A B C's OF PAINTING

A. Allow plenty of time for drying between coats.

B. Brush paint out to a uniform thickness of paint film.

C. Clean all surfaces properly before applying paint.

D. Don't pay for large amounts of "sand" and "water" in paint.

E. Establish a systematic painting program.

F. Follow painting directions carefully.

G. Gather information on paints and painting from authentic sources.

H. Hire skilled painters to do the larger, more difficult paint jobs.

I. Investigate the formula on the can of paint before buying.

J. Judge paints by their durability.

K. Keep paints tightly covered when not in use.

L. Let the whole family help with the painting program.

M. Mix paints thoroughly and make some of your own painting equipment.

N. Never put a used brush away without first cleaning it thoroughly.

O. Open paint cans carefully to avoid waste and so covers can be replaced tightly.

P. Provide the necessary equipment and high quality materials to do the job properly.

Q. Question doubtful paint formulas.

R. Repair before painting.

S. Save money by intelligent selection of paint. Cheap paints may be expensive.

T. Take time to do each paint job well.

U. Underlay finish coats with well-anchored foundation priming coats.

V. Visit your neighbor and observe his paint successes and failures.

W. Wait for satisfactory painting weather.

X. Y. Z. The X Y Z of successful painting depends largely on the paint selected and skill of the person who applies it.

PAI

FARM

AND E

SELECTION A
PAINTS SUITA
AND INTE

W. A. ROSS,
Agricultural Education
Federal

DON CRI
Agricultural Service Div

Prepared and Published by
tion with the U. S. Office o

A sure sign of a progressive farmer—well painted buildings in attractive and well-kept surroundings.

FOREW

The importance of making the
roundings more attractive and us
sized. Unpainted or poorly pain
from the appearance of any farm

In rural areas one finds evidenc
assistance in connection with su
grams. The need for systematic
application of paints suitable for
faces is also apparent. Where tir
to such matters by those concerne
stead and the farm home is not or
of the farm is enhanced. In addit
maintain neat and pleasant surro
contented and progressive.

Just as the skills of farm bla
taught with the use of the raw ma
—so may the fundamentals of f
youth in vocational agriculture ar
ing them how to make home-mixed
and how to judge factory-prepare
flax crop and gum turpentine fron
south are both products of the f
fore, that students become famili
farm buildings.

This publication is designed to
agriculture and farm people in
matter. It is organized in a usab
with painting farm buildings and
and considerable hitherto unpub
cluded. Farmers, teachers, and h
welcome such a publication since m
derived from its pages.

Grateful acknowledgment is ma
of Education for the splendid coo
which made this publication poss

the time of a staff member, necessary working materials and stenographic service, there was also a valuable contribution in guidance in terms of the entire undertaking.

Special thanks are due to Dr. F. L. Browne, Senior Chemist, U. S. Forest Products Laboratory, Madison, Wis., who offered many helpful suggestions and provided illustrations showing paint failures.

Valuable assistance was secured from experienced painters and decorators located in various parts of the country; from specialists in the U. S. Bureau of Standards; from representatives of the lumber manufacturers' associations; from government publications; and from supervisors and teachers of vocational agriculture.

PAINTING FARM BUILDI

Selection and Application of Pa
Interior S

INTROD

A knowledge of painting proc
siderable value to the average p
painting or have it done. This is
rural areas, where expert painter
fortunately, there are inferior pa
very unsatisfactory results. The
cost per gallon but will not stand
average weather conditions. Fla
often take place within a few mo
paints may also contain reinforci
and scale to such an extent that th
than protect the materials they ar
the old paint must be removed in
manent repaint job.

Paints of various kinds have be
tion and protection for centurie
painting is a story involving ma
and new materials. White lead,
used single white pigment for ex
light colors are desired, was kn
Latin writers as Pliny told of its
years ago, history tells us that th
probably contained certain pigme
Earth pigments, such as the umb
of iron have been in use since thos
also used by the ancients. Other
during the Middle Ages, and tho
through the centuries.

Figure 1.—An unsatisfactory paint job is costly and detracts from the appearance of the entire farmstead.

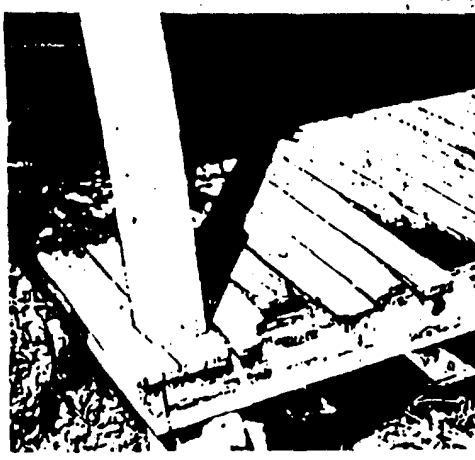


Figure 2.—Porch floors deteriorate

Many improvements have been made in paints in the past quarter century. The leading paint manufacturers, as well as certain governmental agencies, have well-equipped laboratories where men experiment constantly with various materials and develop reliable information from which color pigments have been made clearer and more resistant to light. This is particularly true of the blues, chrome greens, and chrome yellow. An outstanding blue pigment known as phthalocyanogen blue, is a recent addition. This is a light-fast organic pigment and is not affected by heat, alkali, and acids. It is used in high-grade paints, enamels, and printing inks. The newer types of titanium pigments have remarkable opacity and whiteness. White lead in combination with zinc oxide and titanium pigments is used in many of the extra white factory-prepared paints of today.

Linseed oil, known and used for centuries, is still the most satisfactory and widely used vehicle for exterior paint. In recent years, small proportions of china wood oil have been used in conjunction with linseed oil in house paint primers, trim and trellis paints, porch and deck paints.

Factory-prepared flat wall paints for interior use usually include lithopone or titanium pigments in treated oil or varnish vehicles. Enamels for interior woodwork consist mainly of lithopone or titanium pigments in synthetic resin varnish vehicles. There is, of course, a great variation in quality in these synthetic enamels. When factory-prepared paints are desired, the consumers' best guide is always to pu
reputable manufacturer, and to tell
purchase is made the specific use
intended.

Before buying exterior paint it is a
find out about its composition.
plainly labelled with the formula of
some of the transparent pigments u
are sometimes misleading. Extend
the paint in a can, but have little hi
durability of the paint film. A list

1. Calcium carbonate (also know
verized limestone.)
2. Silica (also called silicious mal
3. Calcium sulfate.
4. Barium sulfate (Barytes.)
5. Magnesium silicate (talc, china

The most important ingredients
high quality exterior white and tint
linseed oil or white lead, zinc oxide
linseed oil. Gum turpentine is used
grade paints and varnishes.

In studying or analyzing the for
portant to note the proportion of p
formula for exterior white or tinted

less than 65% pigment to 35% liquid, by weight*. Among the unidentified vehicles or liquids in the formulas of low-grade paints are:

1. Fish oil.
2. Oriental oil.
3. "Paint Oil."
4. "Boiled oil" (other than linseed.)
5. Vegetable oils.
6. Volatile thinner.
7. Water.

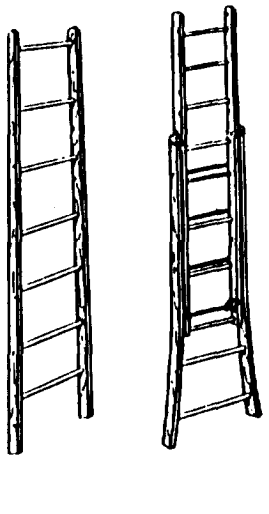
Low grade exterior paints sometimes contain as much as 35% water, designated by such terms as "emulsified solution," "colloidal solution," "solution," "aqueous body agent," or occasionally as just plain water. Durable exterior paints should not contain more moisture than the trace of water which is present in certain of the dry pigments used.

* Federal specifications for lead and zinc type and titanium, lead, zinc type paints Fed. Spec. TTP 86a Class 1 and TTP 101a Type A call for formulas with a minimum of 68% pigment and 32% liquid.

PAINTING EXTERIORS OF

PROVIDING EQUIPMENT FOR

LADI



For ex
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ous. For
ing up t
two foot
substitut
Every ad
a buildin
in ladder
point.

To make ladders safe and to keep
forms or hard surfaces, it is advisab
the lower ends of the side rails.

Window brackets or window seats
teriors of window frames and sash.
full use of both hands, provides a pl
painting is less tiring than from a l

Where
the use
will facil
ing or pa
or ridge
sential t
satisfact

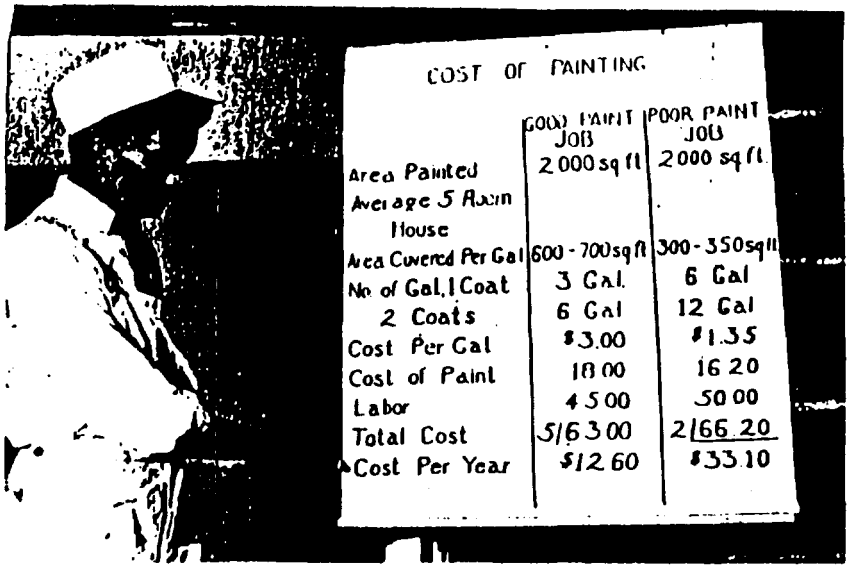


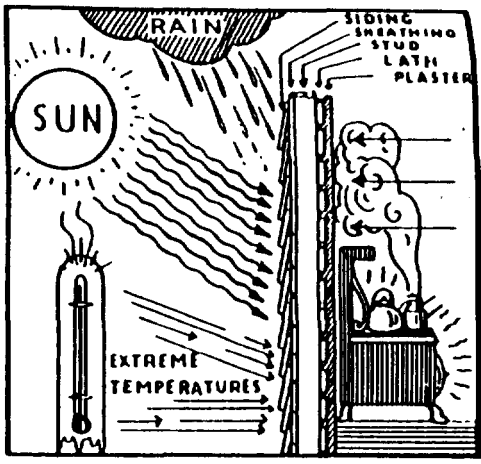
Figure 15.—Student comparing the service of paint jobs on an annual cost basis.

others interested for the purpose of comparing the durability of various paints.

To judge the selling prices of paint, the average cost of the pigments and oils used in its manufacture may be used as a basis. (See page 31.). The cost of packaging, manufacturing, selling and shipping remains somewhat the same with all paints. So if the amount of each ingredient and percentage of it in relation to the other ingredients is stated on the label and comparative costs of the raw materials are known, the value of the paint in the container can be judged fairly. (See Formula Survey blank page 29.)

5. Bulking Value of Pigments.

In comparing pigments there is another very important factor. Each pigment has a "bulking" value when mixed with the paint liquids. Just as starch or flour fills up a measure or bulks more per pound than sand or rock, paint pigments have similar bulking characteristics. This is the main reason why such substitutes and fillers as calcium carbonate (limestone), silica (sand), magnesium silicate, and other inexpensive raw materials are introduced in paint formulation, replacing the more durable and valuable heavy metallic pigments such as white lead and zinc oxide. This should reduce the cost to the buyer when temporary paints are desired. To judge the bulking values of the pigments, see page 30.



6. Kind of Repaint Surface.

Regardless of the kind of exterior p
exposure to the sun, rain, air and ot

The important question to be cons
face will be left to repaint. Shall it
from four to 10 years' exposure? C
by postponing repainting if financia
repainting? Will the paint film fail
toring, or peeling? Will the owner
cracked and scaling paint before re

JUDGING FORM

Certain paint pigments are known
others are known as "inert" pigme
most generally used in the manufac
lead, zinc oxide, red lead and blue lea
mixed with linseed oil a chemical re
which the particles of pigment "bloo
tion with the oil. White lead and lins
film whereas zinc oxide and linseed o
film. These characteristics of the ac
do with the durability of exterior pai

The "inert" pigments consist of sili
stone), magnesium silicate, barytes,
and similar pigments all of which hav
linseed oil and do not react with it. T
in the pigments when mixed with li
their designation as "inerts."

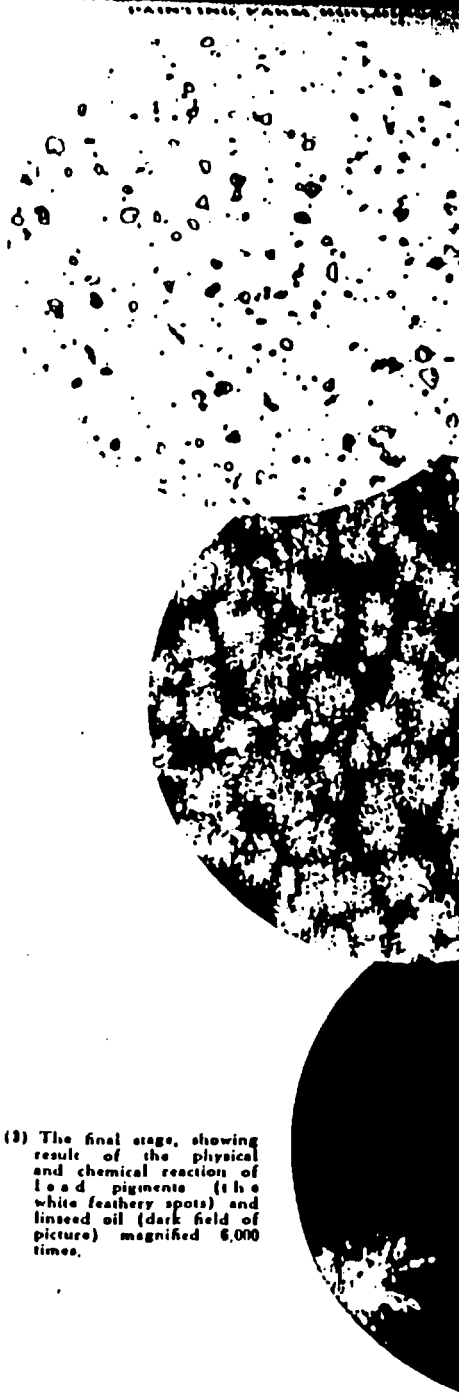
Exterior white and tinted paints containing more than 10 per cent of extenders such as calcium carbonate, silica, kaolin, aluminum silicate, magnesium silicate, barium sulfate (barytes), and lithopone are not usually graded as first quality exterior paints. If large amounts of these cheaper extender pigments are indicated on the formula label, the selling price should be correspondingly lower in proportion than when the paint is made of the higher priced basic lead and zinc pigments. Less durability in cheaply formulated paints is also to be expected. The quality and durability of exterior white and tinted paints can be judged somewhat by the weight per gallon and the costs of the pigments used in formulating the paints. (See pages 26 and 27 for weights.)

The more durable house paints usually contain not less than 65 per cent pigments and not more than 35% liquid by weight. This is the basis used by the Government and painting contractors in specifying formulas for paints described on pages 26 and 27.

Recommendations found in Consumers Guide Vol. 5, No. 17, of the Agricultural Adjustment Administration Division of the United States Department of Agriculture describes Type "L" (lead) paint as designated by the United States Forest Products Laboratory, as follows:

> "Type 'L' Paint: The pigment consists entirely of white lead except for the additions of colored pigments to make the tinted paints. This paint, if used exclusively, remains the best choice for house owners who wish to allow very long intervals, longer than the durability of any other white or tinted paint, to elapse between paint jobs. When worn out, a coating consisting wholly of white lead, on woods that hold paint well, will still go through a long period of neglect during which it looks shabby but not unkempt. After such neglect, a white lead surface can easily be repainted without undue expense. Paint of type 'L' is recommended also for houses in which moisture at times collects behind the painted woodwork. The coating will blister as readily as other paints, but if the coating consists entirely of white lead paint, the blisters usually disappear when the wood dries out without leading to a subsequent peeling and scaling." (See TT-P-156, page 26.)

The single pigment white lead paint is available in ready-to-use form by the gallon as well as in soft paste form. If a factory-prepared multiple pigment paint is to be used, careful investigation of the formula should be made and the pigments and oils



(3) The final stage, showing result of the physical and chemical reaction of lead pigments (the white feathery spots) and linseed oil (dark field of picture) magnified 6,000 times.

Figure 17.—The particle size of white lead

in it should come within the limitations of Federal Specifications TT-P-156, TT-P-36a, Class 1 and TT-P-101a, Type A, if the most durability is desired.

"TT-P-156 for pure white lead paint is as follows:

PIGMENT	NOT MORE THAN	NOT LESS THAN
White Lead		98%
Tinting Pigments	2%	

The liquid shall contain not less than 87% of linseed oil, the balance to be drier and thinner. The weight per gallon shall not be less than 19½ pounds."

"TT-P-36a, Class 1, Federal Specification for lead and zinc base outside paint is as follows:

PIGMENT	MAXIMUM PER CENT	MINIMUM PER CENT
White Lead	—	70
Zinc Oxide	20	15
Tinting colors and white siliceous mineral pigments containing no lead or zinc compounds	10	—
Matter soluble in water	0.8	—

In factory-prepared paint the liquid shall contain not less than 87 per cent linseed oil, the balance to be combined drier and thinner. The thinner shall be turpentine, volatile mineral spirits, or any mixture thereof. The weight per gallon shall be not less than 17½ pounds."

TT-P-101a, Type A, Federal Specification for outside titanium-zinc-lead factory-prepared paints is as follows:

PIGMENT	MAXIMUM PER CENT	MINIMUM PER CENT
Titanium Dioxide (TiO_2)	—	7.0
Zinc Oxide	25.0	—
White Lead	—	58.0
Extenders (white silicate pigments, barium sulfate or mixture thereof)	10.0	—
Matter soluble in water	.8	—

The liquid shall contain not less than 85 per cent of linseed oil, the balance to be drier and thinner. The weight per gallon shall be not less than 17 pounds."

Composition of Wh
(Ready t

Per cent compositions, by weight a
used on exterior wood. (See formula

FORMULA	MATERIAL
	White-lead .....
No. 1	Linseed Oil .....
(First Coat, Repainting)	Turpentine ....
	Drier .....
Per cent pigment in non-volatile port	
	White-lead .....
No. 2	Linseed Oil ....
(Finish Coat, Repainting and New Wood)	Turpentine ....
	Drier .....
Per cent pigment in non-volatile port	
	White-lead .....
No. 5	Linseed Oil ...
(Priming Coat, New Wood)	Turpentine .....
	Drier .....
Per cent pigment in non-volatile por	

MAKING A SURVEY O

The purpose of making a surv
munity is to help determine t
liquids that have been ground to
how to judge the comparative

As about 80% of all exterior
sumer is white or tinted paint,
used as the standard for compari
following procedure:

(1) Provide a supply of surve

(2) Notice on the paper forn
the can, the formula showing th
word "formula" means the reci
manufacturer when he mixed to
Sometimes formula labels are gl
cans. Formula labels are require
in others but all reliable paint n
label on the can in plain view.

It will be found, usually, that
headings. One will be "Pigments
percentages of solid or mineral
heading will be "Liquid" or "
means, in the paint industry,
paint to hold the pigments togeth
the pigments. Note the proporti
total liquid stated on the labe
sheet.

(3) Observe that some formulas may have the ingredients listed "By Weight" and some "By Volume," so copy down the figures showing the percentage of the pigments and liquids, placing these figures in the proper column, "By Volume" or "By Weight." In all cases the column of figures will add up to 100%, which is the total at the bottom of the columns on the survey blanks. If there are pigments or liquids named other than those on the survey sheet, fill these extra names in on the blank lines at the lower part of the list of pigments or liquids.

(4) At the lower section of the survey sheet is a space for remarks or footnotes. Copy off the footnotes from the label.

(5) In order to complete the proper study of formula labels, carefully read the sections in this bulletin relating to Selecting Paints, Comparison of pigment costs and "Bulking Value of Pigments." (See pages 30 and 31.) After the survey sheets have been filled in from formula labels on the different kinds of paint being compared, check the proportions and values of pigments and oils in relation to the facts found in the literature studied.

Near the top of the survey sheet fill in how the paint salesman regards the paint being surveyed as to grade and quality. Then at the bottom of the sheet write in the opinion of the person making the survey.

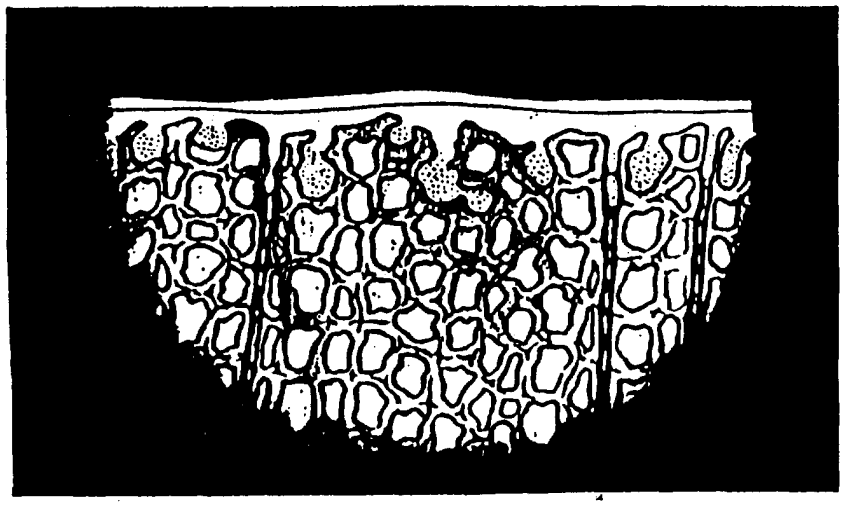


Figure 18.—Cross section (greatly magnified) of white lead paint film on wood after being exposed to the weather 5 years. Part of the surface coats have gradually chalked away, leaving the original priming coat anchored to the wood and providing an even surface for repainting.

PAINT FORMULA SUR
(Exterior White

Name of Manufacturer .....

Brand Name of Paint .....

The Paint Store sells it as their (*Check*)

First quality ..... Second quality .....

Is there a formula label on the can? .....

Pigments	Percentage of By Wt.	By Vol.	Liqu
Carbonate of lead	.....	.....	Lin
Zinc Oxide	.....	.....	Gu
Leaded Zinc	.....	.....	Tu
Basic Sulfate of White Lead	.....	.....	Soy Pr
Titanium Dioxide	.....	.....	Mi
Titanium Magnesium Silicate	.....	.....	Dri Thi
Zinc Sulfide	.....	.....	Wa
Magnesium Silicate (Asbestine)	.....	.....	Re Ve
Barium Sulfate (Barytes)	.....	.....	Tu
Lithopone	.....	.....	Vo ne
Calcium Carbonate	.....	.....	.....
Silicates	.....	.....	.....
Aluminum Silicate	.....	.....	.....
Titanium Pigment	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	
.....	.....	.....	
.....	.....	.....	
.....	.....	.....	
.....	.....	.....	
TOTAL	100%	100%	

Percentage Pigments of Total ..... By We
Percentage Liquid of Total ..... By We

I think the quality of this pai
(*Check which*)

Why .....

.....

.....

.....

Student Making Survey .....

FACTS ABOUT PAINT PIGMENTS THAT SHOULD BE TAKEN INTO ACCOUNT WHEN COMPARING FORMULAS

The following tables show comparisons with bar graphs how one pound of each pigment *fills up the can* or "bulks." For example, when a pound of calcium carbonate, magnesium silicate, or silica is in a paint formula, these pigments fluff up in the gallon about 2½ times what heavy pigments like white lead will bulk. The bulking property of pigments creates the temptation for unreliable paint manufacturers to make paint with cheap high bulking pigments of low opacity and durability. As paint is bought to cover up or decorate a surface it is a waste of money to apply paint containing excessive amounts of such fillers and extenders.

Paint Pigments	Bulking Value of One Pound	Wgt. per Gal.	Hiding Ability	Av. Cost per Lb.
Basic Carbonate White Lead	.0176	56.73	Good	0.75
Basic Sulfate White Lead	.0187	53.40	Good	.066
Zinc Oxide	.0212	47.15	Good	.072
Titanium Dioxide	.0305	32.82	Very Good	.145
Lithopone	.0279	35.82	Good	.042
Zinc sulfide	.0300	33.32	Good	.082
Magnesium Silicate	.0421	23.74	Poor	.01
Calcium Carbonate	.0443	22.57	Poor	.01
Barium Sulfate	.0270	37.07	None	.012
Silica	.0453	22.07	None	.01
Iron Oxide	.0233	42.90	Very Good	0.68

Since pigments vary in their ability to "bulk" or fill up the "paint gallon" and there is a wide range in their cost, the unit of 1 quart in volume has been selected for the purpose of comparing the relative cost of pigments listed in the table on the following page.

COMPARISON OF PAINT P

Dry Pigment
White Lead (Basic Carbonate)
White Lead (Basic Sulfate)
Red Lead
Leaded Zinc Oxide (65% Zinc Oxide (35% Lead Sulfat
Zinc Oxide
Lithopone (30% Zinc Sulfide) (70% Barium Sulfate)
Titanium Barium Pigment (Titanox (30% Titanium Dioxide) (70% Barium Sulfate)
Titanium Calcium Pigment (Titanox (30% Titanium Dioxide) (70% Calcium Sulfate)
Titanium Magnesium Pigment (Titanox M) (30% Titanium Dioxide) (70% Magnesium Silicate)
Titanium Dioxide (Titanox A)
Lead Titanate (Titanox L)
Zinc Sulfide
Calcium Sulfate (Gypsum)
Magnesium Silicate (sometimes list as asbestine on labels)
Barytes (Barium Sulfate)
Aluminum Silicate (China Clay)
Whiting Commercial (Chalk) (Calcium Carbonate)
Calcium Carbonate (Limestone)
Silica (Sand)
Iron Oxide (Ferric Oxide)
Siliceous matter (including any or magnesium silicate, china cl silica, celite, mica) approxima average cost

paint. This volume is part of the resulting total gallons of paint. The prices used are representative of the respective material costs in normal times. Adjustments to meet the current prices prevailing for such materials will be necessary to arrive at the total cost per gallon of paint.

HOW TO FIGURE COSTS OF EXTERIOR PAINT

Total amount of material to purchase for applying a two coat repaint job.

To paint square feet of surfaces	Pounds of paste white lead required		Gallons boiled linseed oil required	Gallons of turpentine required	Total gallons of paint resulting	Approximate cost per gallon of paint ready to apply
	lbs.	(gals)				
12500	500	(16¼)	12½	5	33¾	12.16
5000	200	(6½)	5	2	13½	2.16
3700	150	(5)	3¾	1½	10⅛	2.16
2500**	100	(3¼)	2½	1	6¾	2.16
1900	75	(2½)	1⅞	¾	5⅛	2.16
1250	50	(1⅗)	1¼	½	3⅜	2.16
625	25	(⅞)	⅝	¼	1¾	2.16

Figure 20.

** *Example*:—If enough paint to cover 2,400 square feet is needed, purchase 100-lb. pail of white lead, 2½ gallons of linseed oil and 1 gallon of gum turpentine, as shown in the above table to cover 2,500 square feet of surface on a two coat repainting job.

	Basic Cost
Soft Paste White Lead—3¼ gallons (100 lbs.)	$12.00
Pure Linseed Oil—2½ gallons @ 80 cents	2.00
Pure Gum Turpentine—1 gallon @ 60 cents	.60
TOTAL COST	$14.60

$14.60 divided by 6¼ gallons, the total volume of the paint ready to apply, makes a cost of $2.16 per gallon.

dry but water has soaked into the siding ma
painted before this excess water has evapora
may result.

On previously painted surfaces, a careful s
the building should be made to determine w
been failing on account of water getting bac
sure to look under eaves, beneath porches a
places for paint failures. Any peeling, scalin
should be scraped or sandpapered so all loose
(See pages 11, 12 and 19.)

Check any causes of condensation of moistu
building and ventilate walls to stop water fr
paint causing peeling.

PREPARING, MIXING AND TINTING EX

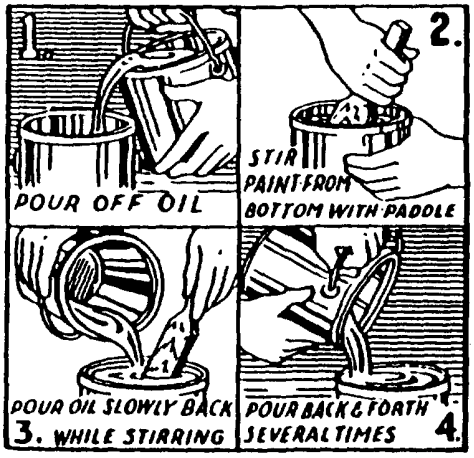


Figure 21.—Thoroughly mix factory-prepared paint before applying it.

maining liquid and paste until it is uniform a

(See Figure 21.) Then add the balance of the liquid slowly and stir until all the ingredients are evenly dissolved. Strain the paint through a piece of fly screen as it is poured into the paint bucket for brushing. Follow the manufacturer's thinning directions found on the can label if the paint is to be used as a priming coat.

Manufactured paints also come in heavy paste form which requires thinning and thorough mixing before using.

Mixing Basic Paint Materials on the Job.

When paste white lead is to be thinned into paint it is more economical to purchase it in 50 or 100 pound kegs. Measure out what is needed for the immediate paint work and cover the remaining paste lead with a small amount of raw linseed oil or water; replace the lid tightly. The paste does not deteriorate and can be used for various kinds of interior and exterior painting as the need develops.

Of course, the water used to protect the soft paste lead during storage should be removed before thinning down into paint.

To complete the preparation of white lead paint dip or pour the quantity of paste lead to be used into a clean mixing tub or can and thoroughly stir in the linseed oil and gum turpentine as specified in the formulas shown on pages 154 and 155 according to the surfaces being painted. (See Figure 22.)

Tinting.

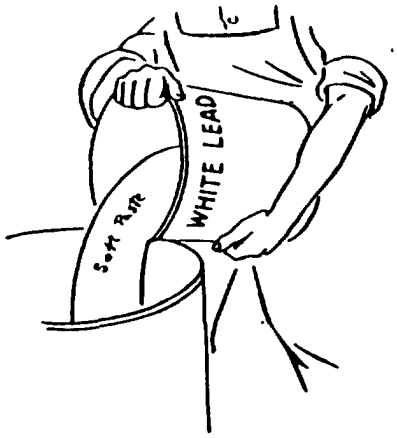
Attractive individual colors and tints are easily made by adding one or more tinting pigments to white lead paint. The quantity required depends on the depth of color desired and the tinting power of the color in oil used.

If heavy paste colors-in-oil are used, thin the paste with gum turpentine before stirring color into the white paint. To prevent streaking always tint and strain the white paint after it has been made ready for application so that the color pigments are more easily and thoroughly dispersed throughout the paint.

It is always advisable, when following a color formula, to add small quantities of color at a time and mix thoroughly. Otherwise a deeper tint than desired may be obtained, leaving no alternative but to add more white paint to reduce the color strength.

In tinting paints, it is best to keep a wet sample or small amount of the tinted paint in a tightly sealed fruit jar or small can in order easily to duplicate the tint if a later batch is desired.

HOW TO THIN DOWN P
TO MAKE HOME-



(B) Add about one-third of the oil and stir until the mixture becomes a thin paste. Then add balance of oil.

Figure 22.—Steps in mixi

Tinting Priming Coat.

Even when the finish coat is to be white, the adding of a little raw umber to the priming coat shows up any "skips" and helps in the hiding as well as providing a more uniform thickness of the finish coat.

Use about two level teaspoonfuls of raw umber in oil to each gallon or one tube (⅛ pint) to five gallons for tinting the priming coat.

Tinting Formulas for Home-Mixed Exterior Paints.

The following are formulas for producing the most popular tints. Only full strength high quality colors-in-oil should be used. The quantities of colors-in-oil indicated will tint 100 pounds of paste white lead and should be adjusted accordingly if a smaller or greater amount of white lead is to be tinted. (See page 69, for measure reducing table.) If paste white lead has already been thinned down ready to apply, use approximately one-seventh of the amount specified below of each color to tint each gallon of ready-to-use white paint.

FOR EXTERIOR BODY COLORS

(Per 100 lbs. of Soft Paste White Lead)

Ivory
1/16 pint medium chrome yellow

Cream
½ pint raw sienna

Lemon Yellow
¼ pint lemon chrome yellow

Colonial Yellow
½ pint medium chrome yellow

Light Buff
1 pint raw sienna

Light Tan
½ pint burnt turkey umber

Russet Brown
3½ quarts burnt turkey umber
1½ quarts Venetian red

Leather Brown
1½ gallons burnt turkey umber
1 quart Indian red

Light Gray
⅛ pint lampblack

Medium Gray
¼ pint lampblack

Warm Gray
1 pint raw turkey umber

Olive Drab
1 quart burnt turkey umber
1 pint light chrome green

Light Green
1 quart of medium chrome green

Foliage Green
1 gallon chromium oxide green

Light Blue
¼ pint C. P. Prussian blue
¼ pint burnt turkey umber

Shutter Blue
3 quarts cobalt blue
1 quart raw turkey umber

TRIM COLORS

The following formulas produce dark-colored paints which are often required for the painting of trim, sash, blinds, and the like. These paints contain no white lead. They are prepared by reducing colors in oil to painting consistency according to the formulas specified.

These paints are for use as finishing coats only. The regular procedure for exterior painting should be followed in the case of undercoats. A satisfactory ground for these dark colored paints

may be produced by tinting the w
shade of the finishing color.

For quick set and good thoro
suggested that about three ounce
into each gallon of finishing coa
arge should be used within two
If boiled linseed oil or litharge i
of drier specified.

Indi
Yield:
½ gal. English
½ gal. Indian
2½ qts. raw lins
1 qt. outside
½ pt. liquid dri

Brigh
Yield:
1 gal. C. P. c
1¼ gals. raw li
2 quarts outsi
1 pint liquid

Mediu
Yield
1 gal. C. P. c
1½ gal. raw lin
2½ qts. outside
1 pint liquid

Dark
Yield:
1 gal. C. P. c
1¼ gals. raw li
2 qts. outside
1 pint liquid

Cresc
Yield:
1 gal. C. P. h
1 pint Indian
3 qts. raw lin
1 qt. outside
½ pint liquid

Chromium
Yield:
1 gal. C. P. c
2½ qts. raw lins
1 qt. outside
½ pint liquid

Prussi
Yield:
1 gal. Prussia
2½ qts. raw lin
1 qt. outside
½ pint liquid

It is quite common practice to dip shingles before they are applied to a building. Of course, this refers only to the priming coat. Shingles can be dipped after delivery to the job by using a vat or tub and placing them in a trough after dipping so the excess stain or paint drains back into the tub. (See Figure 31.)

Spraying.

Spray painting is economical from the standpoint of labor, especially in the application of paint on concrete, stucco, brick, wood shingles, or rough lumber such as fences, barns and outbuildings where there are few windows. The type of equipment used and skill in handling the spray gun are important. To secure a more uniform thickness of the paint film, two men are often used, one to operate the spray and one to smooth the paint with a brush.

The following points should be observed to insure efficiency with spraying equipment:

1. The equipment should be carefully selected and purchased from a reputable manufacturer.

2. It should be carefully adjusted and operated.

3. The gun and paint hose should be thoroughly cleaned after using, before any paint has had time to dry in the parts.

The correct air pressure required and the consistency of the paint should determine the type of equipment to be used. Generally speaking, an air pressure of 45 to 55 pounds will prove satisfactory. The gun should be adjusted to spray the paint as specified without extra thinning, as the addition of thinners in excess of that stated in the formulas will not produce the full thickness in the paint film.

In spraying, the gun should be handled in slow, sweeping strokes, approximately eight to ten inches from the work. Too close spraying results in sags and runs. The work will be facilitated if the areas difficult to reach are sprayed first, and the broad surfaces last.

The spray gun parts should be cleaned at the end of each working day and whenever the material to be sprayed is changed. This cleaning can be done by spraying the correct solvent, usually painter's naphtha, through the gun and finally blowing the parts clean with compressed air. Then the nozzle should be removed and cleaned. This operation should always be done before

Figure 21.—Spray painting saves labor whe
wall surfaces where there are few

the paint material used in the gun has h
ever, if the gun is to be used again in
spray nozzle and set it in a can of s
ready for use.

All paint should be strained throug
ing before using it in spray equipmen

Correct Amount per Square Foot.

Whether brushing, dipping or spra
thing to keep in mind is to apply the co
square foot.

When using home-mixed or factor
film of the finished job should be of the
formulas which are based on certain a
(See formulas pages 147, 154 and 1
film is too thin and will not wear as

To determine how thickly any paint
ure out one quart and apply it to a me
of paint does not reach, it has been ap
paint is left over, it has been spread
this adjust the brushing, dipping, or s

When to Paint.

Outside painting should be done d
Figure 25.) Avoid painting during
The surface should be dry and the te
50°F. Paint will brush on easier when

PAINTING INTERIORS OF BUILDINGS

PROVIDING EQUIPMENT FOR INTERIOR PAINTING

No elaborate set of equipment for interior painting is necessary, but to produce a good decorating or painting job with the least work a few items are essential.

To paint ceilings and sidewalls two stepladders with an adjustable trestle or plank that will rest on the steps and reach between the ladders should be provided. Benches or sawhorses, if of proper height, and a solid plank of the right length can usually be used if stepladders and trestles are not available.

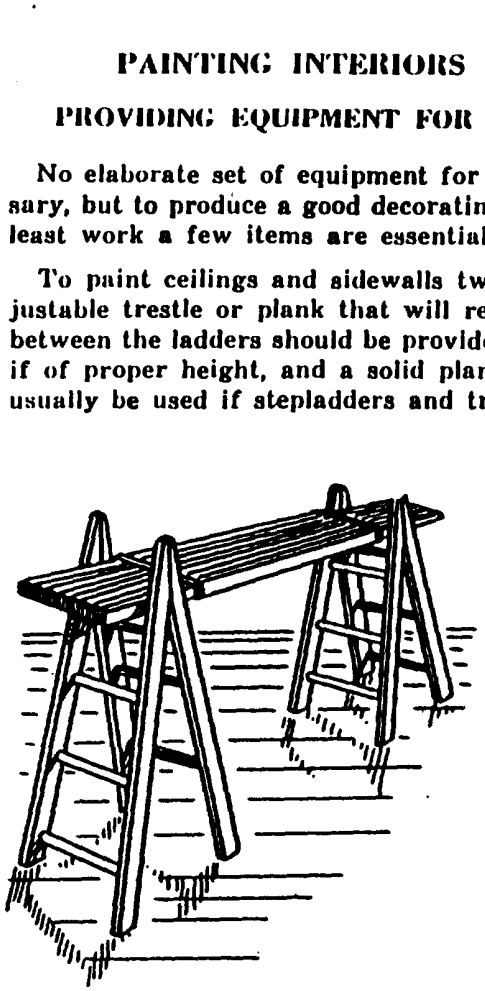


Figure 33.—Type of adjustable trestle used by painters to reach interior surfaces.

An old tarpaulin makes a good drop cloth to cover the floors or furniture. If no cloth is handy, use several layers of newspapers so no wash water or paint gets to the floors.

A putty knife, broad scraping knife, wood scraper, sandpaper, steel wool, washing compound, rags, bucket for washing mixture, paint buckets, paddles, paint remover and paint brushes make up the average list of items that should be provided if painting is to be done on both walls and woodwork of a room.

INSPECTING INTERIOR SURFACES TO BE PAINTED

After deciding on a plan for repainting and decorating, one should take a notebook and make a survey of each room in the house. Begin in the attic and the upstairs rooms. This is the

and dirt into the rooms while the
work is begun on the upper floo
keeping the dust out until the pa
surveying the attic, note what sh
tion through the ceilings of the
causes deposits of dust on ceiling
of the lath. This can usually b
paper or insulation between the c
are nailed. The insulation will als
in winter and make the upper r
nical laboratories have found tha
the ceilings.

Look for roof leaks and have
water will stain the ceilings or w
been redecorated. If a roof leak
or calcimine paints have been us
peatedly "burn through" repain
and spoil the appearance of the su
oil paint but may cause it to peel
before painting.

It is important to note what
the walls and woodwork before
to see if sanding of the woodw
smooth surface for the new pain
or two coats of paint will be suffi
cord, putty or window glass need
scraping window sills? The time
before repainting.

What should be done about the
under the windows or worn spots
ing or scraping off the old paint
Have the cracks between the flo
crack filler should be used to ma
and walls need repairing, should
be concealed in the walls and flo

Should the old wall-paper be
ings? Are there plaster cracks
plaster on ceilings broken loose fr
ceilings or walls so badly in need
ing with new wet plaster will dela
shellacking or wall sizing be nece
in the surface of the new paint
faces be covered with plywood to

Shall repairing of leaking radiators, or defective plumbing, be made to stop water from staining the ceiling? Possibly a joint around the chimney needs caulking or new flashing is required where the chimney joins the roof. Gutters or valley tin may also need repairing.

These are things that should be investigated when making an inspection tour of the second floor rooms.

On the way down to the main floor, the condition of balusters and hand rail on the stairs should be noted. Is the varnish or paint work worn off the stair treads? Shall the color of the balusters and hand rail be changed to conform with a change in decoration of the lower entrance hall or living room where the stairs land?

Such a survey should continue through all the rooms of the first floor—notes being made concerning each room. A page set aside in the notebook for writing up the preparatory work to be done, as well as the colors and quantity of the paints to be used will help in planning the painting program.

If this method is followed, even though all the rooms are not repainted and decorated at one time, there will be a well-planned, harmonizing treatment brought about in each of the rooms as the work progresses. Such a decorating plan may require a year or two before it is completed. Just as the construction of a well-designed home results when an experienced architect is consulted, so the whole family can help plan and carry out the redecorating job with great pride and satisfaction.

SELECTING INTERIOR PAINT

How to Select.

Selecting interior paints for quality and durability is more difficult than selecting exterior paints. Some interior paints such as flat wall paints, enamels, and calcimines are patented products with secret formulas and no label appears on the package or can to indicate the pigments and liquids that have been used in their manufacture. Factory-prepared paints are available in white and in many tints and shades, in original containers. These carry a label on the can giving complete directions for thinning each coat either for new surfaces or repainting work. *It is important that the manufacturer's directions be carefully followed.* The price per gallon cannot always be taken as a guide to quality or durability. Some paints, though made of low grade pigments with oils and other vehicles of doubtful

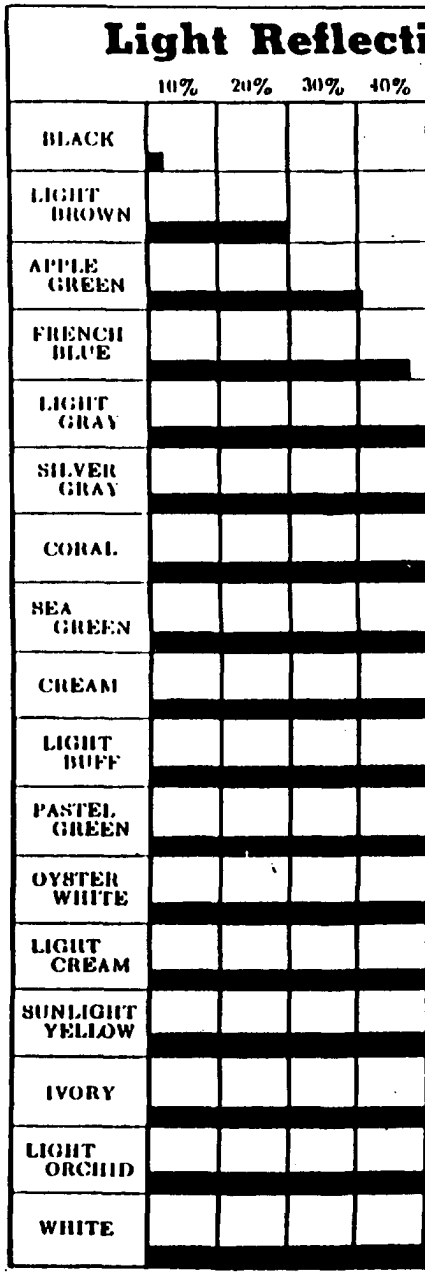


Figure 31.—Light reflectivity of color interior

durability are sold at a high price. They may fail on walls or woodwork that must be washed. It is important that all interior paints be selected to withstand repeated washing if paint maintenance cost is to be kept at a minimum.

Skilled painters estimate that about two-thirds of the cost of a paint job is the labor necessary to prepare the surface and apply the paint. Washable paints, therefore, save time and labor as it is much easier to wash walls, ceilings, and woodwork than it is to repaint them. With exterior paints, the weather exposure to sunshine, rain, and air, gradually wears down the paint film by a gradual chalking process. On interior surfaces there is no such weather wear but if too many coats of unwashable paints are piled up in an effort to maintain clean walls there is every possibility that the weight of the paint will cause it to lose its adhesion and leave the surface resulting in a rough patchy appearance even when repainted. The best practice is to use washable paints that can be cleaned without unduly affecting the paint film. Therefore, in selecting interior paints, for economy as well as for good appearance, one should choose a paint that has demonstrated its ability to withstand the use it will probably get in the different rooms.

Types of Interior Paints.

Interior paints are divided into two main types—those that are for woodwork and those to be used on walls and ceilings. The interior wall surfaces of a home usually are constructed of plaster, wood or insulation board. Each type of wall material requires a priming coat adjusted to the surface of the material painted. However, with washable paints the body and finish coats can be used on any of the surfaces after the proper priming coat has been applied. Some grades of enamel can be used on woodwork or plaster where high gloss is desired. If home-mixed white lead paint or paint formulated and tinted on the job is to be used, the formula specified with the basic paste pigments and oils can be adjusted to suit either the wall surfaces or woodwork, and to give a gloss, flat, or stipple finish.

Cold Water Paints.

Casein and calcimine paints are widely used for painting bedrooms, offices, and ceilings where high light reflectivity without gloss is desired. They dry rapidly, as soon as the water has evaporated; this is usually within one to two hours. They have a fair spreading rate and good hiding power and are usually lower in price per gallon than oil paints. Their use is limited

in that they are not "scrubbable" not be used on walls exposed to fi such as kitchens and bathrooms. moved if oil paints or enamels a otherwise they may cause scaling Casein paint should not be used on such as in basements, cellars, milk rooms because the casein mildews like old cheese. The adhesion of s properties of the casein or skimm it is manufactured.

Calcimine is a mixture of glue, usually consisting of whiting (c similar inert pigments and should where a temporary finish may be and must be removed if oil paints casein and calcimine are usually brush.

Directions for application as f be followed.

Flat and Semi-Gloss Paints.

High grade flat and semi-gloss and very satisfactory. Their form as the vehicle in combination wi quality pigments. Some interior contain large percentages of lithe bonate. These dry with a non-gl be washed successfully as repeat pigment, leaving a splotchy wall. rooms where this type of paint h paint rather than to wash them. pigments are used, their value pe one-third that of high grade exte mixed white lead paint.

Interior Enamels and Gloss Paints.

The use of enamels and high glos is primarily to obtain a finished hard usage and clean more easil Aside from these qualities such p sirable on interior surfaces. In f of reflected light from high gloss disagreeable surroundings in whic like surfaces emphasize patched

Figure 35.—High quality paint materials properly applied to interior wood work provide a washable and durable finish.

walls. In school rooms, glossy surface walls are objectionable because of eye-strain resulting from the reflection of light in irregular and wavy sections of the walls.

Flat and Semi-Gloss Home-Mixed Paints.

High quality flat and semi-gloss paints provide a non-glare, permanent finish that can be washed repeatedly with common soap and washing compounds and yet retains its original color and flat finish. If desired this type of paint can be prepared by mixing it on the job from the basic materials of white lead and oil generally used by painters or it can be purchased as a factory-prepared product. By adjusting the amount of oil, the paints can be used on any interior surface, including woodwork, plaster or other types of wall material. Formulas recommended and used by interior decorators who prepare the paint on the job will be found on page 155. The lead mixing or reducing oil is made especially for thinning paste white lead and provides a tough waterproof paint film when combined with the white lead. This seals the wall surface and helps prevent condensation of moisture in the walls.

Home mixing of these paints has the advantage of reducing

may be used for painting the interiors
wall, milk house, or other surface wh
white or tinted paint is desired.

Tints for Various Rooms.

In selecting the color of paints fo
woodwork, each room should be consi
vary in their use and amount of lig
ample, in the basement there may be
as the fuel. Dust accumulates on th
concrete, cement block, or brick wit
thorough cleaning a problem. (See

To brighten up the basement, a w
is the most practical since the usual
a limited amount of light. If the wa
ment are painted in light colors, th
more satisfactory for the laundry wo
and in some climates, for kitchen and
hot summer months.

Occasionally the store room is in
where windows are lacking. In such
reduced and the rooms rendered mo
walls and ceilings with calcimine, o
permanent paint job is planned, hon
pared at a comparatively low cost a
walls or ceilings. A common hand p
sometimes be used for applying white

The effect of color in the kitchen
shows dirt very quickly so it is usu
walls tinted. Under average conditio
are finished in light colors with a flat
children are in the home, the lower pa
to three or four feet from the floor, ca
color. This will help to eliminate fing
paint used should be of the most dur
The lower wainscot section, or dad
around the room might be decorated
shape design in two or more shades o
part of the walls and the ceiling, if
make a pleasing combination. If the
window space, or possibly one electri
en, the room will appear lighter when
is used for the ceiling and upper side
the most durable and washable paint

In the living, dining room and bedrooms the walls should have tints that harmonize with the furniture and rugs. Light tinted ceilings will reflect artificial illumination, as well as sunshine and daylight, into the different parts of the rooms. (See Figure 34.) The colors of paint for the walls should be selected according to the exposure of the windows. If windows face north, the warm colors, such as cream, yellow and coral, help to make such rooms more cheerful and overcome the lack of sunshine. If rooms have south, east, or west exposure, cool colors, such as blue, blue-green, and gray are desirable.

Bathroom walls should be painted white or light tints, with flat or semi-flat paint that can be repeatedly washed without injury to the paint film. For a further study of color harmony see color wheel in Figure 40, page 23.

ESTIMATING THE AMOUNTS OF INTERIOR PAINT NEEDED

To determine the amount of paint required, it is necessary to find the area of the walls and ceilings. To do this, measure the distance around the room and multiply by the height of the wall. Deduct from this number of square feet of surface the area of windows and doors and you will have the net amount of square feet of sidewall surface. The ceiling surface can be calculated by multiplying the length of the room by its width. Add this to the surface of sidewalls.

To determine the gallons of paint required, divide the total square feet of surface by the number of square feet that one gallon of paint will cover. The covering rate of one coat of home-mixed paint is approximately 800 square feet per gallon over old paint or properly primed surfaces. If factory-prepared paint is to be used, follow the manufacturer's directions for estimating.

HOW TO FIGURE COST OF HOM
LEAD PA

The table below gives the total a
to purchase for a typical *three-c*
including all the material specified
plaster, second coat and flat finish

To Paint Square Feet Of Surface 3 Coats	Pounds of Paste White Lead Required		Ga Le i R Oil
	Pounds	*Gallons	
8000	400	(13)	
4000	200	(6½)	
2000**	100	*(3¼)	
1000	50	(1⅝)	
500	25	(⅞)	

The accompanying table is a p
mixing directions. See page 155 f
the three coats included in this m

(a) This oil should be of a gra
white lead manufacturers f
lead to provide washable f

* There are 3¼ gallons by
of white lead. This volume
the total gallons of paint p
the cost per gallon ready
prices are used as follows: $
lead mixing or reducing o
pounds for soft paste white
prices of raw materials acc
prevailing in different local
cost per gallon of the pain
surfaces have been compu
mately with the covering
packages of white lead as
(25 lb., 50 lb., 100 lb.)

** Example. If enough paint
2000 square feet of surface
100 pound pail of white le
lead mixing or reducing oil
table. This will total enou

a typical three-coat decorative job when mixed according to the formulas for priming, second and third coat flat finish on new plaster.

		Basic Coat	*Total*
Soft Paste White Lead 100 lbs.	(3¼ gals.) . .	$12.00	$12.00
(a) Lead Mixing or Reducing Oil	4 gals. *@*	1.60	6.40
	7¼ gals.		$18.40

$18.40 divided by 7¼ gallons, the total volume of paint ready to apply, makes an average cost of $2.53 per gallon.

PREPARING SURFACES FOR INTERIOR PAINTING

New Plaster Walls.

Examine the plaster closely. Remove any lumps or high spots with a wide putty knife and sandpaper smooth. Notice whether there are any openings around door jambs, base-board, window sills, casings, and picture mould. Patching plaster should be forced into noticeable crevices and cracks.

Eliminating "Hot Spots" from Walls.

Plaster walls that have aged for six months or more do not usually require any special treatment before painting as exposure to the air usually neutralizes whatever free lime the plaster originally contained. Plaster that has not had this time for aging should be treated with a solution of Zinc Sulphate or at least tested for hot spots (free lime) before painting. To test plaster surfaces not previously painted and to avoid "hot spots" developing, the following procedure should be employed:

> Dissolve about 5c worth of Phenolphthalein crystals, available at a drug store, in about a spoonful of alcohol. Mix this in one-half cup of water. Apply the solution with a small swab or brush to spots in different sections of the wall or ceiling that is being tested. If places where the liquid has been applied turn to a deep pink or orchid, it indicates that the plaster has "hot spots" and should be given special treatment to neutralize the excessive lime.

To neutralize hot spots, dissolve two pounds of zinc sulphate in a gallon of water. Apply this liquid freely over the entire

lime dust that has come to t
for priming with paint.

Washing Plaster Walls.

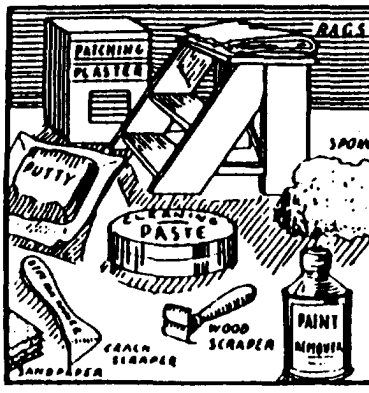
New paint will not adhe
tends to make uneven spot
remove gloss remaining fro
does not remove the gloss i
paints will have better adh

Repairing Cracks in Plaster Wall

Before painting plaster
damaged plaster should b
along the cracks so that pat
securely retained. Force th
knife and smooth it to mat
ing plaster strips on smooth
and allowed to dry before a

When patching plaster is
plastic designed surfaces of
sections must be patted wit
scrub brush, or sponge that
wall surface surrounding it

For repairing cracks in p
amount of thick paint from
to be used for repainting w
stirring in the free oil that
opened can of paint. In this
until the mixture can be
repair material will be pra
which is to be applied.



To produce commonly used tints add, to the gallons of ready-to-use white paint indicated the measures of paste colors-in-oil shown below:

To Produce Tints of	For 1 Gal.	For 2 Gal.	For 3 Gal.	For 5 Gal.
LIGHT YELLOW				
Med. Chrome Yellow	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
OYSTER WHITE				
Raw Turkey Umber	1 Teas.	1¾ Teas	2½ Teas.	4¼ Teas.
PUTTY COLOR				
Raw Turkey Umber	3½ Teas.	2½ Tbls.	3½ Tbls.	6 Tbls.
LIGHT IVORY				
Raw Italian Sienna	2¾ Teas.	5¼ Teas.	2½ Tbls.	4½ Tbls.
CORNSTALK YELLOW				
Raw Italian Sienna	3½ Teas.	2½ Tbls.	3½ Tbls.	6 Tbls.
Raw Turkey Umber	1 Teas.	1¾ Teas.	2½ Teas.	4¼ Teas.
PEACH				
C. P. Orange Chrome Yellow	1¾ Teas	3½ Teas.	5¼ Teas.	3 Tbls.
LILAC				
Rose Lake	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
SHELL PINK				
English Venetian Red	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
TURQUOISE				
C. P. Dark Chrome Green	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
LIGHT GREEN				
C. P. Medium Chrome Green	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
PISTACHIO				
C. P. Light Chrome Green	1¾ Teas.	3½ Teas.	5¼ Teas.	3 Tbls.
SILVER GRAY				
Lampblack	1 Teas.	1¾ Teas.	2½ Teas.	4¼ Teas.
DULL ROSE				
English Venetian Red	5 Teas.	3½ Tbls.	5 Tbls.	8½ Tbls.
Burnt Turkey Umber	3½ Teas.	2½ Tbls.	3 Tbls.	6 Tbls.
ARTICHOKE GREEN				
C. P. Dark Chrome Green	3½ Teas.	2½ Tbls.	3½ Tbls.	6 Tbls.
Raw Turkey Umber	6 Tbls.	12 Tbls.	½ pint	⅞ pint
POWDER BLUE				
Lampblack	3½ Teas.	2½ Tbls.	3½ Tbls.	6 Tbls.
Prussian Blue	1 Teas	1¾ Teas.	2½ Teas.	4¼ Teas.
DULL WINE				
Indian Red	¼ pint	½ pint	¾ pint	1¼ pint
English Venetian Red	3½ Tbls.	7 Tbls.	10½ Tbls.	½ pint
REDDISH GRAY				
English Venetian Red	2½ Tbls.	4½ Tbls.	7 Tbls.	11½ Tbls.
Lampblack	4 Teas.	2½ Tbls.	4 Tbls.	6½ Tbls.

If stipple finishes are being tinted increase the amount of color-in-oil slightly

COMPARISON OF KITCHEN L

	Ounces
1 Pint equals	16
½ Pint equals	8
¼ Pint equals	4
⅛ Pint equals	2
1/16 Pint equals	1

APPLYING IN

Painting A Room.

Prepare to paint the room furniture as possible. Place d remaining furniture, or cover

Set stepladders or sawhorse ceiling surfaces can be easily ing across the short way of th laps is avoided because each quickly and the next one start to set. When painting a roo

1. Prime or first coat:
   a. Woodwork
   b. Ceiling
   c. Wall
2. Apply finish coats to
   a. Ceilings
   b. Walls
   c. Woodwork

In painting ceilings and wall the windows or other source of better lighted view of the sec avoid leaving missed spots or o job.

On ceilings the paint should b semi-circular movement ending already painted. On sidewalls work interfere with free brush overcome with light vertical str the tip of the bristles to touch t page 124.)

The proper type of brush is a the best for the purpose are l inches in width.

The woodwork should be pa coats so that woodwork paint that may have been left along t

Figure 53.—This dairy barn is repainted every 5 years as part of a regular painting program. Such a practice is followed by many successful farmers.

Figure 54.—Testing a painted surface to determine the rate of chalking. Gradual chalking is the normal wearing away of a paint film and excessive chalking indicates poor paint.

Job 1.—Establishing and M

ANA

Steps (Operations)	
1. Provide permanent paint record materials.	Secure ache seve Incl reco ture Secure to b
2. Inspect buildings.	Starti tion prop Study the Walk tion failu or page unle Exa hind build that Mak each Deter shou late List p work moi died
3. Secure history of previous paint jobs.	If a kept able paint build paint If pro the paint
4. Investigate formulas of new paints to be applied.	If facto a su able Copy f branc may page Compa of t

Steps (Operations)	How to Perform (Standard Approved or Accepted Practices)
	Compare the price asked for each grade of paint surveyed.
	If home-mixed paint is to be made with paste white lead, linseed oil and gum turpentine, these formulas are always the same since they have been standardized by government agencies and painting contractors. Comparing prices to be paid for the raw materials is all that is necessary.
5. Select and purchase paints.	Note location of trees and shrubbery so the color of paint to be selected will contrast and fit into the landscaping.
	Discuss with other members of the family the colors to be selected for the body of the building and the trim colors.
	If the building is to be painted white, decide whether a durable paint that will withstand possible postponed repainting is to be used or, an extra-white paint which requires repainting more often is the kind desired.
	If the paint job is sizeable, a saving can be made by purchasing paint materials in large quantities and large size containers.
6. Paint buildings.	Decide which building should be painted first according to need for protection or paint failures that are developing. Apply the paint.
7. Record painting information for future use.	In the paint record book, list month and year that painting is done and about what year each building should be repainted.
	Record the exact formulas, grade, and brand of paint used, weather conditions during the painting process and the approximate drying time allowed between coats.
	Record the cost of the paint used, the number of man hours required to apply it and what preparation of the old surface was necessary.
8. Repaint regularly.	Carry out the painting program which has now been established, using standard approved painting practices.

INTERPRETIVE SCIENCE AND RELATED INFORMATION

Why investigate the history of previous paintings?

Many paint failures are caused by piling up widely different formulations of paints. (See pages 18 and 19).

If the present surface to be painted is in good condition for repainting and no paint failures have shown up in the known history of the old applications the same formula of paint should be used again. This, however, may be difficult as there have been many manipulations of paint formulas to meet competition in paint selling during recent years, and the paint made according to the original formula may not be available.

Why keep a permanent cumulative rec

This should be done so that future
on specified formulas that will be les
patibility of the paint films.

If the past history shows that whi
example, there is no need of a form
one pigment and the formulas would
painting was done, weather conditio
items should be made so that in case
their cause can be traced back to e
proper formulation of the paints use

Why inspect buildings once a year?

This should be done to discover
in order that the cause may be reme
dition that might require complete r

Why investigate formulas?

This is the best way to buy pai
formula rather than by brand-name.
las in certain factory-prepared pain
pigments and oils. Some changes
tried out in certain sections of the c
Usually these paints have not beer
being placed on the market.

What kind of exterior paint is best-

For painting farm buildings the
has been proven the most durable
wholly made of white lead, it has bee
content the greater the durability
This applies to both white and tinted

Why repaint regularly?

Good white paint when exposed
average conditions wears down appr
film of somewhat uniform thickness
done. The best thickness of a paint fi

Two coats of new paint applied a
film to the proper thickness and prote

The period between paintings shoul
building, exposure to sunlight, climat
and quality of paint used.

Steps (Operations)	How to Perform (Standard Approved or Accepted Practices)
	If home-prepared red lead paint is to be used, mix it as follows: To make 1 quart, slowly stir 5 pounds (approximately 4 cups) of dry red lead in 1 cup of raw linseed oil. Let this paste stand over night. Thin to brushing consistency with 1 cup raw linseed oil, ⅓ cup gum turpentime, 1/3 cup drier. (See page 158.)
	If blue lead metal primer is to be mixed on the job, use 3 cups of dry blue lead instead of 4 cups and thin as indicated with red lead.
	If factory-prepared metal primer is to be used, select one which shows in the formula label a high percent of red lead, preferably 100% red lead as the pigment portion.
	For the finish coats on metal work, prepare the same kind of paint that is being used for other parts of the building such as exterior walls or trim. The metal priming paints provide the proper foundation for the succeeding coats of house paints.
	Mix the paints thoroughly according to the formulas selected. Strain through a piece of wire screen to eliminate lumps.
4. Apply paint.	Brush on the paint thoroughly and of even thickness so that the priming coat will protect every crevice in the metal against rust creeping back under the paint film. Apply two coats of metal primer on all sections that have been rusting.
	After metal priming paint is dry, apply finishing coats of house paint by the same method as when painting exterior woodwork, allowing ample time between coats for drying.
	Keep lids tight on paint cans when not in use. Some metal priming paints dry rapidly or set hard in cans if exposed to the air too long at a time and are thus wasted as they cannot be re-thinned for painting.

INTERPRETIVE SCIENCE AND RELATED INFORMATION

What is galvanized metal?

Galvanized metal is coated evenly with a thin layer of zinc, usually by dipping sheet iron in molten zinc. As long as the coating of zinc remains uniform it will gradually corrode away and the iron is protected for a long time from rusting. If breaks occur in the coating of zinc, however, rust begins to attack the iron below at these spots.

Galvanized iron does not hold exterior house paint very well because the zinc corrodes under common house paint, forming salts of zinc that are soluble in water, and thereby takes the zinc out from under the paint, leaving the paint with nothing to stick to. Good primers for galvanized iron contain basic pigments that neutralize acids and thereby stop the corrosion of the zinc. Red lead, blue lead, or zinc dust-zinc oxide primer (80% metallic zinc, 20% zinc oxide) is very suitable for priming galvanized iron. House paints may then be applied over such a primer and if of high quality will not scale or peel off from the metal priming under coat.

What does acid do to galvanized m

Treating galvanized metal with the surface and roughens it so th anchorage. Also, if there is any manufacturing process, this oil wi In this way the paint will hold bet

Why let the acid dry over night?

Allowing the acid to dry or eat i gives it time enough to react on th will hold better.

Why brush off the accumulated pow

Brushing off the powder is to u to be applied later, as well as to metal and make the brushing easie

What does weathering do to galva unnecessary?

During the few months' exposur water, and sunshine destroy any po ized iron. Weather exposure start after about 6 months' time this c effect secured in a few hours by t

Is paint needed on other metals?

If sheet lead or alloys of lead a valleys, and flashing, they last ind paint except to decorate them to ha

Copper needs no paint as far as however, water-soluble compounds which, during rains, results in a painted surfaces and discolors the

Copper staining usually is foun This staining can be prevented if th varnish about every two years.

Copper discoloration washes off w a permanent stain effect.

How do red lead, blue lead, or other

Red lead is an oxide of metalli large pots to a cherry red color of its surface. This forms a gray or lead oxide known as litharge. (Pb small amount of lead is melted in be performed in a high school labo

Litharge (PbO), when reburned, another lead oxide with the chemical form when mixed with linseed oil "l reaction (see illustration page 26) mixed with linseed oil.

Painting new steel or iron wo started coats the surface with an ox which seems to amalgamate itself to gen of the air getting to the iron a

Practically all steel work used in constructing buildings, oil storage tanks, bridges, battleships, and other such structures are kept well painted with red lead as the priming coats over which paints of other colors may be applied for decoration.

A few weeks after red lead paint is applied its bright orange color gradually changes to a yellowish gray. Close inspection will show that a white powder has formed on the surface of the red lead paint. The oxygen and other gases in the air have turned some of the lead oxide Pb.0, to basic lead carbonate [(white lead) ($2PbCO_3.Pb(OH)_2$] which is a white paint pigment and appears gray over the red lead paint. This conversion of red lead to white lead does not affect the durability of the paint.

Metallic lead is almost indestructible and its oxides change their color and atomic composition which all seem to be useful in protecting the oxidation of other metals. Some of these phenomena, although difficult to explain scientifically, may have something to do with the fact that up to the present time no paint treatment for prevention of rusting of iron has been found that appears to excel the use of lead oxides when cost and durability are the main factors and they can easily be prepared at home for painting metal by the simple addition of linseed oil and gum turpentine.

Blue lead is another lead pigment that has practically the same rust inhibitive properties as red lead.

Such metal primers as described can be used on iron or steel machinery after old rust has been thoroughly wire brushed off.

What are most factory-prepared metal primers made of?

Factory-prepared metal primers usually contain red lead, blue lead, or other similar pigments along with varnish or linseed oil.

How do good metal primers provide foundation for house paint?

Good metal primers provide a suitable foundation for house paint because the lead oxide pigments and oils dry hard and hold to the metal without alligatoring or peeling as common house paints are liable to do when applied directly to metal.

Why thin down paste and strain metal priming paints?

All paste paint must be thinned down to brush and spread it to a uniform film thickness on the metal surfaces. It should be strained to remove any "skins" or lumps of paste in order that thick and thin spots do not result when brushing.

Why apply uniformly?

If paint films are not applied with uniform thickness, the thin spots will wear through too soon and the whole building will require repainting more often than otherwise.

Too much paint piled up on any surface, wood or metal, may result in alligatoring, cracking, or peeling. The total paint film should be kept as nearly as possible to about 1/200th of an inch (about the thickness of 2 sheets of bond paper) which by properly spacing periods between repaintings and application of the proper amount of paint per square foot can be maintained. (See Figure 26.)

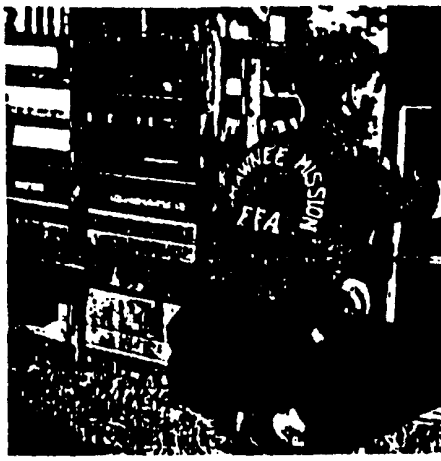


Figure 70.—Priming a steel sash with

Figure 71.—Sealing lower edge of windows prevents moisture from entering sash and causing decay or paint peeling.

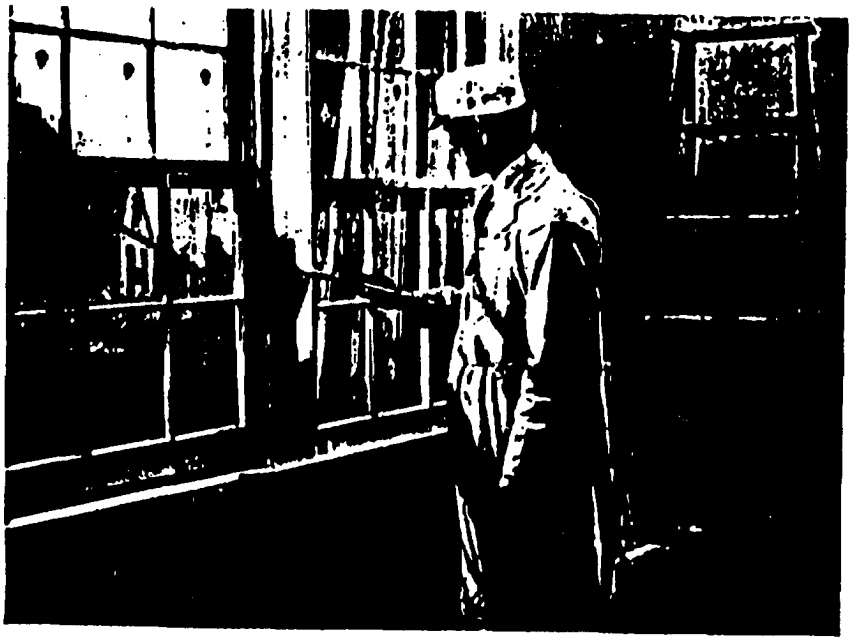


Figure 72.—Good materials and skilled brush work are necessary to secure clean-cut enamel jobs. The brush is especially important. It must be small, the bristles close-packed and flexible.

Job VII.—Painting Ne

ANAL

Steps (Operations)	(S
1. Secure equipment and supplies.	Provid Step Rags Putt Steel Pain Strai (o im Padd
2. Prepare surface.	Clean from oilin wipe Remov woo prop pape win and appe with off If har door ture arou If wa mas time use
3. Secure paint.	If fu man tion. If whi on form finis to c 68.)
4. Apply paint.	Apply it in Fill a putt Strain chec it w

Steps (Operations)	How to Perform (Standard Approved or Accepted Practices)
	When applying interior paint use a 2-inch or 3-inch high quality flat brush and a sash brush. As paint or enamel for interior woodwork contains oils or varnishes that level out more easily than exterior linseed oil paints, such finish material should be "flowed on" with the brush and allowed to level itself without too much brushing. A uniformly thick coating should be applied, based on the correct spreading rates found in mixing formulas (pages 155 and 156) or in the manufacturer's instructions.
	Apply priming and undercoats to seal the surfaces and build up the necessary foundation for finish coats which are subjected to the wear. Be sure the tops and bottoms of all sash and doors receive at least one coat of paint to prevent the entrance of moisture.
	Finish painting the casings around one door or window at a time. This prevents laps and uneven surfaces. In general, the finishing strokes of the brush should be with the grain of the wood. (See Figure 72.)
	Sand to smooth surface between coats with No. 00 sandpaper and be sure to dust or wipe off surfaces before applying the next coat so loose sand does not get mixed with new wet paint.
	Allow enough time between coats for paint to dry so that the paint does not gum up the sandpaper.
	Avoid dust circulation in the room by covering the floors with drop cloths. Windows may be kept open if screens prevent the entrance of insects and the weather is not rainy or windy.
	Soon after finishing the job, move each window sash up and down several times so that they do not get stuck to window stops by hardened paint.
	Clean off paint spots as painting proceeds. These can be easily removed while fresh with a rag wet with gum turpentine. If allowed to harden they require scraping off with a razor blade or the use of liquid remover.
	If new wood, such as Southern Pine (Yellow Pine), Douglas Fir, or Ponderosa Pine, is to be painted, apply a thin coat of shellac to such surfaces, *after* they have been primed and holes have been puttied, to get a smooth and uniform surface. (Cut the regular grade of shellac with equal parts of wood alcohol to make thin enough for this use.) Sand off smooth with No. 00 sandpaper and dust. Apply necessary coats of paint as when painting other woods.

Job VIII.—Repaintin

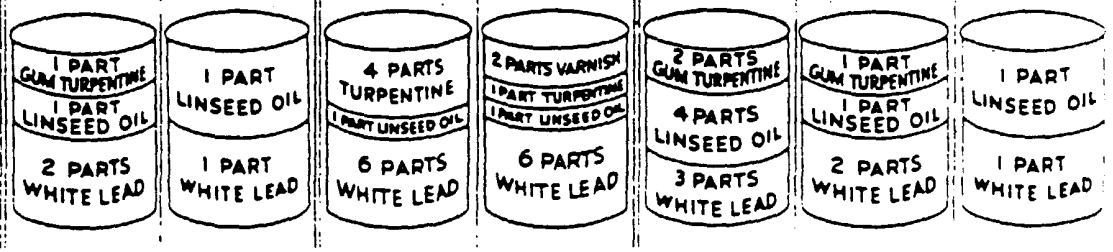
ANA

Steps (Operations)	
1. Secure equipment and supplies.	Provi Ste Dus Pai San Ste Pai Chees
2. Prepare the surface.	Wash wat con the sur glos ing (½ Remo con tim to Putty wu not for sev ove
3. Select and secure paint.	If fa ma tio col glo wit job, and and
4. Apply paint.	Use qua buc pie for nal teri ena bru out thi bas in or

Formulas For Making Home-Mixed Exterior Paint

	REPAINTING EXTERIOR WOOD OVER OLD PAINT				PAINTING NEW EXTERIOR WOODWORK		
	SIDEWALLS		PORCH FLOORS				
FORMULA →	No. 1	No. 2	No. 3	No. 4	No. 5	No. 1	No. 2
	FIRST COAT	FINISH COAT	FIRST COAT	FINISH COAT	FIRST COAT Priming	BODY COAT	FINISH COAT Except porch floors
Soft Paste White Lead	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. 3¼ gal.	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)
Raw Linseed Oil*	1⅝ gal.	3¼ gal.	½ gal.	¾ gal.	4 gal.	1⅞ gal.	3¼ gal.
Gum Turpentine	1⅝ gal.		2¼ gal.	¾ gal.	2 gal.	1⅝ gal.	
Spar Varnish				1¼ gal.			
Liquid Drier*	1 Pint	1 Pint	½ Pint	½ Pint	1 Pint	1 Pint	1 Pint
Gallons of Paint Produced	6⅝	6⅝	6	6	9⅜	6⅝	6⅝
Total Square feet will cover	4850	4850	4200	4200	5600	4850	4850

These simplified volume mixing charts may be used for making larger or smaller amounts of paint. Any size measuring can may be used if the proper proportions of ingredients are measured and mixed



IF BOILED LINSEED OIL IS USED OMIT DRIER.

Formulas For Making Home - Mixed Interior Paint

	REPAINTING INTERIOR WOODWORK AND OLD PLASTER		PAINTING NEW INTERIOR WOODWORK			PAINTING NEW PLASTER	
FORMULA →	No. 6	No. 6	No. 7	No. 6	No. 6	No. 8	No. 6
	FIRST COAT	FLAT FINISH COAT	FIRST COAT (PRIMING)	SECOND COAT	FLAT FINISH COAT	FIRST COAT (PRIMING)	SECOND AND FINISH COATS
Soft Paste White Lead	100 lbs. 3¼ gal.	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. 3¼ gal.	100 lbs. 3¼ gal.
Raw Linseed Oil*			3 gal.*				
Gum Turpentine			2 gal.				
Lead Mixing or Reducing Oil**	3¼ gal.	3¼ gal.		3¼ gal.	3¼ gal.	4½ gal.	3¼ gal.
Liquid Drier*			1 Pint				
Gallons of Paint Produced	6½ gal.	6½ gal.	8½ gal.	6½ gal.	6½ gal.	7¾ gal.	6½ gal.
Total Square feet will cover	5200	5200	6000	5200	5200	6200	5200

These simplified volume mixing charts may be used for making larger or smaller amounts of paint. Any size measuring can may be used if the proper proportions of ingredients are measured and mixed.

Alternate Formulas For Making Home - Mixed Interior Paint

(These formulas may be used if Lead Mixing or Reducing Oil specified in formulas on page 155 is not available)

	REPAINTING INTERIOR WOODWORK AND OLD PLASTER		PAINTING NEW INTERIOR WOODWORK AND PLASTER		
FORMULA →	No. 6A	No. 6B	No. 7A	No. 6A	No. 6B
	FIRST COAT	FINISH COAT	FIRST COAT (PRIMING)	SECOND COAT	FINISH COAT
Soft Paste White Lead	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)	100 lbs. (3¼ gal.)
Linseed Oil*			3 gal.		
Gum Turpentine	1½ gal.	1¾ gal.	1¼ gal.	1½ gal.	1¾ gal.
Floor Varnish (Best grade)	¾ gal.	1 pint	2 gal.	¾ gal.	1 pint
Liquid Drier	½ pint	½ pint	1 pint	½ pint	½ pint
Total Gallons of Paint produced	5½ gal.	5⅛ gal.	9⅝ gal.	5½ gal.	5⅛ gal.
Coverage per gallon (square feet)	800	800	600	800	800

* IF BOILED LINSEED OIL IS USED OMIT DRIER.

NOTE—If the finish coats on plaster are to be stippled reduce the amount of liquid so the paint will be of thicker consistency. This will give depth and sharpness to the stipple design.

SPECIAL FORMULAS ... OR EXTERI...

The formulas below are for ... two coats on new wood, repla... three-coat paint job by adding ... to keep the wood from soaking ... obtained with special priming ... are factory-prepared or home ... full brush and then brushed ou... age. Such brushing is essenti... painters prefer applying the ... instead of trying to apply the ... two coats.

For very porous old wood s... worn off and the siding has ... cent of these two-coat mixing ... surface and make a very satisf... It is also a good priming coa... sidewalls.

FORMULA

No. 9—
PRIMING COAT — 100 lbs. soft pas... 1½ gals. linseed... ¾ gal. exterior... ¼ gal. pure gu... 1 pint liquid d... ½ pint raw um...

No. 10—
FINISH COAT — 100 lbs. soft pas... 2¾ gals. linseed... 3 pints pure g... 1 pint liquid d...

(Note—The small amount of raw u... cause an off-white first coat hides ... like Douglas Fir and Southern Pin... the grain formation. Off-white pu... when the next coat is applied bec... tween the two coats.

How to Make Home-Mixed Red Lead Paint with Dry Red Lead

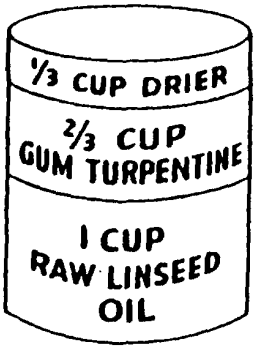
To make 1 Quart of Red Lead Paint proceed as follows:

First Step

Stir 4 cups (5 lbs.) of dry red lead into 1 cup of raw linseed oil to form a paste. (See volume mixing chart). Let this mixture stand a few hours, or over night to allow the red lead to become thoroughly wet with the oil.

Second Step

Thin the paste red lead into a paint of brushing consistency by adding 1 cup of raw linseed oil, 2/3 cup of gum turpentine and 1/3 cup liquid drier. Stir well and keep tightly covered when not in use. If boiled linseed oil is used, omit the drier.



NOTE: If larger amounts of red lead paint are to be made, increase the quantities of dry red lead and other ingredients proportionately, and follow the volume mixing charts above.

FOR EXAMPLE: 20 lbs. of dry red lead, stirred in 4 cups of raw linseed oil will make paste enough to be thinned to one gallon of red lead paint when 4 times the quart formula illustrated is mixed together.

CAUTION: As homemade red lead paste or paint soon gets hard in the can after mixing it with oil make only what paint will be used for immediate painting. Dry red lead keeps indefinitely.

BLUE LEAD METAL PAINT—If a quart of blue lead metal primer is to be made [illegible] cups of dry red lead and add liquids

DEFINITIONS OF

Actinic Rays.—The sun's light rays down of paint films. These are a

Active Pigment.—Pigments in paint t linseed oil. White lead, red lead, cipal, so-called active pigments.

Adhesion.—The property a paint film

Adulteration.—The substitution of inf standard.

Air Brush (air gun).—An atomizer

Alkali.—A substance that neutralizes Alkalis or strong alkaline solutio films.

Alligatoring.—A form of paint failur wide cracks due to a top coat dry which it has been applied.

Aluminum Silicate (silicate of alumin rather fluffy extender pigment w inert.

Anchorage.—The mechanical effect of face of wood or other materials effect is similar to the "clinch" of

Barium Sulfate (barite, barytes, sulfa white crystalline extender pigme expensive heavy pigments.

Basic Carbonate White Lead.—See w

Basic Lead Sulfate (basic sulfate wh made by subliming lead sulfide, w

Benzine (mineral spirits, petroleum s leum distillate, less volatile than

Benzol.—A by-product of the distillati properties for many of the materi For this reason it is used extensi Because of its toxic effect on man by toluol and xylol in the manufac

Binder.—The non-volatile vegetable o erally linseed oil in good paints.

Bleeding.—A term applied when descr as creosote or aniline dyes that m to wood. Later they may dissolve

Peeling.—A term applied to paint failure when the paint film loses its adhesion to the underneath surface and comes off in sizable pieces. Usually caused by moisture back of the paint film, improper formulation of the paint, or painting over greasy surfaces. (See page 12.)

Pigment.—The solid, finely divided particles of paint such as white lead, zinc oxide, titanium, etc.

Plastic Paints.—A thick, plaster like paint usually made by mixing whiting in either factory-prepared or white lead paint made on the job. The mixture is usually thick enough to trowel on the wall instead of being brushed on as is the usual method for applying paint.

Primary Color.—A primary color is a color which cannot be produced by mixing any other two colors. The three true primary colors are red, yellow, and blue. From the standpoint of paint making, black and white may also be considered as primary colors since they cannot be made by mixtures of any other colors. Technically, however, black is the absence of all color and white is the presence of all colors. (See color wheel, page 40.)

Priming Coat.—The coat of paint applied to surfaces which serves as a foundation for the succeeding coats. It helps to seal pores and anchor the paint to the surface of the building material.

Prussian Blue (Chinese blue).—A pigment composed of ferric ferrocyanide. Prussian blue is easily affected by alkali but not by acid. Available in colors-in-oil for tinting paints.

Putty.—A stiff plastic mixture of whiting and linseed oil with or without white lead used for filling cracks or holes and for holding window glass in the sash.

Raw Oil.—Linseed oil in its natural state is called raw oil.

Raw Sienna.—One of the brown earth pigments found in France, Italy, England, and America. It contains from 60 to 70 percent hydrated ferric oxide, the rest being alumina and silica. The color naturally varies according to the exact chemical composition, the deposit from which it is secured, and the method of preparation. Available in colors-in-oil or in Japan.

Raw Umber.—One of the brown earth pigments, consisting essentially of hydrated ferric oxide but differing from raw sienna because it contains in addition to alumina and silica, 10 percent or more of manganese. The color varies according to the locality from which it is obtained and the method of preparation. Umber is obtained from deposits in Italy, France, and England and also from the Island of Cyprus. Available in colors-in-oil or Japan.

Red Lead.—A bright orange red oxide of lead which is used most extensively as a pigment in paint for priming structural steel and other metal surfaces.

Runs.—Defects in a finish due to an excess of finishing material being applied which did not "stay put" but flowed down in a curtained or rugged effect. Usually caused by painting over a greasy surface or using a paint containing too much oil in proportion to the pigment. (See page

Sags. -Irregularities in finished s
uneven flow. Whenever an exc
on horizontal or upright work,

Sal Soda.- Crystallized sodium car
solutions to remove grease and

Sap-Wood. —The portion of a tree ju
about one-fifth to approximat
tree. Usually distinguished by
the heart-wood that forms th
trunk of a tree. When the tr
used where there is too much
heart-wood, on account of the w
resist decay.

Satin Finish.—When a dried paint
one resembling the luster of sa

Scaling.—An evidence of paint fail
Rain moisture entering the crac
property, and results in the bre

Semi-Gloss. -A material is said to
out to a sheen about half way b

Shellac.- It is available as a brow
or as a transparent white shel
leaves a very hard but somew
down as a smooth foundation f

Silica (silex).—A natural extender
It is chemically inert and has

Size.—A solution of gelatinous ma
varnish, which is used to seal o
quently hold succeeding coats of

Skins.—The films of dried paint tha
when left exposed to air. Form
oil in the paint and to the actio

Skips.—Places where the painter has
has been too dry to apply the

Soft Paste White Lead.—A paste
(white lead) 9% raw linseed o
made for painters and large u
factory costs of mixing by thin
job with additional linseed oil a

Solvents.—Volatile liquids, usually o
similar materials to dissolve t
Some of them are used to disso
lacquer.

Soy-Bean Oil. A semi-drying vegeta
when properly processed, can b
varnishes.

Spirit Varnish. A varnish, such as
resins in a very volatile liqui

spirits, or a similar volatile. When dry this kind of varnish leaves a very thin film of the original resins or gums that have been dissolved in the spirits.

Starch Solution.—A solution made with water and starch used by painters for soaking off wall paper or for starching newly painted walls so that they can be more easily washed.

Stencil.—A piece of tough paper or card board from which cut-out designs have been made. By holding the stencil against a wall, the pattern or designs can be made on the surface by applying paint in the cut-out portions in the stencil material. (See page 136.)

Stippling.—A finish made by using a stippling brush or roller stippler on a newly painted surface before the paint is dry. This is done by tapping the surface with the bristle ends of a brush or by rotating a roller stippler over the wet paint thus leaving an orange-peel, roughened design. (See page 72.)

Stretch.—A term used to describe the width of a section of a wall that is painted before moving the ladders or scaffolding.

Sublimed White Lead.—See basic sulfate white lead.

Thinner.—A liquid that can be added to paint, varnish, or lacquer to reduce its consistency. Usually thinners are highly volatile, such as turpentine, mineral spirits and wood alcohol.

Tint.—Is a color produced by mixing a white pigment or paint with a small amount of a colored pigment or paint. When used as a verb, the word "tint" indicates the act of adding small quantities of color, as for example, a white paint is tinted to an ivory shade by adding a small quantity of yellow.

Tinting Colors.—Pure concentrated colored pigments ground in oil or a neutral varnish used for adding to white or colored paints to produce other shades.

Titanium Dioxide.—An inert white pigment with very good hiding power.

Titanium Pigments.—These include the pure titanium dioxide, lead titanate and the composite pigments in which titanium dioxide is co-precipitated or mechanically mixed with blanc fixe, (barium sulfate) calcium sulfate, or magnesium silicate.

Tooth.—A term sometimes used by painters when describing the characteristics a paint has for providing good anchorage or adhesion for the succeeding coats. They say it gives "tooth" to the surface.

Touch-Up Colors.—Paint made and tinted to match old painted surfaces. Used for touching up mended cracks and holes that have been repaired with patching plaster.

Transparent Pigments.—Having no hiding or covering power. Not opaque. Examples are: Silica, calcium carbonate, magnesium silicate, and calcium sulfate.

Turpentine.—(See gum turpentine.)

Tung Oil (Chinawood oil).—An oil extracted from the nut of the tung tree. It has rapid drying qualities and is used largely in the manufacture of [illegible] properties and makes up part of

Tuscan Red. A red pigment mad[illegible] alizarine dye. A typical anal[illegible] 43%; ferric oxide, 33%; and [illegible] colors-in-oil.

Ultramarine Blue. One of the b[illegible] mixtures of china clay, sodiu[illegible] easily affected by acids but n[illegible] for tinting.

Undercoats.—The coats of paint [illegible] smooth finish before applying

Undercutting.—The preparation o[illegible] patching plaster. The crack i[illegible] wider at the bottom of the c[illegible] the patched plaster will clinch [illegible] crack. (See pages 63 and 13[illegible]

Van Dyke Brown.—An organic p[illegible] similar to lignite or brown c[illegible] from Germany. It has a war[illegible] transparent in oil. Used for s[illegible]

Varnish.—A solution of certain gu[illegible] applied to surfaces, produces a[illegible]

Vehicle.—The liquid portion of a [illegible] the oil, varnish and volatile t[illegible] and holds it in the paint film

Venetian Red.—A bright red pigm[illegible] sulfate. Available in dry po[illegible]

Washing.—A type of failure wher[illegible] if composed of certain pigmen[illegible] or streak down over the sidew[illegible] positing the paint pigments on[illegible] walls.

Washing Compounds.—Chemicals [illegible] alkali liquid similar to lye so[illegible] grime when used for washing[illegible] can be made strong enough to [illegible]

White Lead (basic carbonate of lea[illegible] metallic lead. According to hi[illegible] use for over 2000 years. It is [illegible] alone with linseed oil, makes [illegible] power, chalks gradually, and u[illegible] repainting. It is used as the p[illegible] factory-prepared white and t[illegible] oxide and titanium pigments.

Whiting (calcium carbonate, chalk) [illegible] lowish white rock which is com[illegible] marine organisms. Cliffstone [illegible] monly used for making putty [illegible] inert extender in manufacturin[illegible]

spirits, or a similar volatile. When dry this kind of varnish leaves a very thin film of the original resins or gums that have been dissolved in the spirits.

Starch Solution.—A solution made with water and starch used by painters for soaking off wall paper or for starching newly painted walls so that they can be more easily washed.

Stencil.—A piece of tough paper or card board from which cut-out designs have been made. By holding the stencil against a wall, the pattern or designs can be made on the surface by applying paint in the cut-out portions in the stencil material. (See page 136.)

Stippling.—A finish made by using a stippling brush or roller stippler on a newly painted surface before the paint is dry. This is done by tapping the surface with the bristle ends of a brush or by rotating a roller stippler over the wet paint thus leaving an orange-peel, roughened design. (See page 72.)

Stretch.—A term used to describe the width of a section of a wall that is painted before moving the ladders or scaffolding.

Sublimed White Lead.—See basic sulfate white lead.

Thinner.—A liquid that can be added to paint, varnish, or lacquer to reduce its consistency. Usually thinners are highly volatile, such as turpentine, mineral spirits and wood alcohol.

Tint.—Is a color produced by mixing a white pigment or paint with a small amount of a colored pigment or paint. When used as a verb, the word "tint" indicates the act of adding small quantities of color, as for example, a white paint is tinted to an ivory shade by adding a small quantity of yellow.

Tinting Colors.—Pure concentrated colored pigments ground in oil or a neutral varnish used for adding to white or colored paints to produce other shades.

Titanium Dioxide.—An inert white pigment with very good hiding power.

Titanium Pigments.—These include the pure titanium dioxide, lead titanate and the composite pigments in which titanium dioxide is co-precipitated or mechanically mixed with blanc fixe, (barium sulfate) calcium sulfate, or magnesium silicate.

Tooth.—A term sometimes used by painters when describing the characteristics a paint has for providing good anchorage or adhesion for the succeeding coats. They say it gives "tooth" to the surface.

Touch-Up Colors.—Paint made and tinted to match old painted surfaces. Used for touching up mended cracks and holes that have been repaired with patching plaster.

Transparent Pigments.—Having no hiding or covering power. Not opaque. Examples are: Silica, calcium carbonate, magnesium silicate, and calcium sulfate.

Turpentine.—(See gum turpentine.)

Tung Oil (Chinawood oil).—An oil extracted from the nut of the tung tree. It has rapid drying qualities and is used largely in the manufacture of [illegible] properties and makes up part of

Tuscan Red.—A red pigment
alizarine dye. A typica
43%; ferric oxide, 33%
colors-in-oil.

Ultramarine Blue.—One of
mixtures of china clay,
easily affected by acids
for tinting.

Undercoats.—The coats of
smooth finish before ap

Undercutting.—The prepara
patching plaster. The c
wider at the bottom of
the patched plaster will
crack. (See pages 63 a

Van Dyke Brown.—An orga
similar to lignite or br
from Germany. It has
transparent in oil. Usec

Varnish.—A solution of cert
applied to surfaces, prod

Vehicle.—The liquid portion
the oil, varnish and vol
and holds it in the pain

Venetian Red.—A bright red
sulfate. Available in d

Washing.—A type of failure
if composed of certain p
or streak down over the
positing the paint pigme
walls.

Washing Compounds.—Chem
alkali liquid similar to
grime when used for wa
can be made strong enou

White Lead (basic carbonate
metallic lead. According
use for over 2000 years.
alone with linseed oil,
power, chalks gradually,
repainting. It is used as
factory-prepared white
oxide and titanium pigme

Whiting (calcium carbonate,
lowish white rock which
marine organisms. Cliffs
monly used for making
inert extender in manufa

Wood Turpentine.—Turpentine that has been made by steam distilling Southern pine chips and stumps rather than distilling the pure gum gathered from live trees.

Wood Fillers.—Fillers are of two kinds—paste and liquid.

Paste fillers are something like a very thick paint and are composed of some solid powdered substance, usually silica or powdered quartz, mixed with linseed oil or varnish thinned with turpentine or benzine. They are applied to the dry surface of the wood with a stiff short bristle brush or put on with a cloth and rubbed well into the pores of the wood. After half an hour or so the surface of the wood is wiped off and after further drying sanding is done before finish coats are applied.

The word "filler" is sometimes used synonymously with extender.

Wood Stain.—Stains that penetrate and change the color of the cellular structure of wood. They usually form no film on the surface of the wood.

Spirit stains made with alcohol or oil stains, composed of linseed oil and color pigments do not raise the grain of the wood and water stains composed of water and coloring matter are used on close grain woods where the grain is not easily raised by moisture.

Wrinkling.—A defect in paint films usually caused by applying too thick a coat which partially dries first on the surface; later drying and shrinking of the paint underneath wrinkles the surface. (See page 16.)

Zinc Oxide.—A white pigment composed of the oxide of zinc and made by burning metallic zinc. Used largely in factory-prepared paints, enamels, and lacquers in combination with other pigments.