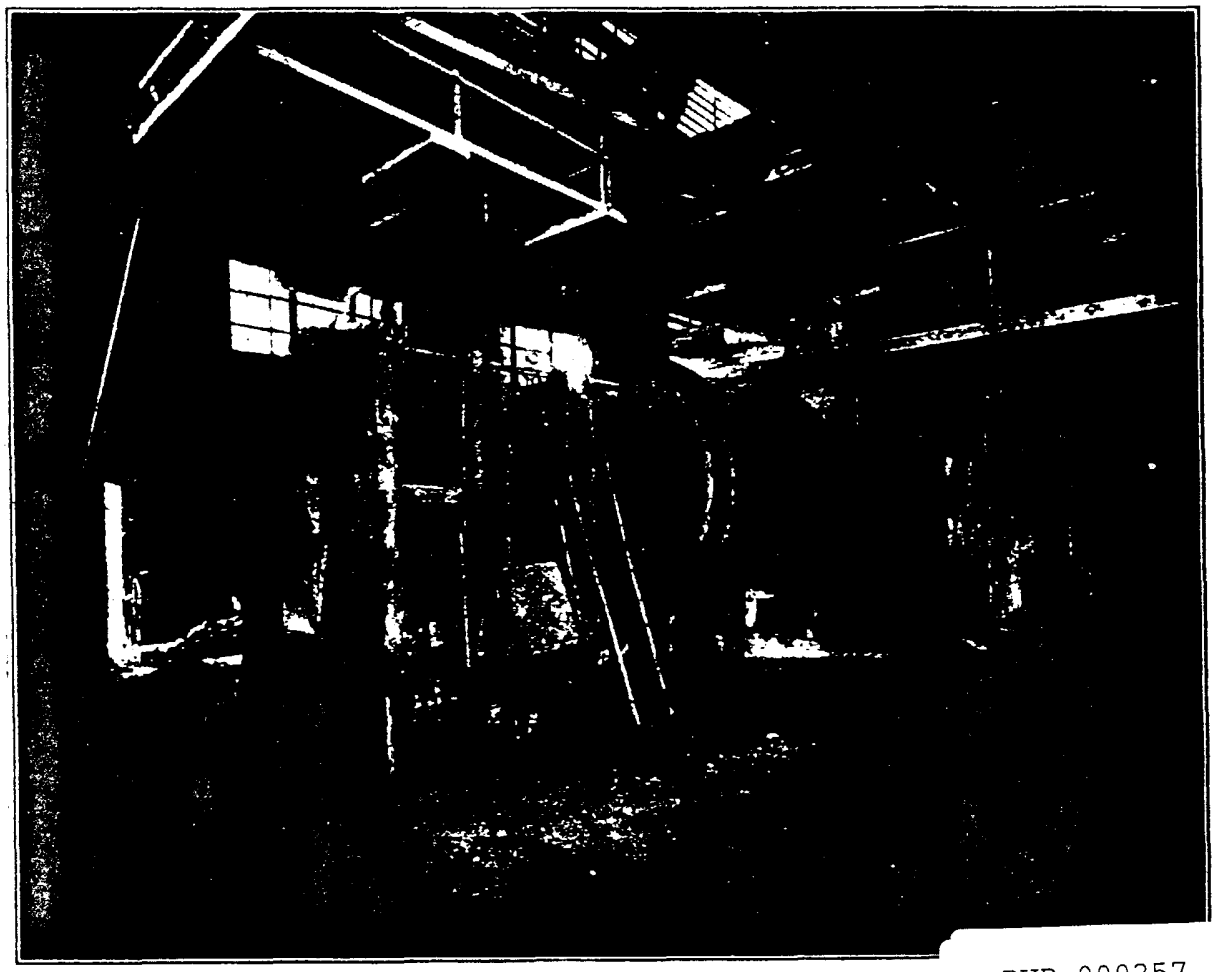
The Carter, or, as it is sometimes called, the quick process, is also in common use for making white lead. Here the change from lead to white lead takes place in fifteen days, so that there is a decided saving in time over the Dutch process. In this process, the lead, instead of being piled in stacks, is powdered from the molten condition and placed in large closed wooden cylinders which revolve slowly. While they revolve, acetic acid and carbon dioxide are introduced into the cylinders and corrode the lead, converting it into lead carbonate in much the same way as in the Dutch process.

White lead, the most commonly used of all paint pigments, has the greatest covering power of any of the white pigments. That made by the Dutch process has unusual hiding power, while the quick process lead has better whiteness and spread. The best paints are, therefore, made by using for the white lead base a mixture of stack and cylinder process lead. Such paints have greater durability and combine the advantages of each. Unfortunately, white lead produces a rather soft surface in the completed paint film and it is turned black when it comes in contact with sulphur fumes in the air. It cannot, therefore, be used satisfactorily in paint without having another pigment present to counteract these tendencies.

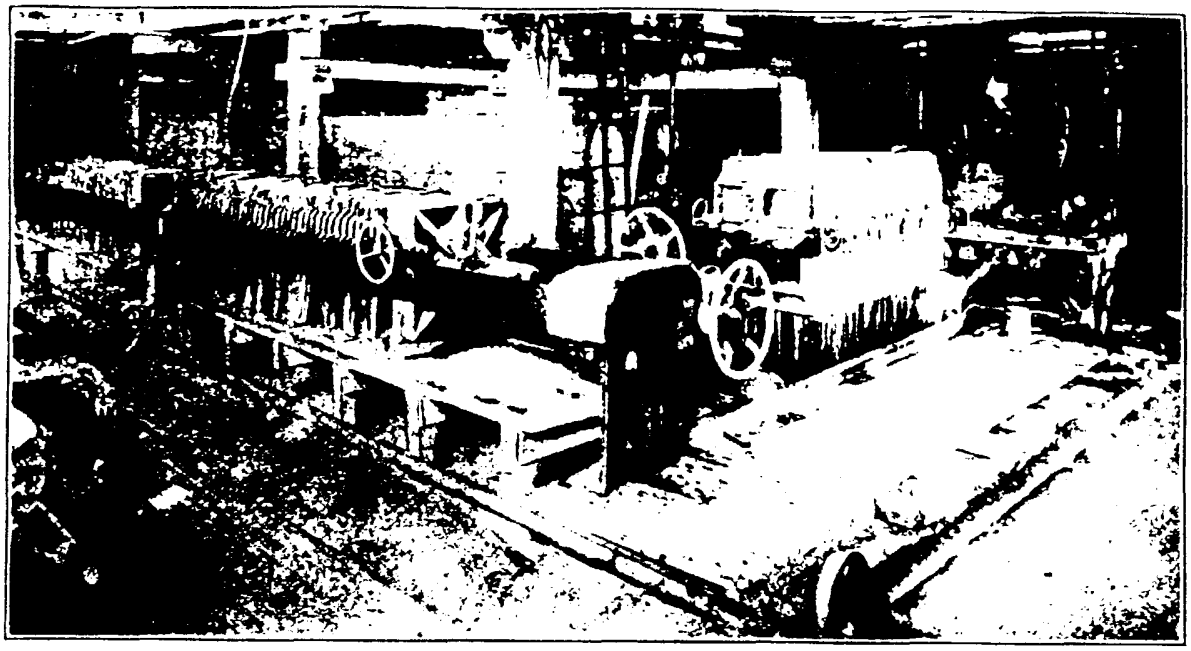
The pigment usually used in paint in conjunction with lead is zinc oxide. This pigment has been in use for only about sixty years, but its use has assumed important proportions in the paint trade. Like white lead, it is made by two processes. In the indirect, or, as it is sometimes called, the French process, the metallic zinc is subjected to extreme heat which converts it into vapor. The vapor or "smoke," as it is called, is conducted through large chambers where the zinc oxide settles in the form of dust.

In the direct, or American process, the zinc oxide is made direct from the zinc ore, which is mixed with fine anthracite coal and charged in furnaces. The gases are conducted into huge bags or filters which retain the zinc oxide dust but allow the other gases to pass through.

As a pigment, zinc oxide is very long wearing and has good covering power. It is second only to white lead in this respect. While lead when used alone produces a film that is too soft, zinc oxide, on the other hand, when used alone, has a tendency to produce a paint film that is very hard and brittle. These two pigments are, therefore, nearly always used in combination with each other so as to counteract the defects of each and produce a well-balanced paint.



Muffle Burner Where Rock is Burned in Making Lithopone



Lithopone Filter Presses

Sublimed white lead or lead sulphate, as it is commonly known, is also made directly from the raw ore in practically the same manner as zinc oxide. It has a fine grain and produces a film a little harder than white lead, but not quite so elastic. It dries very slowly, and, of course, this is a good quality for it prolongs the life of the paint film.

A fourth class of white pigments are the leaded zincs, which are usually about half and half lead sulphate and zinc oxide and partake of the nature of both. They are made in the same way as sublimed white lead, by heating the ore and collecting the dust in chambers. The leaded zinc pigments lack the covering power of white lead, but they are more durable and less likely to chalk.

One of the newer pigments used in the paint industry is lithopone, or Beckton White, which has become exceedingly popular in the last few years, particularly for interior painting. It is a mixture of the solutions of the salts of zinc and barium. These are mixed together in the proper proportions in a vat, and the lithopone precipitated in the form of a powder. This powder is then washed, baked, and ground very fine, and it is ready for use as a pigment.

Many other pigments are used in the manufacture of paints. The more important of these will be discussed in a later article.

Held His Audience

The Lecturer—There was one time in my life when I had no difficulty in holding an audience.

The Sympathizer—When was that?

The Lecturer—The night I proposed to my present wife.—*Answers*

Watch the Details

During this period, when unprecedented activities are demanding the full time of every worker, many details are likely to go without notice. In many cases this may not have a bad effect, but in farm operations neglect of certain details can result only in failure. This is especially true of orchard and garden pests. Many orchards appear to be healthy during the winter and spring months, but later develop troubles of one kind or another that absolutely ruin the fruit crop. The only guard against these troubles is constant spraying, a detail which should never be neglected at any time.

In the anxiety to produce the maximum amount of food crops, there is a likelihood of planting crops on lands to which they are not suited, or on lands that have already become sick of these crops, or that are poisoned or diseased in such a way as to make the crops unprofitable. This should be avoided by careful rotation.

Only the best seeds should be selected, as faulty seeds cannot be expected to produce satisfactory crops.

The little details of crop growing must be as closely watched by the gardener as they are by the extensive farmer if success is to be expected.

Why Waste Time?

"Why do you consider women to be superior to men in intelligence?"

"A bald-headed man buys his restorer by the bottle, doesn't he?"

"Er—yes."

"Well, a woman doesn't waste time on a hair-restorer; she buys hair."—*London Passing Show.*

Spraying the Only Safeguard Against Many Orchard Pests

DU PONT AMERICAN INDUSTRIES

For the convenience of buyers considering the purchase of any Du Pont product, and desiring specific information, this coupon is printed. Upon receipt, it will be forwarded immediately to the proper office for attention.

Fill in, Cut Out and Mail This Coupon

(Du Pont Magazine, Apr. '18)

Sales Promotion Division Date .....

E. I. du Pont de Nemours & Co.
Wilmington, Delaware

EXPLOSIVES
- ☐ Farm Explosives
- ☐ Blasting Supplies
- ☐ Industrial Dynamites
- ☐ Blasting Powder
- ☐ Permissible Explosives
- ☐ Road Building
- ☐ Clay Mining
- ☐ Land Clearing
- ☐ Tree Planting
- ☐ Charcoal
- ☐ Wood Pulp
- ☐ Saltpetre
- ☐ Refined Nitrate of Soda

PAINTS
- ☐ Town and Country Paint
- ☐ Colors in Oil
- ☐ Vitrolac Varnish
- ☐ Vitrolac Stain Finish
- ☐ Flowkote Enamel
- ☐ Dulite for Mills
- ☐ Antoxide Iron Paint
- ☐ Shingle Stain
- ☐ Auto Finish
- ☐ Sanitary Wall Finish
- ☐ Bridgeport Standard Paint
- ☐ Wheeler's Wood Filler
- ☐ Bridgeport Wood Finishes
- ☐ Smokestack Paint
- ☐ Floor Varnishes
- ☐ Floor Paints
- ☐ Enamels
- ☐ Concrete Paint
- ☐ Marine Paints
- ☐ Industrial Paints
- ☐ Railway Paints
- ☐ Ferro-Keep (Metal Paint)
- ☐ Barn Paint
- ☐ Wagon and Carriage Paint
- ☐ Auto Paints and Enamels
- ☐ Decorative Stains
- ☐ Varnishes
- ☐ Wire Screen Paint
- ☐ Japans
- ☐ Shellac
- ☐ Red Lead

SPORTING POWDERS
- ☐ Hunting
- ☐ Trapshooting
- ☐ Black Sporting Powder
- ☐ Smokeless Powder
- ☐ Hand Trap
- ☐ Rifle Smokeless Powder
- ☐ Pistol Smokeless Powder
- ☐ Resort Shooting
- ☐ Shooting in Colleges
- ☐ Shooting on Boats

CHEMICALS
- ☐ Acids
- ☐ White Lead
- ☐ Alums
- ☐ Lithopone
- ☐ Litharge
- ☐ Rubber Makers White
- ☐ Dry Colors
- ☐ Pulp Colors
- ☐ Salt Cake
- ☐ Barium Chloride
- ☐ Distilled Water
- ☐ Bronze Powder
- ☐ Bronzing Liquids
- ☐ Wood Lacquer
- ☐ Metal Lacquer
- ☐ Waterproof Cement
- ☐ Py-ra-lin Enamel
- ☐ Pontar
- ☐ Pontoklene
- ☐ Pitch
- ☐ Pegamoid Aluminum Paint
- ☐ Mantle Dips
- ☐ Leather Renovators
- ☐ Ether
- ☐ Parlodion
- ☐ Nitre Cake
- ☐ Creosote
- ☐ Shingle Oil
- ☐ Pyroxylin Solutions
- ☐ Benzol Products
- ☐ Carpo (Metal Paint)
- ☐ Carpolene (Wood Preservative)
- ☐ Wood Oil
- ☐ Dead Oil
- ☐ Belt Cement
- ☐ Household Cement
- ☐ Blanc Fixe
- ☐ Solvents
- ☐ Leather Substitute Solutions
- ☐ Split Leather Solutions
- ☐ Patent Leather Solutions
- ☐ Coke
- ☐ Belt Cement

PY-RA-LIN
- ☐ Py-ra-lin Toilet Goods
- ☐ Challenge Cleanable Collars
- ☐ Novelty Sheeting
- ☐ Transparent Sheeting
- ☐ Py-ra-lin Rods and Tubes
- ☐ Py-ra-lin Pipe Bits
- ☐ Py-ra-lin Specialties
- ☐ Brushes
- ☐ Mirrors
- ☐ Combs
- ☐ Toilet Sets
- ☐ Manicure Sets
- ☐ Desk Sets
- ☐ Colored Sheeting

COATED TEXTILES
- ☐ Fairfield Rubber Cloth
- ☐ Rayntite Top Material
- ☐ Motor Fabrikoid
- ☐ Craftsman Fabrikoid
- ☐ Truck Special Fabrikoid
- ☐ Marine Special (U. S. Standard)
- ☐ Shoe Special
- ☐ Book-Finish Fabrikoid
- ☐ Fabrikoid Sheeting
- ☐ Home Uses for Fabrikoid
- ☐ Fabrikoid for Baggage
- ☐ Fabrikoid for Upholstering
- ☐ Rug Anchor
- ☐ Hat Sweat Material
- ☐ Buggy Aprons
- ☐ Fabrikoid for Railway Cars

Name ..... Position .....

Your Address (If Personal) .....

Name of Concern (If Company) .....

Address of Company .....

BUSINESS: ☐ Manufacturer; ☐ Producer; ☐ Jobber; ☐ Dealer; ☐ Consumer. (Check which)

What Du Pont products do you sell? .....

If a user, for what purpose does the product checked, or that which you now use, interest you? .....

Specific Questions Should Be Asked In An Accompanying Letter

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