RETAIL PAINTMANSHIP

A HANDBOOK OF

Practical Paint Merchandising and Commonsense Technical Information.

COMPILED BY

J. LEYDEN WHITE
Editor "American Paint & Oil Dealer"

F. N. VANDERWALKER
Editor "American Painter & Decorator" and author of "House Painting Methods," "Wood Finishing, Plain and Decorative," Etc., Etc.

AMERICAN PAINT JOURNAL COMPANY
3713 Washington Avenue
ST. LOUIS, MO.

then talks some more. It is no easy matter to shut the mouth of the loquacious patron without shutting up his purse.

Do not forget that the reward of patience with the talkative one generally does come, for he, or she, commonly does buy. Such people are unconscious of their own wordiness and are usually good-natured. Their favorites are people who listen to them, although they generally do not realize that is the reason for their liking of certain people.

The greatest objection that may be registered against the endless talker is that he tries the patience of waiting customers and may drive away worthwhile trade. If the hour is dull and other duties permit, better let the windy one talk herself out. If she starts during a rush hour the most you can do is to close a sale as soon as possible without discourtesy and then smilingly turn to another patron.

Just Folks

Always remember that the people on both sides of the counter are just folks. Hardly a day passes but that you change sides with the patrons and are outside of the counter, a buyer.

There will be days when sorrow, anger, ill health or exuberant joy will show in your salesmanship. No man who is temperamental enough to make a good salesman can always hide these emotions. But he should control them to a reasonable degree while selling. In being paid to sell he is being paid to control them. However, the customer is just as subject to emotion as is the salesman. He may have just come from a condition where he was paid to control them, and did, but he is not paid to control them while buying. There is always at least a subconscious sense of superiority on the part of the buyer. Although reduced by ages of development to the millionth degree, a sense of master and slave is still existent within humanity and it is never so keenly felt as in buying and selling.

Thus the seller is paid to control his emotions while selling. It is inherently human that the man who buys should feel that in buying he pays, not only for material things, but for the right to give free rein to his emotions.

So the successful retail paint salesman must often "stand the gaff." Never to the degree of cowardice; never to accept insult, but always to the very limit of patience and the preservation of self-respect.

CHAPTER IV

Dry Paints, Paste Paints and Tinting Colors

A KNOWLEDGE of the methods of the manufacture of the various so-called raw materials which are used in paint making is not absolutely essential to success in selling paints and varnishes.

If a man desires to become informed on this subject he can secure books at any good public library that will be instructive and interesting.

Paint is a general term usually applied to liquid paint ready for use, but also used in referring to the ingredients which, combined, go to make up the finished product such as white lead, zinc oxide, tinting colors, paste paints and paint oils and thinners.

Dry Paints and Colors

Dry paints (colors) have a great variety of origin, some are dug from the earth and after being purified and ground are ready for use in paint making. Some of the earth pigments are produced artificially because they can be produced cheaper and better this way.

Many special dry pigments such as lithopone titanium oxide, etc., are only used by the paint manufacturers and large consumers who grind their own paints.

The common dry paints usually bought by the retail paint merchant and the painter are as follows: American ochre, usually sold in barrels weighing three hundred pounds, and French ochre (this is imported and comes in large casks.) The retail merchant and painter usually buy this in less than cask lots. The difference between American and French ochre is very great, the latter being very much better in tone (color) and stronger in tinting and lighter in gravity.

There is in the United States very little English Venetian red imported, as artifically produced American Venetian red has displaced it. It is put up in barrels weighing three hundred pounds. There are several shades differing in tone and strength.

Burnt umber is raw umber that has been roasted or burnt. Raw umber is a brownish gray, while burnt umber is a very dark brown. Both raw and burnt umber have drying qualities, owing to the fact that they contain some manganese oxide.

English vermilions are very brilliant but

darken somewhat in time. They are made in several shades, but only two are in general use—the pale and the deep. Chinese vermilion is practically out of existence in our market, but is the same as the English in every respect. They are both made by roasting cinnabar and are known as quicksilver and sulphur vermilions. American vermilion is basic chromate of lead. It has the same brilliant hue as English, French and Chinese vermilion, but is an entirely different chemical composition. It is rated in tests as the finest of rust inhibitive paints for metals and has been used for years on fire plugs because of that quality and great permanence of color. It is too expensive for extensive use on large metal surfaces. American vermilion, so called, made by staining red lead or orange mineral with brilliant red aniline dye is no longer popular as it fades pink and is not very durable in color.

Several other reds are produced, each by a different process, and are known variously as para reds, vermilionettes and vermilions.

English vermilion is sold in chamois skin bags of various sizes weighing from 6 to 20 pounds, also in kegs, weighing 100 pounds.

American vermilion, chrome yellow, chrome green, red lead, litharge, orange mineral and dry white lead are usually sold in 100-pound kegs and in casks weighing from 350 to 500 pounds. American ochres, Venetian red, siennas and umbers in barrels of 300 pounds. French ochres imported in casks of from 500 to 600 pounds. Lampblack in 1-pound packages, 25 pounds to the barrel, also put up in one-half and one-quarter pound packages or assorted in barrels of 25 pounds. Barrels are always charged extra. Graphite and carbon black is sold in bulk only, in full barrels.

Questions:

How do dry paints originate?
Name the principal dry colors.
Which pigments are produced by mechanical process?
What is the difference between raw and burnt umber?

Paste Paints and Tinting Colors

Paste paints can be divided into several general classes, viz.: Oil paste, Japan paste, distemper and pulp colors. Oil paste can be subdivided into two classes, to-wit: Bulk paste goods such as lead, ochres, graphite, etc., and

fine colors such as tinting colors and graining colors. Bulk paste goods are reduced to liquid condition by the painter, who adds paint oil (usually linseed oil) and paint drier.

Tinting colors are added to the bulk goods, generally white lead and zinc, to produce special shades.

Japan paste colors are principally used by the automobile, wagon and carriage painter. Japan colors are made in a very wide variety of shades and are ground in a thin varnish called Japan. They are reduced to painting consistency with turpentine and applied with a camel hair color brush. They usually dry hard enough to recoat in about four hours. They dry perfectly flat. Other Japan paste goods are rough stuff, and iron filler, paste wood filler and colors which are usually used by agricultural implement trade and are generally red, greens, blues and yellows put up in large packages.

Distemper colors are fine colors ground in water and are used by fresco artists in painting and stenciling on calcimined walls and ceilings; usually put up in 1-pound glass jars and 10-pound crocks.

Pulp colors consist of colors produced by chemical precipitation in water or are levigated in water. They are sent to the consumer in paste form containing a certain percentage of water. The amount of water is generally agreed upon between the buyer and the seller as it largely regulates the price. The same color would sell higher or lower according to the amount of water present.

Questions:

How are paste paints classified?
How are special shades produced?
For what work are Japan paste colors chiefly used?

Tinting Colors in Oil

Every practical house painter will appreciate good tinting colors in oil, for nothing has caused greater vexation to the painter than to find upon using the tinting colors which he has purchased that they were weak in tinting strength and often would not produce the shade which they were expected to, on account of the fact that they were off color. Because low-priced tinting colors do not possess as great tinting strength as the better grades they often are more expensive in the end,—obviously a greater quantity of cheap colors must be used to pro-

duce a given tint or shade. One pound of strong, high grade tinting color at fifty cents is far better than two pounds of cheap color at twenty-five cents per pound, as a rule for the good classes of work.

Tinting colors in oil should be made of the very finest selected dry stock, ground to the utmost degree of fineness.

Another point which is often overlooked but which greatly facilitates the ease with which the colors can be incorporated into the paint that is to be tinted, is the consistency of the goods in the can. Tinting colors should possess a smooth and buttery consistency, which makes them easy to be "broken up," reduced and incorporated with other colors.

Questions:

What qualities should tinting colors in oil possess?

What defects sometimes have to be overcome?

Of what should tinting colors in oil be composed?

A brief mention of the colors used in tinting and their principal characteristics.

Lampblack

The best grade of recalcined lampblack should be used, as it is very much lighter in gravity than ordinary lampblack, and is absolutely free from the greasy properties which are inherent in common lampblack, and which causes low grade goods to be slow in drying. Lampblack is not a true black, but has a noticeable gray cast when pure. Some lampblacks are blued or have been mixed with carbon black to overcome this gray cast. Pure lampblack produces cold gray shades when mixed with white. It is so light in gravity (so bulky) that 12½ pounds will fill an ordinary 25-pound pail.

Drop Black

There are a number of grades of drop black, varying in quality according to the intensity of their black tone. Drop black possesses less tinting strength than lampblack and is not generally used for tinting purposes, but when the most intense black shade is desired for dressing window sash, lettering and work of this character, drop black is to be preferred to lampblack.

Sign-writers' black is a black specially prepared to meet the requirements of the sign

painter, but possesses all the qualities of drop black.

Blues

Prussian blue. There is a slight reddish cast to tints produced with Prussian blue. It is a very powerful tinter and must be used with great care, as a little of it goes a long way. A pound of Prussian blue in oil will tint one hundred pounds of white lead a good sky blue. Prussian blue fades too rapidly in direct sunlight to be practical.

Chinese blue differs very little from Prussian blue in its general characteristics, except that it produces a cleaner tone and is generally preferred on this account to Prussian blue. Chinese blue produces a greenish blue tint. Both of these blues appear to be black in the can. Both have excellent covering qualities when used by themselves, and in this respect will equal lampblack.

Ultramarine blue also comes in a great variety of qualities. Ultramarine blue has nothing like the tinting strength possessed by either Prussian of Chinese blue, but produces a shade which is somewhat different, and, if used with zinc, it is very permanent, but if combined with lead it will rapidly darken and the tint will lose its beauty on account of the chemical action which takes place between the lead and the sulphur in the blue. Ultramarine blue has very much less covering capacity than Chinese or Prussian blue, but has a beauty of tint impossible to reproduce with any other.

Cobalt blue is not largely used. It produces a peculiar shade of blue when used as a tinting color which no other blue will produce.

Questions:

Why should the best grade of lampblack be used?

What shades does pure lampblack produce when mixed with white?

What are the characteristics of drop black?

Why does ultramarine blue darken if mixed with lead?

Yellows

Yellow ochre. Made of the very best grade of imported French ochre; is the only ochre that should be used for tinting purposes; is very strong, but produces no brilliant tints.

Golden ochre is what is known to the trade as chrome ochre; that is, a combination of chrome yellow with yellow ochre. This is a

brilliant shade of yellow, very closely approximating the shade of chrome yellow D itself, and is a strong tinting color and produces some very fine tones when mixed with white. It is also used by itself, and has splendid covering qualities.

Raw sienna is a yellow of peculiar shade and is darker than yellow ochre. The tints produced with raw sienna are somewhat similar to those produced with yellow ochre, but differ in tone. Raw sienna produces, when mixed with white, buffs and tans.

Chrome yellow in oil is made in several shades. Each shade when mixed with white will produce a tone that cannot be reproduced by any of the other shades. Chrome yellow "L" produces the canary and lemon shades; chrome yellow "M" the medium shades; chrome yellow "D" richer yellow tones, and chrome yellow "orange" a dark orange shade. These yellows are the most beautiful yellow tinters to be obtained by the painter.

Browns

Raw umber in oil is a brown and when mixed with white produces cold drab shades and olive browns.

Burnt umber is a dark chocolate brown and produces brown and tan shades when mixed with white. It is also used in coloring paste filler for hard wood. Burnt umber is produced by roasting raw umber. Both burnt and raw umber possess drying qualities to a considerable degree.

Burnt sienna is a peculiar shade of reddish brown and produces salmon tints when mixed with white. Burnt sienna is sometimes used in making oil stains and produces fair imitations of cherry and mahogany, especially if enriched with rose pink.

Vandyke brown is so deep a shade of brown as to appear black in the can, and when used to tint white, produces warm, light brown shades.

Reds

American and English vermilions have been described under the heading of dry colors. They are little used by house painters for tinting but largely by decorators, sign and auto painters.

English vermilion "D" is the most popular shade and possesses a richness of tone which is much admired.

Venetian red is a rich shade of oxide red and

has great tinting strength. Not so brilliant as vermilion.

Indian red is a very rich shade of dark red, and when used as a tinter produces a purple undertone.

Tuscan red is a deeper shade than Indian red, and has a still richer tone.

Rose pink is an aniline color struck on a translucent base, and its principal use is in combination with burnt sienna, as described above.

Questions:

What is yellow ochre?

What is golden ochre?

What shades are produced by mixing chrome yellows in white.

What shades do the following colors produce when mixed with white: Lampblack? Prussian blue? Ultramarine blue? Chinese blue? Chrome yellow? Raw sienna? Burnt sienna? Burnt umber?

Greens

Chrome green in oil, like chrome yellow, is made in several shades, and while used some for tinting white their principal use is for trimming colors. Chrome green is not permanent in sunlight; it fades on such exposure much more rapidly than such earth pigments as the umbers and siennas. However, chrome green is the only satisfactory green we have in common use. Avoid using it in direct sunlight whenever possible.

If some salesmen talked ½ as much about their goods as they do about conditions they would get about twice as much business.

Perhaps no pigment is more affected by its handling than the greens.

It is possible to produce quite a wide variation in the shade or tone of a paste green paint by varying the amount of thinner or the character of the thinner. This is a fact that the salesman should bear in mind when he has a complaint on lack of uniformity in the shade of green. For instance, if there is as much difference as an excess of a quarter of a pint of naphtha in a gallon of paint made by reducing paste green, it will be slightly lighter in shade if put on as a flat color (by flat color we mean to dry out without gloss.) If there is more oil or varnish added to a mixture at one time than another it will make a darker shade.

In applying quick drying greens ground in Japan the shade will vary if the same propor-

tion of turpentine is not used every time. If the painter does not lay the color off all in the same direction there will be a difference in the shade. For example, the shade of the green that is brushed from left to right will be different from that part of the surface where he has brushed it from right to left or up and down. This is owing to the crystalline nature of the color and the refraction of light upon it.

Testing Colors

The usual way of testing tinting colors is to weigh out on an apothecary's or chemist's scale, equal amounts of two or more colors that are to be tested and mix them with a given amount, say an ounce of paste white zinc in oil, using care to see that there is no excess of linseed oil in either the colors or the white zinc. The color that makes the cleanest and purest tint is to be preferred. The color producing the darkest tint is only an indication of the strongest, but not necessarily the best color.

Questions:

What is chrome green chiefly used for?
What is the peculiarity of green?
How would you test oil colors?

Paste Colors in Japan

In selling Japan colors, the question of fineness of grinding, consistency in the can, covering capacity and amount of thinner required, time necessary to wait before succeeding coat can be applied, etc., are not discussed nor understood as much as their importance deserves. It usually is a matter of supplying the color desired at a price which is satisfactory, but as the above features affect the cost of the color, they should be understood by the salesman when he finds himself "up against" a price proposition. Some manufacturers grind such colors as will permit of it in a shellac Japan, others use a grinding Japan containing no shellac. A color ground in shellac Japan will dry to recoat in an hour or two while other kinds of grinding Japan take longer to harden.

Some manufacturers use a grinding mixture consisting of part Japan and when this is used it will require six or eight hours for the flat color to become hard enough to recoat. The foregoing applies when turpentine only is used to reduce the color for use as a flat coat.

In many cases the painter adds linseed oil to his Japan color; if so he will not object to a Japan and oil grinding mixture, particularly if

he is painting wagons, but this kind of a grinding mixture is cheaper and colors can be sold at a lower price per pound.

For carriage and automobile painting a very large line of beautiful colors has been created to meet the demand for new styles. These are put up in collapsible tubes weighing about 4 ounces and in 1-pound and 5-pound cans. The 5-pound cans are what are known as press cans and are made with a small hole in the side near the bottom, which is covered before opened by painter by a thin piece of tin easily pierced, and the hole is further protected by a little gate operated by a lever. The color is packed in these cans and a heavy paper disk is placed on the top and then a tin lid is soldered on. The painter cuts out the top, punches a hole through the tin at the gate and puts the can in a press especially made for the purpose. The press has a plunger which presses down the paper disk and forces the paint through the hole at the gate. The painter catches this in a cup having a capacity of about a pint. He takes out as much color as he can use at one time and beats the color until it is well stirred into a smooth paste. He then adds a very small amount of turpentine and stirs again until it is all taken up by the paste. Another small amount of turps is added and stirred in. He then adds enough more turps to make the bulk of the entire mix about twice that of the original color. This care is necessary to prevent lumps. Some colors will take more reducer than others and cover satisfactorily. It depends upon the shade or tone and also the character of the pigment as well as its purity. This mix is the flat color or ground, over which color varnish or clear varnish is to be applied, depending upon the color and the ideas of the painter.

Other Quick Drying Paste Paints

Other quick drying paste paints are prepared and known as paste wood filler for filling open grain woods and rough stuff for undercoating the body of carriages and automobiles, to fill up and level rough surfaces before the Japan color is put on. Paste car body surfacer for under coats on steam and electric passenger cars; paste engine filler; paste machine filler and paste iron filler (same purpose). The latter are synonymous and are intended for filling the iron castings of engines and machine tools.

Another form of paste paints is that ground in water and known as distemper colors and

is sold for fresco decorations, principally. Paste graining colors are also supplied ground in water and ground in oil.

Questions:

What classes of paste goods are ground in quick drying liquids?

What points should be considered in discussing Japan colors?

What kind of paint is sold for fresco work?

CHAPTER V

Liquid Paints and Basic Paint Pigments

LIQUID paints are supplied in several forms. First: Those that are ground in oil and that dry with a gloss. Such paints are liquid paints of various kinds for interior and exterior use.

Second: Those paints that dry without gloss, known as "flat" paints. In this class fall flat wall paints, flat white ground coats for an enamel, flat yellow ground coats, over which to apply enamels, graining or varnish stains, etc.

There are, of course, many degrees of gloss and of flat. We have the very high gloss of exterior paints which are mixed with boiled linseed oil, also enamels and varnishes. Then there are the semi-gloss, matt or eggshell gloss finishes represented by the factory prepared flat wall paints and those mixed from white lead and turpentine or flatting oil.

Lastly we have the dead flat coatings which are totally without any sheen or gloss—such as enamel undercoater paints and Japan colors.

Varnish Gloss Paints

Where it is desirable to have a paint dry with a high gloss, it is necessary to add some varnish to the paint. Such a paint would be known as a "varnish paint." The prepared wagon paints, for retail store trade, are of this class.

Color Varnishes

Where a still higher gloss and harder finish is desired, the colors are ground in varnish only. Liquid carriage paints for store trade are of this class, as are also the so-called color varnishes made particularly for the carriage and automobile factory trade. Color varnishes are made in a variety of grades, depending upon the quality of the varnish used and the proportion of pigment to the liquid.

The solid rubbing color varnish for the carriage trade contains the maximum amount of pigment. It is not very easy to apply but can be rubbed with pumice and water.

A free flowing color varnish contains less pigment but works easier under the brush and can be successfully applied over large surfaces. Free flowing color varnish will not admit of being rubbed with water and pumice, but the

gloss can be removed by rubbing with curled hair or southern moss.

Enamels

Enamels are, practically, varnish and colors. They are made in all colors and some, like the white, require that two or more coats of flat ground paint should be first applied before the enamel is used. Most carriage color varnishes require a flat ground coat of shade similar to the color varnish.

Questions:

In what forms are liquid paints supplied?
Name three classes of liquid paint.
How are enamels prepared?
Do enamel undercoaters, Japan colors and flat wall paints all dry dead flat like whitewash?
Are color varnishes and enamels nearly the same?

Liquid Prepared House Paint

Usually spoken of as "ready mixed," is made on a great variety of formulas, and considering this dissimilarity in the mode of manufacture there is a fair uniformity in the durability of the paints made by the leading high class paint houses.

It is considered by one group of manufacturers that barytes, calcium carbonate, china clay, asbestine (magnesium silicate) and some other white pigments are valuable as reinforcers when combined with white lead, zinc oxide or titanium oxide and that they increase the durability of the paint. It is true that their use may reduce the cost of the paint, yet they are not to be considered as adulterants unless used in excessive quantities. However, they are generally lacking in opacity and therefore are used in small proportions, say 10 to 15 per cent, in the various shades of high grade paints, though they may run considerably higher in others.

There is, however, no white paint pigment suitable for exterior use that possesses the opacity or obscuring power of white lead (either sulphate or carbonate) and titanium oxide. When it comes to white paint pigment suitable for interior use, however, lithopone has such great obscuring power and whiteness that it has attained great popularity as a pigment for interior paints. This product unfortunately is peculiarly affected by light and turns gray in sunlight and its use is restricted to undercoats, or for interior use where not so much exposed to light. Some manufacturers are now producing a lithopone which they claim is free from this defect. Lithopone is generally unsuitable for outside painting because it is rapidly decomposed by the elements, the zinc sulphide portion being oxidized to zinc sulphate, which is soluble in water and washes from the surface.

It is a prevalent notion that there are no other pigments, irrespective of color, that are as durable as lead, though it is a fact that many paints made with colored pigments are fully equal and in some instances superior to white lead in their durability or protective power—notably, lampblack, graphite, Venetian red, and some other iron oxide, but such pigments have no value for white and light colored paints.

The reason for this is a matter of some controversy. A white lead manufacturer declares: "White lead produces a more durable white paint than can be obtained with any other white pigments, but it has been found that the addition of a small amount of tinting materials increases the durability of any white paint, probably due to some actinic action of sunlight on the white pigments. This statement, however, should not be construed to mean that the darker the color the more durable will be the paint, as such is not always the case. The darker shades, obtained with lampblack, siennas, umbers, Venetian red, etc., are very durable, and the light tints obtained with the addition of small amounts of iron oxide are also durable, but paints containing a large amount of iron oxide pigment do not wear nearly as well as the lighter tints made with a white lead base."

Too much emphasis, however, must not be placed on the pigment content of paint. The character of the liquids in the paint greatly affects its durability and a good paint can not be made unless the proper liquids are used.

Questions:

Why are the inert pigments used in relatively small quantities in the light shades of high grade paints?
What is white lead's most valuable characteristic?
What are the characteristics of lithopone?
What of the effect of tinting colors on the durability of paint?

White Lead in Oil Paint

One of the oldest forms of paint known is that which is still very extensively used today—

paint mixed from white lead paste as the basic pigment.

White lead (carbonate and sublimed) is made by corroding pure lead metal with acetic acid (vinegar) and carbonic acid gas. The black lead metal is changed by this chemical process into a pure white, fine and very opaque dry pigment. It is one of the two most opaque white pigments known which are suitable for exterior exposure.

White lead is used in the dry form by all manufacturers of good quality exterior house paints and constitutes fifty per cent or more of the total pigment content of such paints.

White lead in the dry form is ground with pure raw linseed oil by the manufacturers in the proportion of 92 per cent lead and 8 per cent oil. One hundred pounds of white lead paste bulks a little over 2¾ gallons. This makes a very stiff paste which is packed in small press-top cans containing 1, 3 and 5 pounds each. It is also sold more extensively in steel kegs containing 12½, 25, 50 and 100 pounds each. Wood barrels of white lead sold contain about 300 or 500 pounds each.

By the addition to white lead in oil paste of raw linseed oil, turpentine and drier, the painter makes high quality paint. Boiled linseed oil is also used, but without the drier. And when tinting colors ground in oil are added an unlimited number of durable tints and shades are made. For mixing the extremely dark paints like dark reds, black, chocolate brown and dark green, white lead is not used.

Questions:

What is the basic material out of which white lead is made?

What is the chief characteristic of this white pigment?

As a rule do paints for exterior surfaces contain some white lead?

In a 100-pound keg of white lead how much is lead pigment and how much is linseed oil?

How many gallons of paste paint are contained in a keg of 100 pounds of white lead?

Is white lead put up in smaller packages than the common 12½ pound size?

Zinc Oxide in Oil

This very white and extremely fine paint pigment is made from zinc metal by a furnace burning process. Zinc is extensively used by manufacturers of high grade house paints and enamels, also to some extent by painters who mix from 10 per cent to 15 per cent of zinc with white lead for the last coat on exterior surfaces. For enamel undercoats decorators use half lead and half zinc.

Zinc is so very fine that it bulks about 4⅛ gallons to 100 pounds. Used in interior paints it makes a very dense, smooth and fine textured surface which, because it is harder too, is easier to wash than softer paints.

Zinc oxide is ground in linseed oil and sold in stiff paste form to painters in steel kegs holding 12½, 25, 50 and 100 pounds each.

Questions:

Are whiteness and fineness the chief characteristics of zinc oxide?

Does zinc make a harder paint film than most other pigments?

What are the two principal uses to which zinc is put in paints?

What is the basic material from which zinc is made?

How much does a 100-pound keg of zinc oxide ground in oil bulk in gallons?

What size kegs are used in packing zinc oxide for the trade?

Titanium Oxide

A new basic white paint pigment, that is, it is new to production on a commercial scale, although known to the chemists for some years back. This pigment is made by a chemical process from the mineral known as titanium. It is being extracted from the beach sands of Florida.

The noteworthy characteristics about titanium oxide are its remarkable opacity, being even more opaque than white lead and zinc, and its fineness and whiteness. This pigment is not

suitable for use alone with linseed oil as paint, because it chalks excessively in that form. It is recommended for use only in combination with other pigments,—with zinc or barytes, principally.

Titanium oxide is not sold to painters and consumers as such, but only to manufacturers who prepare it properly with reinforcing pigments to get the most paint value out of its good qualities.

Titanox is a trade name for a titanium oxide paint.

Questions:

What are the chief characteristics of titanium oxide?

Does titanium oxide and linseed oil alone make good paint?

What reinforcing pigments are used with titanium oxide as a rule?

Is titanium oxide ground in oil and put up in small packages for use by painters and others, to be sold over the retail counter?

CHAPTER VI

Painting Interior and Exterior Surfaces

HAVING a paint composed of the proper ingredients combined in the best proportion to insure greatest durability, the next thing to consider is the kind of surface it is to be applied upon, for this will exert considerable effect upon the durability.

If we have an absorbent surface, the liquid of the paint will be quickly absorbed, leaving the pigment on the surface without as much binders as it should have to insure greatest durability. Additional liquids should be added in paint to go on absorbent surfaces.

If, on the other hand, the surface is smooth sheet iron, clean and free from rust and mill-scale, the same kind of paint can be spread over a much larger area because there is no absorption of the liquid. Care, however, must be exercised to avoid spreading the paint out too thin or to leave it on the surface too thick. Some makers of paint for metal surfaces advertise the great spreading capacity of their goods and advertise the spreading of one gallon over 1000 to 1200 square feet of surface. This may seem a good point to the consumer, but he must consider the probable durability of a paint film as thin as tissue paper. For greatest durability a paint film should be at least twice as thick as that and no attempt should be made to spread a gallon over more than 450 square feet of surface one coat, if only one coat is to be applied.

To the unthinking, a paint is valued at its cost per gallon. To those who can see a little further, a paint is valued not per gallon, but by costs per square yard on the finished job. These who inquire still further, look into the durability of the paint and realize that the paint that puts off for the longest time the necessity of repainting is the best and cheapest.

We wish to emphasize this point: A paint film can easily be too thin to afford maximum protection.

The usual limitations placed upon paint is that so long as it hides the surface satisfactorily, it can be spread as far as it can be brushed out. We think this is a great mistake, for there are two classes of paints that cannot be so treated with best results from the standpoint of durability. First, there are those dark paints which possess such splendid hiding power that they can be brushed to the farthest limit.

We will consider the second class a little later.

Let us take, for example, one of the red oxide or the graphite paints, which come in the first class. It is possible to spread them out so thin that the coat will be less in thickness than tissue paper and it is unreasonable to expect a paint film as thin as this to afford maximum protection. If four or five coats are applied of this thinness the results will be very satisfactory, but the labor cost would be too great to make this procedure one to be considered.

The second class referred to above are those light colored paints which will not cover or hide the surface satisfactorily if spread as thin as the dark paints.

The tendency is to apply these paints as heavy as possible in order to hide the surface; this results in being impaled upon the other horn of the dilemma and we have a paint film too thick to dry satisfactorily and one that is sure to give trouble sooner or later in peeling, cracking, chalking or scaling. It makes an unsafe foundation for subsequent coats of paint and is altogether unsatisfactory.

No matter how deficient in power to hide, such a paint should be brushed out to as thin a film as those that hide perfectly with one coat and as many coats be applied to hide the surface as is necessary. It is unreasonable to expect a light-colored paint to cover as well as a dark paint.

No one should yield to the temptation of attaining covering at the expense of durability by applying paints relatively poor in covering qualities in heavy coats nor, on the other hand, should they apply paints relatively strong in covering power in coats too thin for durability.

There are limits then on either hand beyond which it is not safe to go, and care and judgment must be exercised by the painter to keep within bounds.

Questions:

How does the surface and its condition affect paint durability?

What is the thickness of a paint film when a gallon of paint is spread over 450 square feet?

What if spread over 900 square feet?

What is the best way of figuring the cost of exterior painting? By the gallon? By the yard? By the year? And why?

Why should not dark paints be spread farther than light colors?

The Painter's Viewpoint

The painter usually judges a paint by four points:

First—Its power to obscure or cover.

Second—The ease with which it is applied. That is to say, if it slips off the brush easily and is easily spread or brushed out over the surface so as to cause the minimum amount of fatigue.

Third—The time it takes to harden or dry. (The painter wants a paint to harden with reasonable speed.)

Fourth—The durability, which cannot be determined beforehand, and this accounts for the conservative attitude of painters regarding paint with which they are unfamiliar.

Outside and Inside Paints

Paints intended for exterior use require liquids that will withstand the exposure, but paints for most interior use cannot be made with the same liquids and give satisfaction.

Numerous cases have occurred where inside white and colored paints have been ignorantly used for outside surfaces with disastrous results. This brings up the subject of putting up exterior house paints in packages smaller than quarts.

Many dealers cannot seem to understand the practical difficulties which beset the manufacturer in this matter of furnishing the same colors as shown on the exterior house paint card in the smaller cans. The facts are that paints bought in small cans are usually used for interior work.

This being the case it would be sure to cause trouble on account of slow drying or turning yellow of white paints if exterior house paint quality were put into these small packages and used on interior surfaces.

On the other hand, if a change were made in the quality of the material put into the small packages to make them more suitable for interior use they would be certain to cause trouble because of occasionally being used out of doors. Therefore, in order to avoid this difficulty most manufacturers put up two lines, one for interior and one for exterior use, and purposely change the shades so that the purchaser cannot buy a can of interior paint to match the exterior paint, or vice versa.

Questions:

What four qualities does a painter consider as essential in paint?

What are the reasons why most manufacturers do not put up exterior colors in packages smaller than quarts, and do not match colors of exterior paints with interior paints?

Can one tell the probable durability of paint by visible characteristics before that paint is spread on a surface and subjected to the weather?

Does the only assurance of durability come from buying the products of reputable manufacturers?

How Much Paint Can a Man Apply in a Day With an Ordinary Paint Brush?

This depends upon conditions.

If he is painting a house and he is working alone on a ladder he can apply little more than a gallon per day. If he has a companion to help move ladders and they use a plank supported by braces from two ladders, he can apply 1½ gallons per day. If working from swing staging or on horses he can apply 1½ to 2 gallons per day. If painting floors or walls while standing on the ground he can apply from 2 to 2½ gallons per day. If working on structural steel in the yard or in the shop, he can paint about 900 square feet or about four tons of structural steel of the average sizes; this will consume about 2 gallons of paint, figuring 450 square feet to each gallon. With a spray painting machine he can apply from 10 to 25 gallons of paint a day, depending on where he is working and the facilities afforded him.

Painting steel that is erected is very difficult to estimate. It varies according to the conditions.

Painting New and Old Work

Many kinds of woods are used in house building. On new work of white pine, fir (Oregon pine), poplar or white wood the priming coat should be of the color with which you intend to finish and it should contain a large amount of linseed oil. If of red cedar, cypress, Southern yellow pine or other lumber which contains an oily or resinous substance on the surface reduce the priming coat only with a pint of turpentine, a pint of raw linseed oil and half a pint of benzol to the gallon of paint. The second coat in both cases should be thinned with one pint of turpentine to the gallon of paint (no benzol, for it will soften the first coat and spoil the job). The third coat should be applied as it comes from the can or, if too heavy to brush well, add one pint of raw oil to the gallon. Great care should

be taken to stir the paint thoroughly before using. By all means avoid ochre primers.

In painting houses that have previously been painted the treatment varies according to the condition of the surface. If scaling and cracking, first scrape or burn off the paint and then proceed as for new surfaces. If blistered, burn off where blisters occur and use turpentine in thinning the paint. If peeling, burn off and proceed as for new house. If surface is in good condition but dry and powdery, add one-eighth to one-fourth gallon raw linseed oil to the gallon of paint for each coat. If surface is in good condition, but hard and firm, add one pint of turpentine to the gallon of paint for first coat and one pint of raw oil for second coat. Allow from five days to one week between coats. Never paint a house after a rainstorm without waiting at least a day for it to dry out.

The mixing proportions in standard practice for mixing paint from white lead and zinc oxide are as follows:

Questions:

How much paint can a man apply in a day under various circumstances?

How many tons of structural steel will a gallon of paint cover?

In repainting old houses, what kind of surfaces are met with and how should the paint be treated according to the surface?

What is the effect of applying paint too heavy on woods?

What kinds of wood require benzol in the priming coat?

When should benzol not be used in the priming coat?

Why should not benzol be used in subsequent coats?

Why is turpentine recommended for second coat work on new wood?

When is turpentine recommended for first coating on old painted surfaces?

How much time should be allowed between the various coats of paint, priming, second coat, etc.?

Paint-Mixing Formula

New Exterior Wood

FIRST COAT

100 lbs. pure white lead
4 gals. pure raw linseed oil
1 gal. pure turpentine.
1 pt. japan drier
Bulks about 7¾ gals. of paint

SECOND COAT

100 lbs. pure white lead
1½ gals. pure raw linseed oil
1½ gals. pure turpentine
1 pt. japan drier
Bulks about 6 gals. of paint

THIRD COAT

100 lbs. white lead
3½ to 4½ gals. pure raw linseed oil
1 pt. pure turpentine
1 pt. japan drier
Bulks 6½ to 7½ gals. of paint

Use of Zinc

When a harder wearing surface is wanted on the paint for use on the sea coast to resist salt air and hard, driving rains, zinc oxide ground in oil may be used with white lead. From 10% to 15% of zinc in the last coat only are the correct proportions. Zinc used in undercoats and used in any coats excessively has a tendency to make the paint too hard and brittle—then scaling may result.

Paint-Mixing Formula

Old Exterior Wood

FIRST COAT

100 lbs. pure white lead
2 gals. pure raw linseed oil
2 gals. pure turpentine
1 pt. japan drier
Bulks about 7 gal. of paint.

SECOND COAT

100 lbs. pure white lead
3 gals. pure raw linseed oil
½ gal. pure turpentine
1 pt. japan drier
Bulks about 6½ gals. of paint

THIRD COAT

100 lbs. pure white lead
3½ to 4½ gals. pure raw linseed oil
1 pt. pure turpentine
1 pt. japan drier
Bulks 6½ to 7½ gals. of paint.

On two-coat jobs omit the above second coat. More oil and less turpentine are needed on old weather-beaten surfaces for the first coat.

Wall Painting

Wall painting on smooth plaster is best done with a 4-inch or 4½-inch flat wall brush. Old-fashioned painters who believe in using "elbow grease" in spreading paint, like the round 8-0 bristle paint brush for outside work, believing they can spread the paint better with this kind of a brush, but for inside painting on smooth walls, and especially where a smooth finish free from brush marks is necessary, better work can be done with a flat wall paint brush. Very little brushing can be done when using the new types of flat wall paint.

How to Apply Paint to a Wall or House

It is, of course, necessary to apply it evenly, and in order to explain how this is done we will take for an example an interior wall. Commence painting at the upper left-hand corner and start by applying the first brush full of paint about eighteen inches from the corner, and spread the paint in both directions from this point, working the paint to cover the corner and to about an equal distance to the right, making a lap or stretch of 36 to 48 inches in length, and about six inches wide with one brush full. Paint down to as low a point as is convenient and then move over to the right and start a fresh stretch as before, using care not to overlap too much and thus avoid getting too much paint at the joints where stretches meet. Work across the wall in this way and from left to right until top course is completed, then take down ladder and paint next lower course in same manner, and so till job is done. The ceiling should be painted before the walls.

Questions:

1. What kind of brush is best for applying paint to smooth inside walls?
2. Why is this kind of a brush best?
3. Where should one commence to paint a wall?
4. How long a "lap" is advisable?
5. Why is it best to do this?
6. How can "laps" be kept inconspicuous?

Flat Paints

In applying flat paint to walls the surface for the finishing coat should be prepared by building up a foundation with a first coater of some kind. The surface scratches, cracks and holes, if it be new plaster, should be thoroughly pointed up with a mixture of the paint that is to be used and a sufficient amount of equal parts of dry whiting and paste white lead to make a stiff putty. This will be found to far surpass plaster paris compositions often used.

This mixture makes an easy working filler for the holes and cracks on plaster surfaces, for it is elastic and will not dry out and leave a hollow spot where it has been applied, as there is no shrinkage in this material. When the work must be coated with paint the same day, however, putty made by soaking plaster of Paris in water is usually used.

After the wall has been thoroughly pointed up, apply a first coat of paint. It is necessary to stop the suction and give a uniform surface which will have no porous spots. By looking across the wall or ceiling a perfectly sealed surface will show a uniform gloss without any dry spots. If there are any dry spots and they are easily noticeable, these spots should be given a second coat so that the whole surface will show a uniformly glossy appearance. Or a coat of size should be brushed onto the whole surface to stop suction.

The size may be a glue and water coating made by dissolving enough first-class glue in hot water to make it slightly sticky when the fingers are dipped into it and allowed to dry. Don't use too much glue or the paint will scale off surely.

A far better size is made by thinning good floor varnish with turpentine to about the consistency of linseed oil. Then add a little of the paint to it to give color.

Or you may use one of the first-class prepared wall sizes several of which are offered in the trade-paper advertising. Some of them not only seal up the surface, but neutralize any hot lime spots as well.

Always advise what is termed a broken-in brush; new brushes should only be used on priming coats of woods, and every painter has second-coat brushes which he uses for finishing coats. New brushes usually have square points and from laying in the box they are often curled up some on the ends, and this makes a very scratchy-looking job when these brushes are used, usually necessitating more coats than would be the case if the proper brush is used.

If the surface to be covered has no dirty spots, one full coat flowed on gives a good finish and it is then only necessary to brush on another thin coat to get perfect results; assuming that the new color is about as dark as the old, when a very light-colored paint is to be spread over a dark colored surface three coats are usually needed. Where the surface is dirty and in bad condition, it is necessary to wash it before painting. Under good conditions, a considerable saving on material can be made in the finishing coat and still obtain good results, if care is taken to get a sufficient thickness of film to hide the imperfections that may be on the surface and to guard against the possible necessity of having to apply an additional coat.

You will find that most complaints, if you get any, can be traced to the fact that the painter took the job at too low a price and instead of putting on two proper coats, attempted to make a gallon of paint go as far as two gallons by brushing out the material, and when he had finished he found that he had brushed the paint out too far to cover the surface and it is necessary to apply a third coat which, of course, he does not like to do, and he will be extremely reluctant to admit he is wrong.

Newly finished plaster is sometimes hot in spots, if not all over. A good lime-proof sealer is advisable for such walls. Gloss oil is often used, but a better liquid is preferable. A hot wall will burn the paint and cause a discoloration and also make the paint flat too much. A wash composed of zinc sulphate dissolved in water and brushed on will neutralize the hot lime spots. Use as much zinc sulphate as a quart or gallon of water will dissolve—a saturated solution.

Questions:

What kind of treatment should a plaster wall receive before being painted?

What kind of mixture is recommended for filling defects in the wall such as holes and cracks?

Why is this best?

Why is a first coater necessary for plaster walls?

What treatment should dry or flat spots receive?

What causes these spots?

Why is a new brush not recommended?

What complaint is the painter likely to make and why?

Why are three coats usually necessary?

Blistering of Paint

Blistering is no defect of the paint. It may occur when the best of paint is used. Blistering is caused by the presence in the wood of an unusual amount of water or sap.

Blisters appear more often on the shady side of the house because it is more damp and the

paint consequently remains elastic for a longer time.

Moisture or dampness may come from roofs, rusted out tin flashings over windows or gutters that leak into the space between the clapboards and the plaster wall or it may come from damp cellars, as the space between clapboards and plaster wall is usually open at the bottom.

An interesting case of blistering was once brought to the writer's attention for investigation. It was confined entirely to the clapboarding around a large porch which was clapboarded clear to the ground on every side with no ventilators. The railing was nearly a foot through and was clapboarded on the inside down to the porch floor and on the outside down to the ground, and the blisters were confined to the inside clapboards of the railing and the front of the house under the porch. The owner of the house condemned the paint, but his attention was called to the fact that the paint was in excellent condition everywhere on the house but around the porch. The writer ventured the opinion that the entire trouble lay with the lack of ventilation, and that the moisture from the ground under the porch, not having other mode of escape, was forced to find its way out through the paint, which it did so long as the old paint was porous, but when the new paint closed up this means of egress, blisters were inevitable.

This theory was thought by the property owner to be altogether out of the question, but the writer insisted that that was the true explanation and finally asked the owner if he would admit the truth of it, if it was discovered that the studding and sills beneath the porch were rotten. To this he assented, the steps were then taken away as the only means of access to the space beneath and much of the studding and sills were found to be completed rotted with great masses of white fungus and mold hanging to them. This settled the question and nothing further was said about poor paint.

Another interesting case was a house that had been partially destroyed by fire and rebuilt with new clapboarding on one side. Shortly after it was painted enormous blisters appeared on the old clapboarding, which, by the way, was the north side of the house and shaded. The writer was called in to settle the dispute between the owner and the painter, as to the cause. The owner laid the blame on the painter.

Investigation developed the fact that large quantities of water had been thrown on the building by the fire department. The fire had

occurred in the winter and as the painting had been done in the early spring, little or no opportunity had been given the water to evaporate before the painting had been done. The result was blisters and such blisters the writer has never seen before or since. They were the size of the palm of the hand, and when opened as much as half a teaspoonful of water ran out of some of them. The new lumber showed no signs of blistering and the conclusion reached was that the fault lay in the water in the old house and not in the paint.

Questions:

Name some of the causes for paint blistering on wood?

Why do blisters appear more often on the shady side of an exposed wall?

What causes moisture to gather?

When a surface shows blisters, does it mean that all the paint on the whole surface is defective, or only the blistered spots?