

TRAINING COURSE FOR REPRESENTATIVES OF
THE SHERWIN-WILLIAMS CO.

TEXT No. 6

OTHER S-W OIL PAINTS—LIQUID

Mine, Mill and Factory
Commonwealth Paints
Commonwealth Barn Red
Commonwealth Barn Gray
Roof and Bridge Paint
Family Paint



THE EMBLEM OF
QUALITY AND SERVICE

N41565

Property of The Sherwin-Williams Co.

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OTHER S-W OIL PAINTS—LIQUID

We have observed in previous texts the development of an appreciation of and belief in paint as the saviour of physical surfaces. This naturally has brought about a demand for good paint at a lower price, paints which though they may not have all of the good qualities of S W P, would nevertheless be good, reliable paints. Not that S W P is too good or too costly, nor that the desired low-price paint is to be "cheap." But just as one person buys silk hose with a certain purpose in mind—GOOD silk hose—so another may desire a wool hose or a cotton hose or a half and half mixture to suit his particular purpose, or perhaps fit his economic condition. Since the beautifying and protecting of surfaces constitute the dual purpose of paint, the desired lower-price paint would not hit the mark if one or the other of these two purposes were sacrificed.

Mr. Henry Ford recently wrote his opinion regarding these two factors of Utility and Beauty:

"We have made many improvements in design and materials, and, of course, in manufacturing methods, but the benefit of every improvement had been passed on to the public.

"The design has been as good looking as we knew how to make it, considering that each part had to be made in the light of these three principles, given in the order of their importance; 1—Strength; 2—Economy in manufacture; 3—Appearance.

"It may be asked: 'Is it not better to sacrifice the artistic to the utilitarian than the utilitarian to the artistic?' What, for instance, would be the use of a teapot that would not pour because of the ornate design of its spout? Of what use would be a spade which cut one's hands because the handle was richly carved? As soon as the decoration on an object of utility interferes with its functioning, it ceases to be an object of art and had better be discarded as a nuisance.

"It has been said that trade and industry are fatal to art; but that is not true. When art is divorced from utility something is wrong. Industry and art are not incompatible, but sound judgment is necessary in preserving the true balance between them. An automobile is a modern product and has to be designed, not to represent something which it is not, but to do the work for which it was intended."

Mr. Ford rightly holds that the balance between art and utility lies in performance.

To produce, therefore, a line of paints in which the extremes of ECONOMY and DURABILITY meet WITHOUT SACRIFICING THE PLEASING OR ARTISTIC EFFECT was what our company aimed to do. How well we have done it will be seen in this text which discusses these LOWER-PRICE, good oil paints. The following S-W paints fall within this list:

- S-W Mine, Mill and Factory
- S-W Commonwealth Paints
- S-W Commonwealth Barn Red
- S-W Commonwealth Barn Gray
- S-W Roof and Bridge
- S-W Family Paint

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S-W MINE. MILL AND FACTORY COLORS

First Produced in 1885

This line of paints is especially adapted to the purpose of decorating and preserving buildings adjacent to mines, mills and factories where a good, substantial paint is required at a low price, and that will give satisfactory results in two coats.

Good, substantial and satisfactory in two coats are not the only requirements here, for our composition must be such as to cause the paint film to withstand the discoloring gases in industrial communities. S-W Mine, Mill and Factory Paint meets all these requirements fully.

Let us take S-W Mine, Mill and Factory Paint White and see what composes it, the better to understand how it meets the durable qualities required.

THE PIGMENTS ARE:

Zinc Oxide
White Lead Sulfate
Magnesium Silicate.

ZINC OXIDE: Very fine particles, fluffy, it carries a great quantity of oil; mixed with good paint oil it dries to a very hard film. G. B. Heckel says of it: "Zinc Oxide is unaffected in color by any gases present in the atmosphere, has no effect upon any pigment with which it may be mixed, and is non-poisonous."

WHITE LEAD SULFATE: Whiteness, fineness of particles, great oil carrier, resists the discoloring action of hydrogen sulphide and other harmful gases in the atmosphere longer than any other lead pigment; uniform and counterbalances hardness of Zinc Oxide in the film.

MAGNESIUM SILICATE: This is the pigment specified by so many industries and railroads for their paints. We have seen it to be a great help in S W P. Chemically inactive; makes an excellent associate for Zinc and White Lead Sulfate; strengthens the film; being very fine it carries much oil; is tough, and it has been said by one of our greatest paint authorities that "if Magnesium Silicate had more opacity it would be the IDEAL PAINT PIGMENT." It is smooth, yet hard as steel in its particle-strength, and the "feel" of it under the brush is like the touch of fine velvet. It is a fire-retardant. This pigment gives durability to the film. In this particular combination with Zinc and our particular selection of oils the great hardening tendency of Zinc is reduced.

THE VEHICLES ARE:

Linseed Oil
Durable Drying Oil
Drier
Mineral Spirits.

LINSEED OIL dries to an elastic, tough film and binds the pigment material to the surface.

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DURABLE DRYING OIL: This is a "newcomer" to us. It is a combination of Chinawood Oil and Mineral Spirits. We note first that it is a DRYING OIL, and that it is a DURABLE Drying Oil. Let us spend a few moments with the Drying Oils.

Linseed oil is the only oil which we have, hitherto, studied. This oil comes from the picturesque flax plant of the field. We are now to go to the slopes of far Eastern countries and find trees with oil-bearing seeds and down to the sea in ships to see whether other good oils for paint can be found.

Our journey is a successful one. For years chemists have been busy developing other good oils for use in paint. We thoroughly appreciate the qualities par excellence of linseed oil; but we are now to see that it is not the only good oil available for paint purposes. The oils to which we here refer are all "drying oils." "Semi-Drying Oils" is a term often used to define these oils which are by nature slower in their drying properties than Drying Oils.

WHAT ARE THE CHARACTERISTICS OF A DRYING OIL?

G. B. Heckel, Secretary of the Paint Manufacturers' Association of the United States, says, in his "Paint Catechism for Paint Men," Page 27: "Drying oils have the peculiar property of absorbing oxygen and forming a tough elastic substance. They harden from the surface inward. Certain oxides and salts when incorporated with these oils by heat or otherwise, by acting apparently as catalytic carriers of oxygen, hasten the drying process. On exposure the hardening progresses slowly until the material finally crumbles and disintegrates. The added metallic salts, etc., are known as 'driers,' the oil in which such driers have been incorporated as 'drying oils,' and if incorporated by heat 'boiled oils.' A strongly concentrated drying oil thinned with a volatile oil (turpentine, benzine, etc.) is also known as a 'drier' and sometimes, especially if a gum or resin be added to it, as a 'Japan drier.' "

WHAT ARE THE DRYING OILS? They are linseed oil, perilla oil, soya bean oil, poppy seed oil, nut oil, tung or Chinawood oil, menhaden oil, lumbang oil, and sunflower seed oil. There are a few others not so commonly used.

WHAT IS THEIR PARTICULAR USE IN PAINT? Heckel very briefly answers this question in the book above quoted (page 27). "First, to give to the paint the necessary fluidity; secondly, to insure the uniform distribution of pigment on the surface; thirdly, to form a firmly adherent, coherent, and impermeable film of the proper character, and lastly, to produce in the paint the desired lustre."

Chinawood oil comes from the seed of a tree very common in China and Japan. The family name of the tree is "Ying-Tsu-Tung," so called after the name of its fruits, "ying," meaning bottle. It grows in stony ground to a height of 10 to 15 feet. The fruits, which are gathered in August and September, contain five to seven large and poisonous seeds, from which the oil is expressed.

Maxmillian Toch, in his lectures in England, in 1910, on "The Newer Paint Materials," gives his authoratative opinion on Chinawood Oil. He says: "There is very little that can be added to my previous writings concerning Chinawood Oil. In America we can make a better varnish out of Chinawood and rosin than out of Manila copal and linseed oil"—(Copal is a very durable resin gum used for making varnish.) "The average paint and varnish maker who is not up to date, cannot of course, manipulate Chinawood Oil with success, for we have found in paint chemistry, as we have found in everything else, that a rule-of-thumb method is not only obsolete but unprofitable, for uniform goods cannot be produced unless they are manufactured by scientific control.

"Chinawood Oil is a remarkable material, and for enamel paints and for hard drying paints it will probably not be superseded for many years. IT PRODUCES A WASHABLE SURFACE, BUT THE BEST RESULTS ARE OBTAINED WHERE SMALL QUANTITIES OF LINSEED OIL ARE ADDED during the course of its preparation. For the manufacture of driers it is of great advantage. I am positive in my statement that even if a man made a Kauri-Japan drier out of the highest priced gum and mixed it with a properly made paint, there is no man at the end of three years who could see the difference between a paint made of such a drier and a paint made of tungate drier reduced with benzine."

Heckel concludes that Tung Oil has been applied extensively in varnishes used in making marine paints, which possess valuable properties for resisting the alternate action of air and salt water, and the WEARING AND ABRASIVE action of waves.

It is interesting to note a unique quality in Tungate Oil used as a drying oil, i. e., IT DRIES THROUGHOUT SIMULTANEOUSLY, WHEREAS OTHER DRYING OILS DRY FROM THE OUTSIDE INWARD.

Louis Edgar Andes of Vienna, said by Professor Ware of our company to be one of the foremost continental authorities on Drying Oils, in his book "Drying Oils, Boiled Oils, and Solid and Liquid Driers," writes as follows concerning Chinawood Oil, pages 46, 50, 52, 53: "In regard to the rapidity of drying, it surpasses linseed oil; the hot pressed does not appear to dry so rapidly as the cold pressed.

"According to De Negri and Shurlati, the seeds from which wood oil is obtained contain 53.25 per cent of oil, of which about 42 per cent can be obtained by pressing.

"The oil is clear; somewhat yellow in color, and of peculiar smell, resembling that of castor oil. It is without taste and dries in 24 hours in the air. It is soluble in ether, petroleum spirit, and chloroform, and insoluble in cold absolute alcohol. By solution in carbon bisulphide and evaporation of the solvent the oil is changed into a crystalline mass.

"In regard to the drying of the oil, the following observations have been made: If a very thin layer is spread upon glass it dries in a closed space in about 24 hours with a whitish appearance, so that the combination of oil and glass is no longer transparent but resembles

ground glass. In thicker layers it requires several days to dry off. If the coating is exposed to the light, even thick layers dry in a few hours; the oil which has been heated alone, without additions, shows on drying the same whitish appearance, whilst oil which has been heated with Litharge (a drier) dries clear and bright as boiled linseed oil does under any conditions. THE OIL SHOWS THE GREATEST PECULIARITY AFTER DRYING; WHILST RAW AND BOILED LINSEED OIL AND THE OTHER DRYING OILS FORM A SLIGHT SKIN WHICH GRADUALLY THICKENS FROM BELOW, WOOD OIL DRIES UNIFORMLY THROUGHOUT, SO THAT THE LOWER LAYERS ARE JUST AS DRY AS THE UPPER. The slight adhesion of the dried coating to the smooth surface of the glass is remarkable.

"On account of its peculiar and signal property of drying throughout in a short time under the influence of air and light, it has already obtained an entrance into the manufacture of varnishes and paints. There is no doubt that when thorough research has been made a number of applications will be found for it. THUS CHINESE WOOD OIL IS USED FOR OILING FLOORS ON ACCOUNT OF ITS HARDNESS, also in the manufacture of WATERPROOF materials it has been made into a substance similar to oilcloth, AND DISTINGUISHED BY GREAT ELASTICITY. The raw oil cannot be well employed if it is to be used in the same manner as linseed oil; it must be heated with several per cent of lead oxide (Litharge or red lead), for without this addition it gives a non-transparent layer. The same inconvenience would not be caused if the oil were used in paints, but it is necessary to heat it in order to obtain increased drying power.

"PIGMENTS GROUND WITH THIS OIL (TREATED) PRODUCE PAINTS OF EXCELLENT PROPERTIES, WHICH IN A SHORT TIME DRY HARD THROUGHOUT, and not as the paints made with linseed oil—dry only on the surface, but in the lower portions of the layer still soft after a long time."

This authority on "drying oils" further states (page 53): "THE COMBINATION OF WOOD OIL WITH LINSEED OIL GIVES VERY GOOD RESULTS and especially in the case of varnishes FOR OUTSIDE USE; the former oil imparts hardness, the latter elasticity."

DRIER: Used solely for the purpose of hastening the drying of the wet paint.

MINERAL SPIRITS: G. B. Heckel, in his "Paint Catechism for Paint Men," page 35, writes: "Turpentine, Benzine and Benzol are solvents of oils, resins, etc. Of the three, Turpentine generally evaporates most slowly, though some mineral spirits surpass it in this respect."

S-W Mine, Mill and Factory Paint is a good, reliable outside paint.

THE MARKET: Mines, mills and factories are large purchasers of this paint, using it for decorating and preserving company-owned dwellings as well as their mill and factory buildings. Householders in industrial communities have made this a popular house paint. Master painters, contracting painters.

S-W Mine, Mill and Factory Paint is prepared ready for use. It requires no thinning unless it is to be applied to a surface which is unusually porous, then use pure raw linseed oil. It dries to a good, uniform gloss.

Sizes: 1 and 5 gallon cans and barrels.

S-W COMMONWEALTH PAINTS

First Produced in 1903

These paints are especially designed to meet all the requirements of exposed surfaces, such as barns, garages, fences, arbors, and other similar surfaces. Those who have been observant have seen while passing through the country decaying barns, rusted and useless farm equipment. Who can see such disintegration, loss and waste—and that, too, where it can be ill-afforded—and not thrill with a desire to tell the story of Safety in Paint!

Let us take Commonwealth Paint, White; analyze it and see how all the requirements of the purposes for which it is intended, are fully met.

THE PIGMENTS ARE:

Zinc Oxide
White Lead Sulfate
Magnesium Silicate

THE VEHICLES ARE:

Linseed Oil
Durable Drying Oil
Drier.

First, let us gather the properties of the pigment.

ZINC OXIDE: Brilliant, white, hard, fine in particle which tends to make a compact, well-knitted film, maximum oil carrying capacity, is unaffected in color by any gases present in the atmosphere, does not chemically affect the other pigments with which it is mixed.

WHITE LEAD SULFATE: Being a sublimed pigment its particles are finer than any pigments produced in any other way; being fine it carries much oil and does not settle out of the package; it resists the discoloring action of hydrogen sulfide and other harmful gases in the atmosphere longer than does any other lead pigment; it is uniform in composition; it counterbalances the hardness of the Zinc in the film.

MAGNESIUM SILICATE: It is tough, yet fluffy; the rod-like shape of its particles acts as a reinforcer to the film, carries much oil; is unctuous; light in gravity, it helps to keep the other pigments in suspension; is chemically a perfect "mixer" with other pigments and is chemically inert so far as action or reaction on the vehicles is concerned; it is a fire-retardant; it remains absolutely unchanged from the time it goes into the mixture till the last horn blows in the life of the physical material whose surface it protects; its smoothness under the brush is the delight of the painter; it is not affected by gases in the atmosphere.

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These pigments, then, Zinc Oxide, White Lead Sulfate and Magnesium Silicate have all (and more) of the qualities needed for our purposes.

Let us now note the vehicles.

LINSEED OIL: Oil is the life of the paint; good, "old reliable" linseed oil is present because when applied to the surface it dries to a hard, tough film that is impervious to moisture.

DURABLE DRYING OIL: Here is Chinawood Oil which when properly treated has the property of drying exceedingly hard in comparison with linseed oil which dries to an elastic hardness. This oil also gives increased oil value to the paint and thus helps to make the film more durable.

MINERAL SPIRITS: Used for the purpose of assisting the paint to remain in healthy condition in the package and to spread more freely over the surface when applied.

THE DRIER: Employed TO HASTEN the drying of the wet paint.

We have here then, a combination of those pigments and vehicles whose peculiar properties create a paint which meets all the requirements proposed. The paint when applied, creates a film that is tough, hard, moisture-proof, durable, and at the same time economical.

THE MARKET: Painters, painting contractors, householders: for use on houses, barns, roofs, fences, corncribs, tool sheds, garages and any similar surfaces.

APPLICATION: This paint is made with a heavy body and should therefore be thoroughly stirred before applying to the surface. It is then applied AS IS except where the surface is extremely porous, in which case the first coat may be thinned freely with pure linseed oil.

COLORS: Red, Gray, Green, Orange Yellow and White.

Sizes: $\frac{1}{2}$, 1 and 5 gallon cans; also barrels.

S-W COMMONWEALTH BARN RED

First Produced in 1903

In many parts of the country farmers desire a good red paint for their barns, corncribs and other buildings. Many factory buildings also are painted red, for both "looks" and protection from the elements. To meet this demand for color and protection we produced S-W Commonwealth Barn Red, which has become one of our most popular single products. The same dependable quality is here as is found in the other Commonwealth Paints. It has a combination of pigments and vehicles which give it even greater wearing quality. As our esteemed President, George A. Martin, said recently concerning Commonwealth Barn

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Red: "This paint MUST be made as good as we know how to make it for the high purposes intended; its great mission is to save from decay the thousands of buildings which help to make up America's most important economic institution—the American farm."

Let us examine the contents of Commonwealth Barn Red the better to understand our President's remarks, and see why this paint has EXTRAORDINARY DURABILITY.

THE PIGMENTS ARE:
Venetian Red
Calcium Carbonate.

THE VEHICLES ARE:
Linseed Oil
Durable Drying Oil
Drier.

VENETIAN RED: Heckle, in his book "Iron Oxides," page 12, reminds us of the saying among painters that "Venetian Red will out-last the memory of man." This pigment derives its color from the Iron Oxide which is a great part of its composition. Iron Oxide we learned in the study of Floor Finishes (Text 5) is a natural, mineral pigment of color and physical strength, chemically inactive and is, on the whole, one of the best paint pigments. We recall that the famous box-car paint used by the Pennsylvania Railroad Company, after years of experiment, is an Iron Oxide paint.

CALCIUM CARBONATE: Almost transparent when ground in oil, it is exceedingly durable; carries much oil; is inert; neutralizes any traces of free acid which may exist in the oil or other pigments used, and also aids in keeping the pigments in suspension.

LINSEED OIL: Tough, dries to a hard durable film when applied to the surface; it excellently binds the pigments to the surface.

DURABLE DRYING OIL: This is a combination of two oils which have extraordinary qualities. Only comparatively recently have chemists found how to treat and use them; in the proper treatment of these oils lies the secret of their excellent mission in paint. Here perhaps more than anywhere else in the paint and varnish industry do chemistry, skill, brains and long practice reap success for the paint and varnish manufacturer; for not every one can bring forth from these Drying Oils all their splendid qualities.

CHINAWOOD OIL is our first one. This we have seen in Commonwealth Paints and Barn Red adds hardness and durability to the film and dries simultaneously throughout instead of from-the-surface-in.

Next is MENHADEN OIL. This oil comes from the Menhaden fish so prevalent along the Atlantic Coast. All oils have their particular odor and for a long time Menhaden Oil found little favor because of its fish odor; but this has been reduced to a point where it is just as agreeable as other oils used in paint. Its iodine value usually is about 150 as compared to linseed oil, which has an iodine value of about 180. H. A. Gardner, one of America's foremost chemists, and a recognized authority on matters of paint and varnish, finds that if the Menhaden Oil is made in winter ("winter bleached") the iodine number may run as high as 178 and contain no odor. S-W Menhaden Oil is specially selected and has an iodine value of 180—it is the cream of all the Menhaden Oil on the market! The higher the iodine number the better fitted for paint is the oil, generally speaking.

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Menhaden Oil WILL NOT BLISTER UNDER HEAT; will not peel as readily as linseed oil; where much heat is present it is equally as durable (when used in combination) as linseed oil.

Toch says in "Chemistry and Technology of Paints":

"A properly neutralized fish oil PREVENTS THE HARDENING or setting of Red Lead in the package, and a paste made of this material can be transported long distances and will last for many months in a fresh and soft condition." Toch agrees with our chemists and his experience supports our practice. He writes (same book, chapter on Drying Oils):

"Menhaden Oil should, of course, be used with a drier, and the best results are obtained with a tungate (Chinawood Oil) drier."

DRIER: To hasten its drying when applied to the surface.

With this particular combination of effective oils and pigments a small percentage of water, required in treating some of these oils, it has been found, will keep the mixture in a healthy condition, aid suspension of the pigments, and cause the whole mixture to remain in a proper physical consistency for application when the can is opened.

Because S-W Commonwealth Barn Red is made of these excellent, well recognized materials and scientifically ground and mixed and ready for use, it fully meets the complete requirements of the surfaces for which it is intended. In addition it is a low-price paint. Our representatives have here another prepared paint which fires the imagination and quickens enthusiasm.

THE MARKET: Master painters, painting contractors, manufacturing plants and farmers. Especially designed for barns, fences, corncribs, garages, silos, tool sheds, warehouses. A great paint for general use where the color is suitable.

APPLICATION: The can is opened and contents stirred thoroughly. It is applied as it comes from the package. On surfaces which are very porous, the first coat should be reduced with pure raw linseed oil. Second and third coats should be applied without reduction of the paint as it comes from the can.

Sizes: 1 and 5 gallon cans, and barrels.

COMMONWEALTH BARN GRAY

First Produced in 1913

Here we have splendid quality in another low-price paint.

Commonwealth Barn Red had met a great demand, and between 1903 and 1913 there developed a wide demand for this same good, sturdy, reliable paint in Gray. To meet this new demand we produced Commonwealth Barn Gray. Similar to Commonwealth Barn Red in durability, its

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composition we find is quite different, just as we should expect. For, whereas Barn Red is naturally made with a good deal of Iron Oxide which has a reddish color, Barn Gray had to be a white base with a tint to produce the Gray. It was not difficult to find the proper pigments for we had at our command those wonder-working pigments—White Lead, Zinc Oxide and Magnesium Silicate. Where in all the world of pigments could we find a more perfect combination of pigments for the requirements in hand? These, then, were the pigments selected as the base, with Pure Carbon Black in Oil as the tinting pigment. The Carbon Black reduced the white pigments to a Gray tint.

Let us briefly review the extraordinary list of qualities to be found in the component materials of Commonwealth Barn Gray. We remember that in Zilo we first met Lead Sulfate and Zinc, and the three—Lead, Zinc and Magnesium Silicate—combined, for the first time in S W P. Therefore we KNOW these pigments MUST be effective.

THE PIGMENTS ARE:

White Lead Sulfate
Zinc Oxide
Magnesium Silicate.

THE VEHICLES ARE:

Linseed Oil
Durable Drying Oil
Japan Drier.

WHITE LEAD SULFATE: Opacity; fine particles carry much oil; drying quality; checks the hardness of zinc oxide; will not turn dark under influence of carbonic or sulphuric gases; will not check; does not react on linseed oil, and adds durability to the film.

Henry A. Gardner, Director of Scientific Section, Paint Manufacturers' Association of the United States, has made innumerable tests of paints containing White Lead Sulfate and here is one of his observations ("Paint Researches and their Practical Application," pages 23-24):

"Most remarkable results have been obtained with this pigment when made into paints that have been used upon exterior surfaces of wood, iron and cement, as some of the references below will indicate. It is also coming into considerable use for the manufacture of interior paints of various kinds."

In the last published report on the Atlantic City wooden test fence, it was stated that: "The white paints made of Zinc Oxide and basic Sulphate-White Lead were giving exceptional service." This report was made after the tests had been exposed to the severe conditions prevailing at the seacoast for five years, with one repainting. In a similar report on the Nashville wooden test fence, after two years' exposure, it was stated that: "Basic Sulphate-White Lead—presented a surface free from checking or alligatoring, this result being in accord with the findings from previous field tests." "At Pittsburgh, excellent results were also obtained from basic Sulphate-White Lead, the mixed pigment paints containing this pigment being especially resistant to darkening or discoloration. IN THE ATLANTIC CITY STEEL PANEL TESTS, SUBLIMED WHITE LEAD WAS THE ONLY WHITE PIGMENT AMONG THE PIGMENTS RECEIVING THE TEN HIGHEST AVERAGE RATINGS IN THE INSPECTIONS OF 1910, 1911 AND 1912."

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ZINC OXIDE: Hard; carries great quantities of oil; will not discolor; will not chalk; adds durability to the film.

Gardner further makes these remarkable findings:

"OBSERVATIONS ON THE RESISTANCE OF CERTAIN PAINTS, EXPOSED IN AGRICULTURAL DISTRICTS, TO THE DARKENING INFLUENCE OF VEGETABLE MATTER. The writer was probably the first to attribute the darkening of some paints to the accumulation of plant pollen blown against the painted surfaces. This was pointed out in Circular No. 22 ("The Effect of Zinc White in Paints") issued in June, 1914, describing an extensive series of paint tests made at Arlington, Va., upon the experimental farm of the U. S. Department of Agriculture. At this place there is practically no soot or dirt in the atmosphere because of the distance from any industrial community. On some of the panels most rapid darkening was observed soon after the paints were exposed. Examination of these surfaces with a photomicrographic camera disclosed small round particles of plant pollen and dried plant material adhering to those paints which had not dried to a hard coating or which had softened under the heat of the sun. The plant pollen came from the dried plants near by. The rubbing of such paints produced a dark yellow stain which could not be removed by washing with water. THE PLANT POLLEN DID NOT STICK TO THE LEAD PAINTS WHICH CONTAINED ZINC OXIDE AND SIMILAR FILM-HARDENING PIGMENTS. SUCH PAINTS PRESENTED FILMS WHICH OFFERED NO LODGING PLACE FOR FOREIGN MATTER, AND THEREBY REMAINED HARD AND CLEAN. That the pollen-encrusted surface of paint furnishes an excellent germinating place for fungi is shown by the accompanying photomicrograph of a culture from scrapings obtained from one darkened paint, by G. Rigg and the writer." (Gardner, "Paint Researches and their Application," pages 179-190.)

MAGNESIUM SILICATE: Tough as steel particles; carries a big load of oil; does its job without stirring up action and reaction, being inert chemically; rod-like shape of its particles gives reinforced strength to the film when used in this combination.

PURE CARBON IN OIL: In a future text we shall study more closely those pigments which are used for coloring paint. (A brief outline of colors in oil will be found in a later text.)

What is Carbon? Heckel gives a splendid description of Carbon Black in his booklet, "A Paint Catechism for Paint Men," page 26. "The Carbon Blacks are practically pure carbon. They comprise Lamp Black, from oil lamps; Gas Blacks, from natural gas; Graphite, a natural product now also produced artificially by means of the electrical furnace." Other Blacks are made by carbonizing vegetable matter to which inert minerals are added. Purest Carbon is made by the combustion of oil or gas. The Carbon Black used in our Commonwealth Barn Gray is made by combustion of natural gas.

Heckel writes as follows concerning Lamp Black and the Gas Blacks: "They are chemically inert, amorphous, the particles are extremely fine and their specific gravity low; consequently they

require a surprising preponderance of liquid (i. e., oil) to fit them for use. Their covering capacity in proportion to weight is enormous and their durability is a striking example of the durability of inert pigments in general when used in painting. They are seldom used alone as pure color, it being deemed technically advisable to grind with them such a proportion of colorless inert pigment as will measurably increase the thickness of the paint film without perceptibly impairing its opacity." ("A Paint Catechism for Paint Men," page 26.)

Such a good selection of good pigments as is here made, makes us wonder how we can produce and sell Commonwealth Barn Gray at a medium price. Though it is somewhat higher in price than Commonwealth Barn Red, due largely to the Zinc and Carbon contents, it has been frequently asked, "How can you sell Commonwealth Barn Gray at so low a price?" So much, then, for the pigments used in Commonwealth Barn Gray.

Let us now look into the Vehicles of Commonwealth Barn Gray.

LINSEED OIL: Dries to a hard film, acts as a binder which holds the pigments to the surface, and contributes life to the film.

DURABLE DRYING OIL: Chinawood Oil and Menhaden Oil and Soya Bean Oil. To give the film the most copious load of oils which carry the proper qualifications to best suit them for the purposes intended; adding to the film these properties, heat-resistance, non-peeling and non-blistering, making the film more durable.

For the first time we meet here the SOYA BEAN OIL. Writes G. B. Heckel, in "A Paint Catechism for Paint Men," page 32:

"Soya Bean Oil is an oil derived from several varieties of the soya, soy or soja plant, belonging to the same family as the ordinary pea and bean. Within the past few years its cultivation as an oil-producing plant in the United States has made important progress. Up to the present time, however, the principal source of seed for the oil used in industry is Manchuria. In its physical characteristics it resembles the other semi-drying oils. Its acid number is very low (generally about 2) and its iodine number is about 133, which is high for a semi-drying oil.

"Experiment thus far would indicate that the oil from the soya bean is, perhaps, the most satisfactory of the vegetable oils ordinarily used in conjunction with linseed oil. Extensive field tests strongly indicate that when properly treated in combination with the drying oils, it is a valuable addition to the too meager list of available paint liquids."

MINERAL SPIRITS are added to help thin the mixture so that it may more easily be spread upon the surface; also it helps to keep the material in a fresh condition over a long period of time.

JAPAN DRIER is used to hasten the drying of the film, and give gloss to the finish. Heckel defines this as "A strongly concentrated drying oil thinned with a volatile oil with a gum or resin added."

THE MARKET. S-W Commonwealth Barn Red and S-W Commonwealth Barn Gray share the honors in dressing up and protecting barns, corncribs, roofs, silos, sheds and other types of buildings found on the farm, also fences, railroad sheds and tool houses, store-houses and industrial buildings.

Mr. Lloyd F. Collister, Manager of Trade Sales of our Company, makes a remarkable observation concerning S-W Commonwealth Barn Gray, in his bulletin No. 48, March 31, 1925. Mr. Collister shows that S-W Commonwealth Barn Gray takes to galvanized iron surfaces like a duck to water. We are learning something new about this great product every day.

Here is what Mr. Collister says:

"In So. Atlantic District Mr. A. H. Kennedy, Manager of the Industrial Sales, has sold several hundred gallons of Commonwealth Barn Gray Rx 409 to a large customer erecting galvanized iron buildings. This customer has used one coat of 409 on all buildings, putting the material right against the new galvanized iron.

"While the Company recommends using Sherwin-Williams Galvanized Iron Primer as a first or priming coat on new galvanized iron, following it with a coat of oil paint, still I am sure you will be interested in reading Mr. Kennedy's letter telling of the success of his customer in using 409 as a one-coat proposition on galvanized iron:

'I have always felt that we had a perfectly safe product in recommending Rx 409 as a galvanized iron paint. In my entire experience during the past ten years I have never heard of a complaint on Commonwealth Gray.

'During the war I sold many thousands of gallons to the Government where there was only one coat applied to galvanized iron surfaces. I understand that our Export Dept. also sells large quantities of this piece of goods for similar character of painting, and from a personal point of view from noting the performance of a paint product, I felt we were perfectly safe in letting this account handle it as a one-coat piece of goods.

'You know it is not new with this customer for the reason that they have used Rx 409 for the past 3 years for various galvanized iron buildings that they have constructed, inasmuch as it is a manufacturing account and construct galvanized iron buildings of different types. Due to the fact of the vehicle not being of a high linseed oil content has led me to believe in it more as a galvanized iron paint as the vehicle was not so susceptible to the action of the acid surface of the galvanized iron.'

"It is well to have this knowledge concerning the qualifications of Commonwealth Barn Gray Rx 409, and to know what it will do based on experience, as there are many times that a customer wants to get away with a one-coat job on such a surface."

Representatives should keep their eyes open to opportunities to sell this splendid product to builders and erectors of galvanized iron structures, such as garages, warehouses, etc.

0007-SWP-040671

0007-SWP-000124062

APPLICATION TO THE SURFACE: This paint being a prepared paint should be thoroughly stirred from the bottom. It should be applied then without further treatment except where the surface is extremely porous, in which case pure raw linseed oil may be freely added to the first coat. If a painter finds when he opens the can that the mixture is too heavy for easy use, he may add pure linseed oil.

This paint dries to a rich, smooth appearance.

Sizes: $\frac{1}{2}$, 1 and 5 gallon cans, also barrels.

S-W ROOF AND BRIDGE PAINT

First produced in 1886

This paint is especially designed to protect roofs, bridges, fire escapes, metal cornices and shutters and fences from corrosion and disintegration. It gives complete satisfaction on both wood and metal structures.

It is a low-price paint crowded with excellent qualities of durability, weather resistance, permanence of color, heat resistance.

Now a structure must have above all things a water-tight roof and a firm foundation. Paint safeguards both. The disintegration of the one will shortly cause the breakdown of the other. Gardner well says (page 99, "Suggestions on Painting Hotels and Apartments"—1924), speaking of metal parts of roof and paint film, that the former "is often only as good as the paint coating applied to it." Sir Robert Hadfield, in his report on the corrosion of ferrous (iron) metals to the Institute of Civil Engineers of Great Britain, has stated that during 1920 THE AMOUNT OF IRON METALS WASTED AWAY THROUGHOUT THE WORLD AS RUST AMOUNTED TO PROBABLY 29,000,000 TONS. This amount would have an enormous economic value counting the cost of the metal, fuel, labor, etc., of nearly \$3,500,000,000. MUCH OF THIS MIGHT BE SAVED BY PAINTING. Now much of that wasting rust came from roofs, and certainly such rusting indicates the high probability that water found its way through many a roof, causing further economic loss. The figure we should arrive at if we attempted to estimate the loss caused directly and indirectly through such leaks would be almost beyond our comprehension.

Paint puts the escape in fire-escape.

Bridges play an important part in our civilization—without them the cost of transportation would be increased for distances would be lengthened.

Without paint to protect them, whether steel, iron, concrete, wood or what not, they will very quickly corrode or fall before weathering processes.

What an epidemic of disasters would follow, if the City, County, State and Railroads were to discontinue to paint the bridges.

0007-SWP-040672

0007-SWP-000124063

THE COMPOSITION: In the process of manufacturing paint products on a large scale, there accumulate many small quantities of various kinds of paints, due to overgrinds, damaged cans, etc. This material is classified and reground. It contains even our highest grade products, being the sum of all the paints which compose it. It has excellent properties for protection of such exposed surfaces as roofs and bridges.

S-W Roof and Bridge Paint produces a tough, hard film with a smooth gloss.

THE MARKET: City, county and state departments, construction companies, painting contractors, master painters, factories and householders.

Much of our Roof and Bridge Paint is used on warehouses, fences, out-buildings, such as corncribs, chicken houses, barns and other structures made of rough lumber, fire escapes, fire doors, window sills, etc.

S-W Roof and Bridge Paint is used on metal, wood, brick, cement or composition materials. It is made with a good, heavy body, which permits it to stand considerable reduction with pure raw linseed oil.

It has a covering capacity of about 300 square feet, two coats to the gallon.

APPLICATION: The surface should be dry and clean. Better results on old work can be obtained if the old paint is scrubbed off with a steel brush or scraper.

COLORS: Gray Slate, Red, Bronze Green, Brown, besides White.

Sizes: 1 and 5 gallon cans, and barrels.

S-W FAMILY PAINT

First Produced in 1878

A good paint well named, for it is splendidly adapted to the various requirements about the home and can be applied by members of the family. It is designed particularly for interior use yet it has given good results on exterior work.

The materials used in the making of S-W Family Paint are the best--each in its class.

The great care in selection of the raw materials, the ceaseless attention to mixing and grinding, the scientific correctness of the particular combination of pigments and vehicles, all contribute toward producing this good, reliable, inexpensive, general utility, interior house paint. The work-closet of every well ordered home should contain Family Paint so that odd jobs about the home can be done in spare time at little cost.

0007-SWP-040673

0007-SWP-000124064

It is, as we note the formula, an oil paint. It has durability, ease of application and a gloss finish. It aims to bring to every household the same sanitary, cheerful, protective benefits, which it had been thought existed only in the more expensive paints. It must be emphatically declared that S-W Family Paint is not a "cheap" paint as to quality. It is the best paint possible for us to make and sell at the price. The vast quantities of repeat orders prove the claims made for it.

It will give good service on inside work in schools, hospitals, public buildings, stores and similar buildings.

Let us examine the composition of this good Family Paint.

THE PIGMENTS ARE:

White Lead Sulfate
Zinc Oxide
Magnesium Silicate.

THE VEHICLES ARE:

Linseed Oil
Durable Drying Oil
Drier.

WHITE LEAD SULFATE: A sublimed product of lead; very fine particles; therefore excellent opacity; combines well with other pigments and mixes with linseed oil and carries much of it.

ZINC OXIDE: Whiteness; opacity; gloss; durability; carries much oil.

MAGNESIUM SILICATE: Tough; harder than steel; carries much oil. Shape of particles make it a marvelous builder up of a sturdy paint body when used with other pigments.

LINSEED OIL: Natural ability to dry hard; tough, elastic and binding; weather resisting.

DURABLE DRYING OIL: Assists in drying the paint and making the paint film tougher and more durable.

DRIER: Speeds up the naturally slow drying time (oxidizing) of linseed oil.

We have then in our pigment and oil combination only those materials which make a definite contribution to the film.

S-W Family Paint is reliable—it bears the label of The Sherwin-Williams Co.—that is sufficient.

Sizes: $\frac{1}{4}$ pint to 5 gallon cans, and barrels.