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PROGRESS

In Our

HOUSE PAINT

FORMULATION

Book No._____

Assigned to

The information in this report is to be regarded as strictly confidential.

PROGRESS in our HOUSE PAINT FORMULATION

There is definite need for progress in our house paint formulation, which is brought about by the fact that the surfaces that we are protecting are varying from year to year - due to new construction methods and new engineering ideas, such as air-conditioning, the variety and quality of wood being used for construction purposes, the length of time that buildings are allowed to go before re-painting, due to economic conditions, increasing labor costs for application of paint, stressing the need for a minimum number of coats and many other similarly important factors emphasizing the need for keeping alert in our formulations if we are to meet the present day needs.

Add to the foregoing the fact that there is the possibility of obtaining new paint performance, based on the availability, at lower prices, of the new pigments and improved liquids, which definitely bring about the possibilities of:

1. Adequate opacity with fewer pounds of pigment.

2. Brighter and cleaner whites from these strong pigments.

3. Less dead weight with these lighter specific gravity pigments.

4. Better sealing with adequate adhesion, improved coverage and filling qualities in our foundation or first coat.

Although sufficient attention always must be paid to unforeseen complaints that crop up from time to time in specific areas - which are probably due to extremes of climatic or other conditions at the time of painting, yet, in general any change in our formulating practice must be based on wide-spread experience throughout very large areas so as to cover all possible experiences that are going to confront our goods by reason of our wide-spread distribution.

Recently a few competitors have gone to the trade with claims of revolutionary developments in house paint - and you may judge for yourself from the exposure records shown in the following pages just why these competitors found the need for these revolutionary changes in their formulas. However, there is nothing revolutionary in the formulating practice in good house paints. Improvement comes only from the steady growth of technical information gained after long continued experimental work accompanied by adequate exposure tests..

All the experience of the years has taught us the utter inadequacy of house paint tests limited to standard exposure panels, or of following the ideas of some raw material producer overly anxious to sell his products.

A few years ago, to check out our old and new formulations as well as the competitive goods, a series of buildings was painted on the outskirts of Cleveland, that presented the type of surfaces that would

generally be met throughout the country for re-painting. The exposures were varied enough - east, southeast, south and southwest - so as to give the sort of results one would obtain under actual conditions in the field.

These tests are especially interesting because the same buildings were painted with so many varieties of formulations of paints and the results can very easily be compared and the facts carried from one part of the building to the other, whereas in trying to compare one building to the other there is always difficulty on account of the space involved.

This book describes, therefore, in a very simple manner, the reasons why various changes in the formulation of SWP have been made over the last few years. Along with the photographs of the buildings there are close-up photographs, magnified enlargements of the paint surfaces and the information concerning each exposure is self-explanatory.

It can be seen by studying the following pages, that each move made in the re-formulation of SWP has been the result of careful technical development improving the product to meet the changing requirements of the trade and to take advantage of new and improved raw materials, as they became available. On the whole, these steps have been sound ones, leading us always towards a better balanced formula.

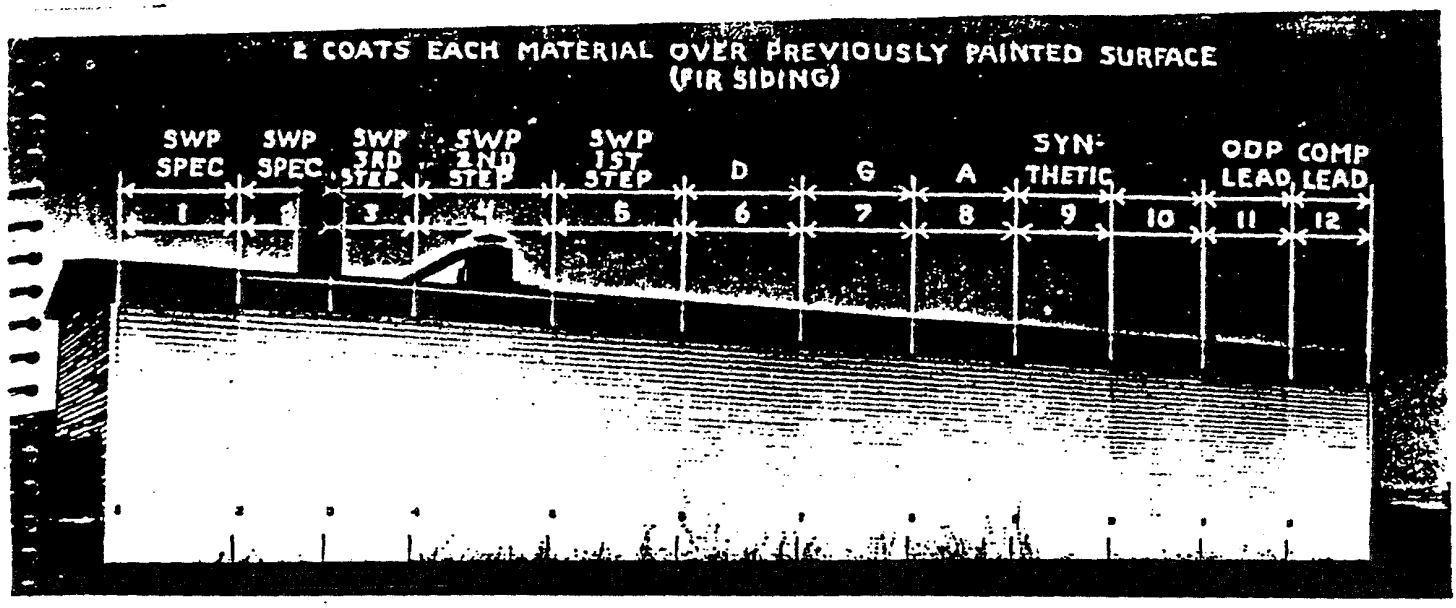
The progressive development of our formulae, with the increasing use of titanium pigments, led us naturally to the acquisition of a new and unique process and a new plant for producing our own titanium pigments, thereby assuring us of proper control of the quality of this important ingredient.

These same progressive steps in formulation led us also to the unmistakable fact that in the application of SWP we meet application problems that must be met or corrected by formulation, and to point to the need of some sort of a primer or foundation coat. The painter, who is used to applying a priming coat of lead and oil, without any great care, has occasionally run into trouble in the application of a ready-mixed paint as a priming coat.

The photographs, and explanations along with them, will point out conclusively that many of the competitive institutions have, perhaps unwisely, tried to solve two problems with the production of their primers - that of curing their application problems on hard, glossy surfaces and also trying to get abnormal coverage with their primer which - according to our exposure tests - will eventually bring about failure of the film and an unsatisfactory condition so far as protection of the job is concerned.

Building exposures will prove conclusively to you that these primers are not satisfactory even when used under SWP, wheras SWP, over lead and oil - or over itself - or over the priming foundation coat we are now recommending - has given a good account of itself.

The progress and the explanation of the photo enlargements are complete enough to tell, each of them, a story in itself.

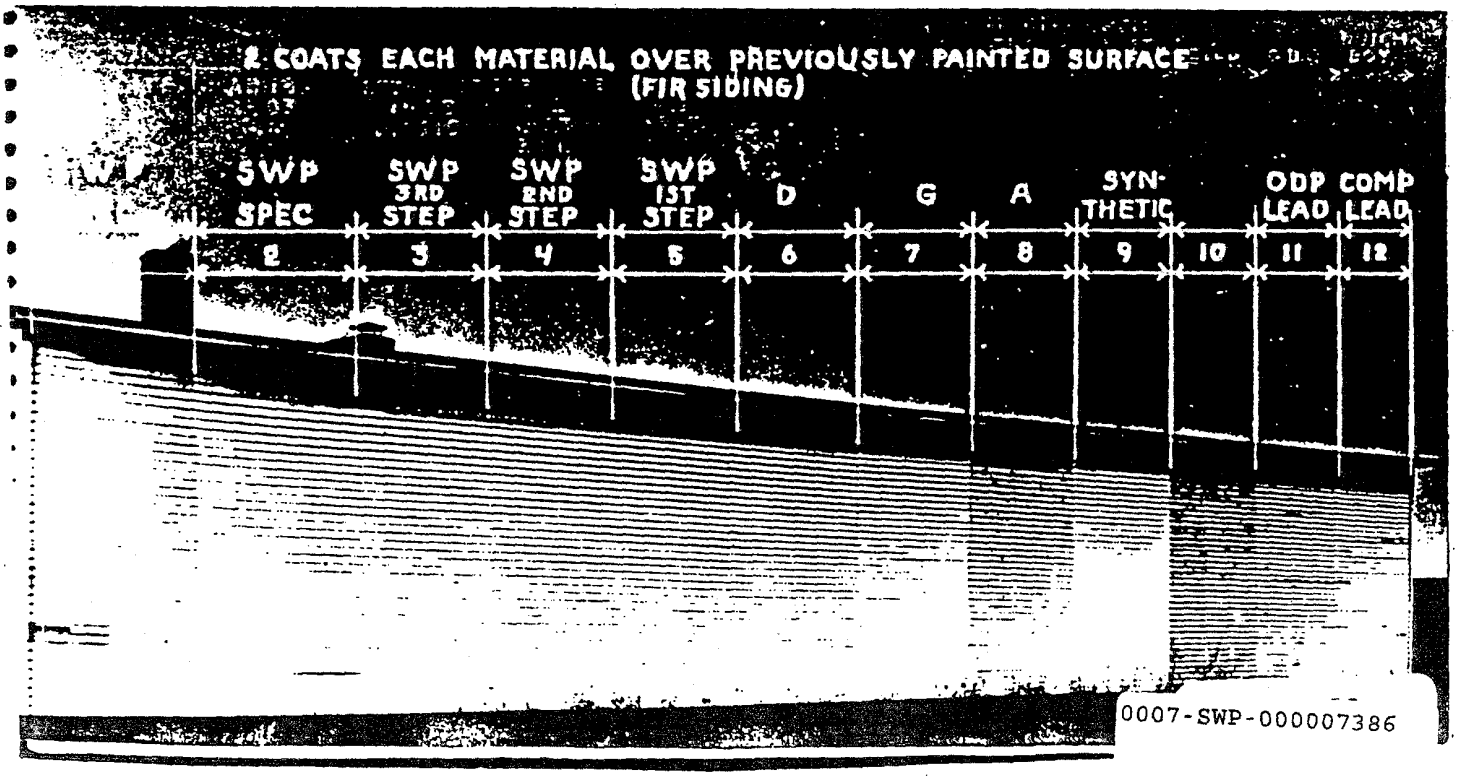


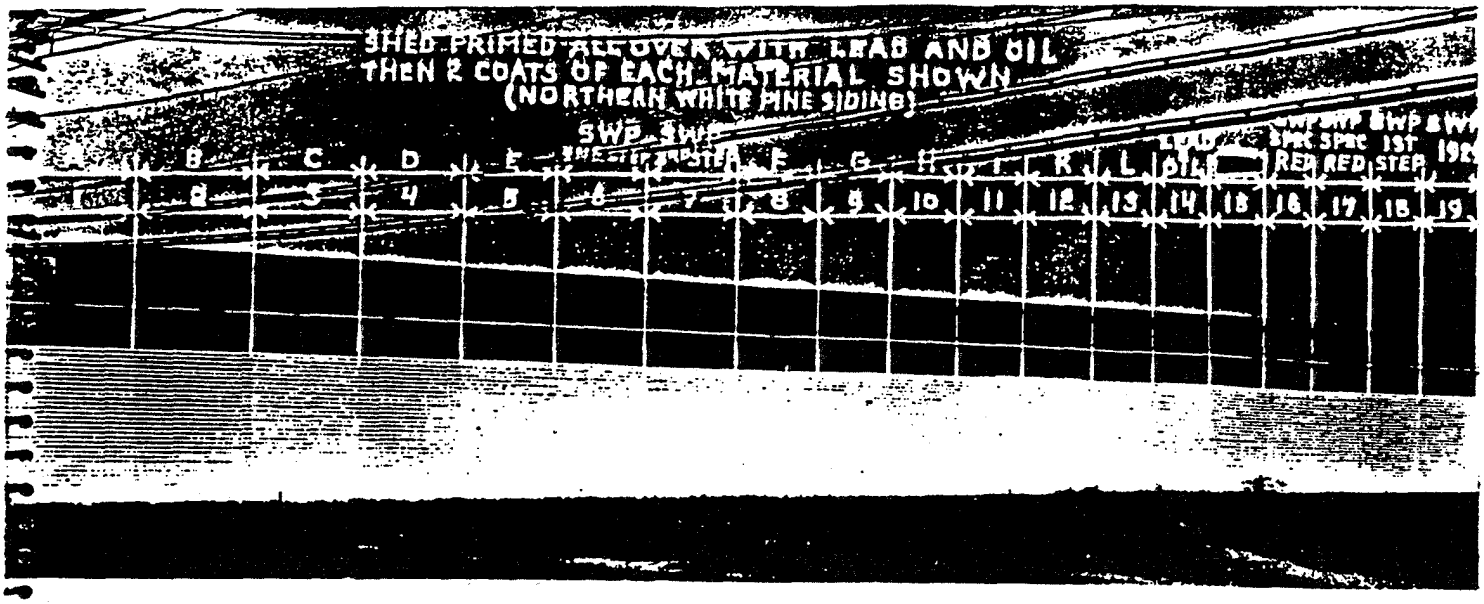
Building No. 1 Freshly Painted - 1934

This building faces southeast and is used for the storage of finished lumber. It is constructed of ordinary firwood siding which had been painted but was considerably weathered.

The chart indicates the variety of formulations tested. Observe that all panels were pretty uniformly white when first painted.

Building No. 1 Photographed in 1938

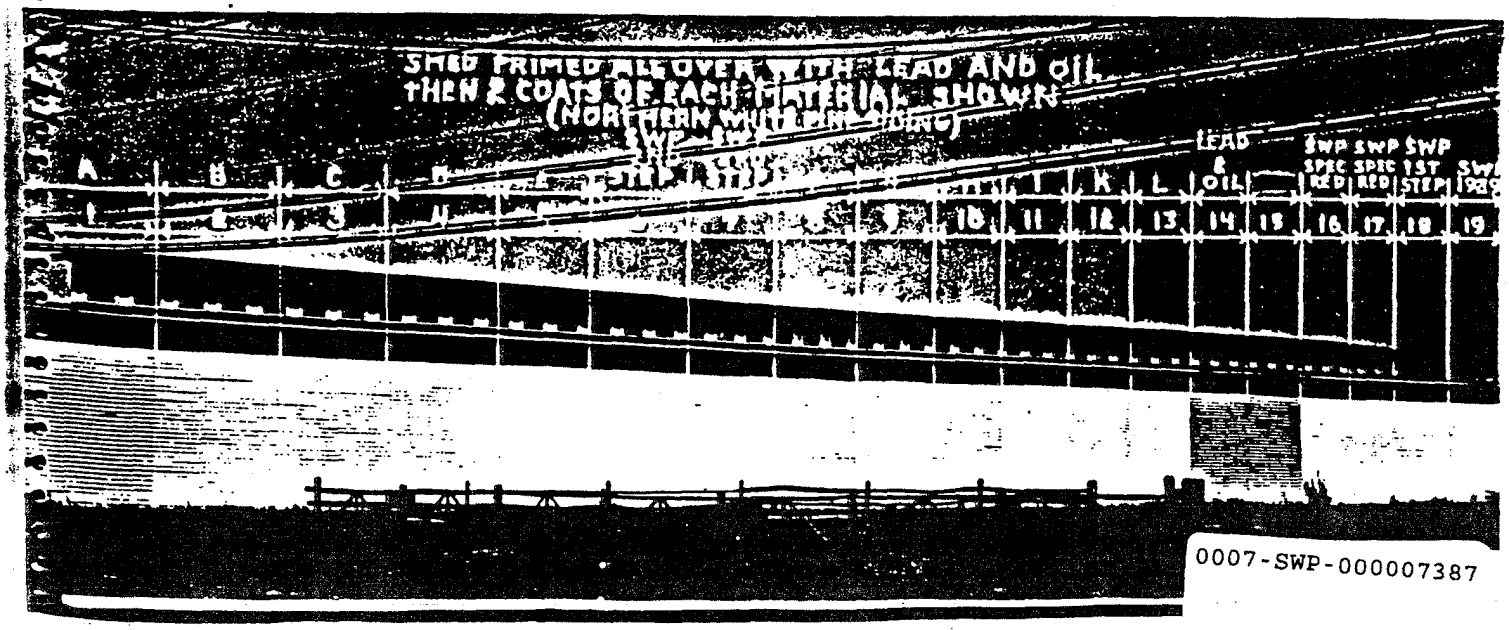


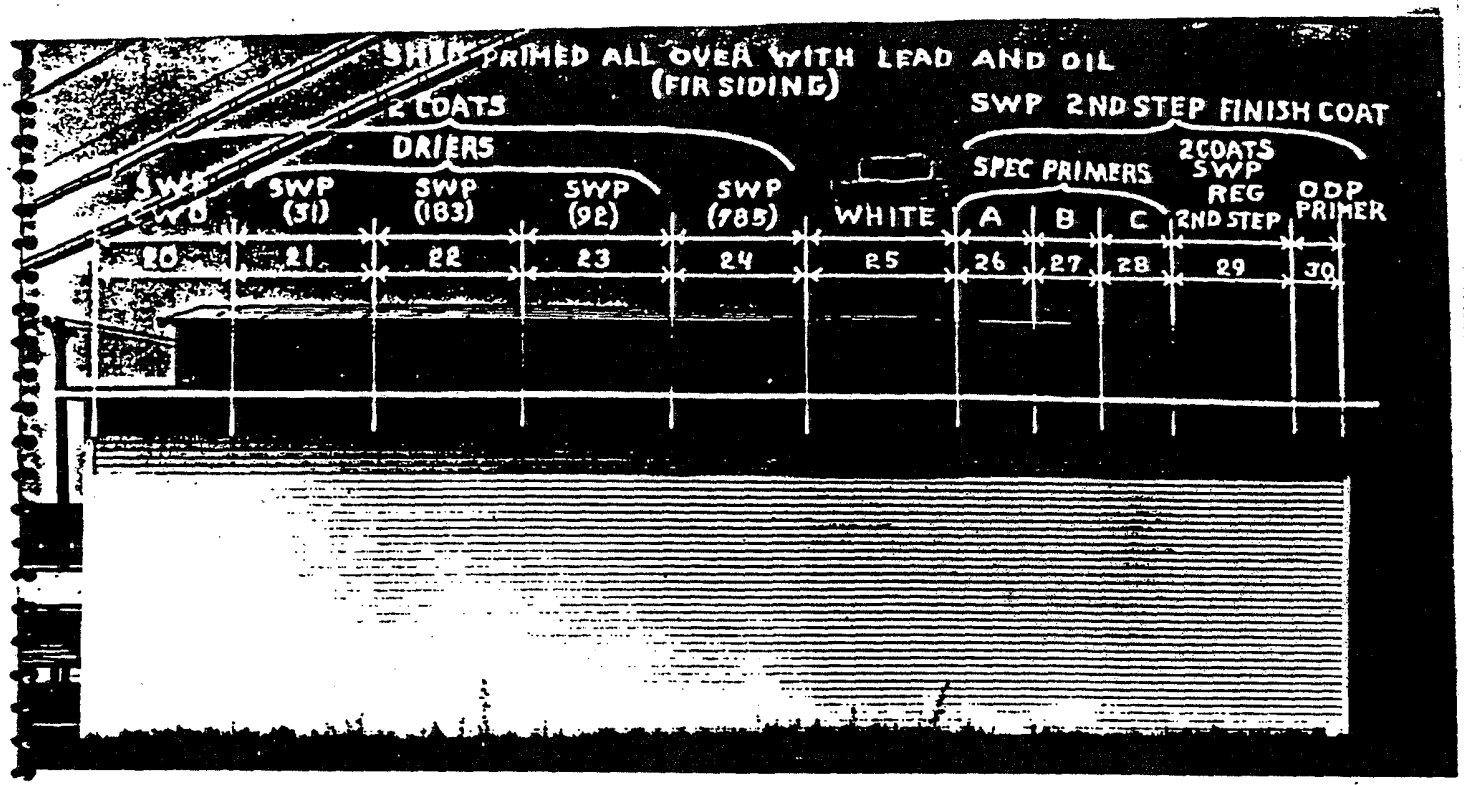


Building No. 2 Freshly Painted in 1935

This building is in a group with No. 1. It faces southeast and is constructed of ordinary northern pine siding. Painted, but weathered badly, it was given a priming coat over all of lead and oil. Then two coats of each material to be tested were applied with the very slight variation in whiteness observable at the time of painting.

Building No. 2 Photographed in 1938

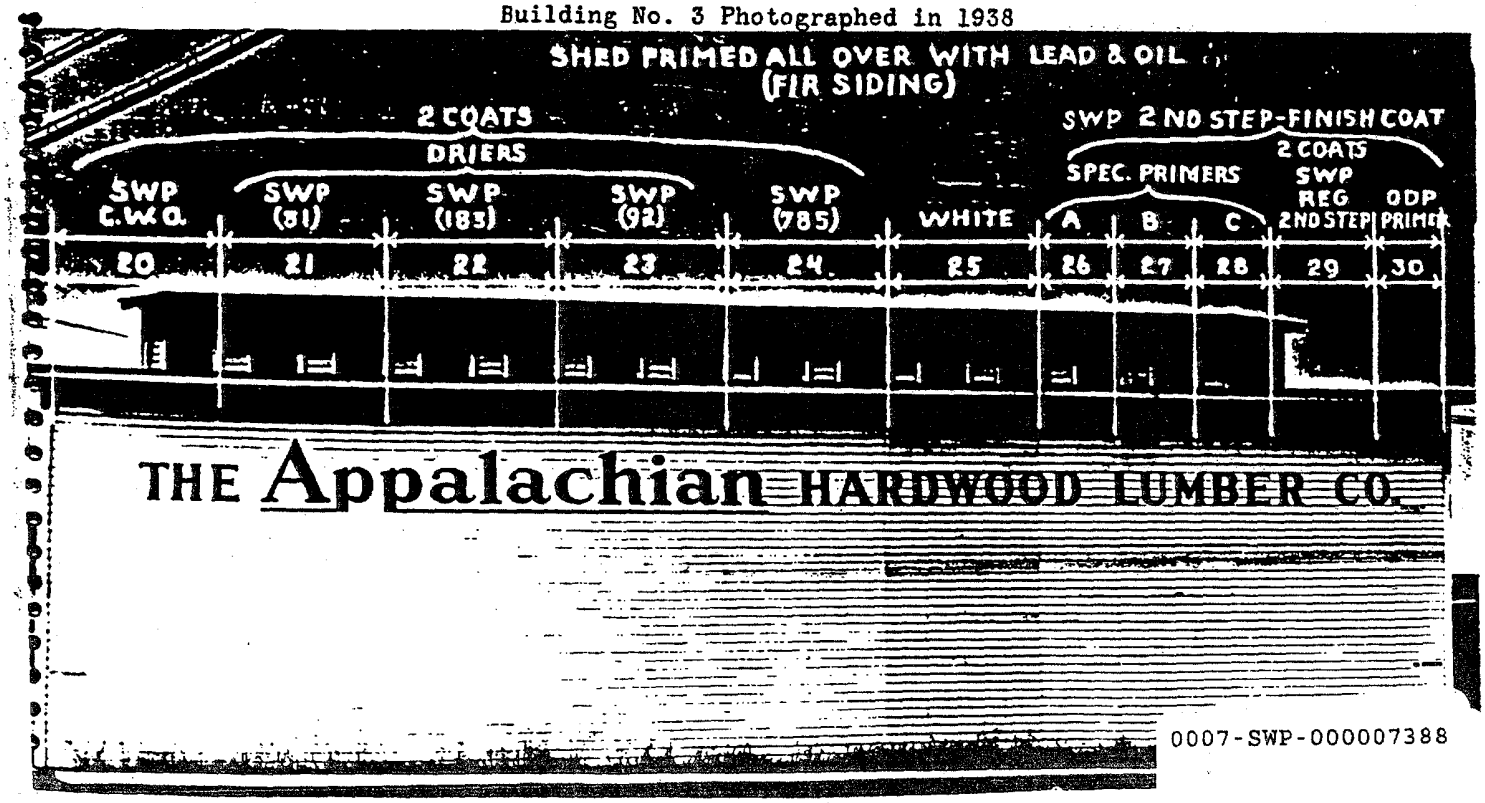


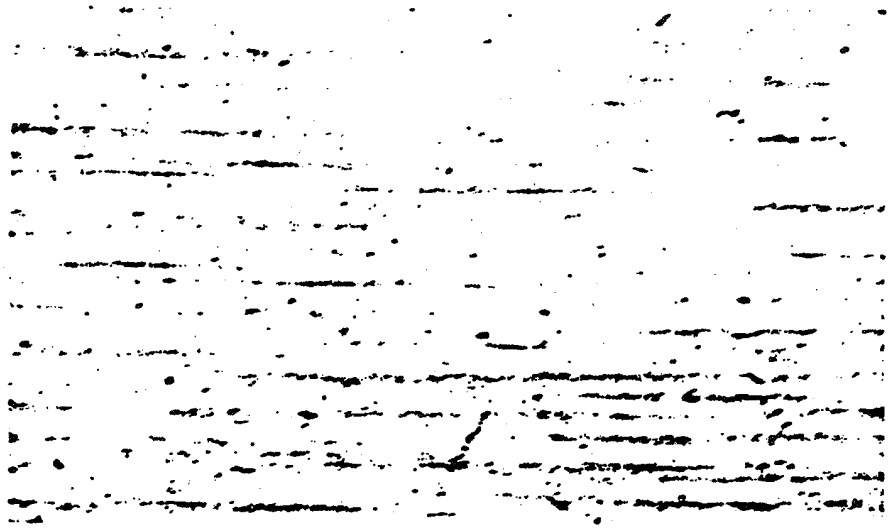


Building No. 3 Freshly Painted in 1935

This building faces southeast. It is constructed of ordinary northern pine siding considerably weathered. It was given an all-over priming coat of lead and oil followed by two coats of the various materials to be tested. The appearance of the various panels does not vary greatly in whiteness (with the one exception) the failures are principally by cracking as shown in the enlarged pictures shown later in the book.

Building No. 3 Photographed in 1938





Building #2 - Panel #19

The 1929 SWP Formulation

Label Analysis		Formula Analysis	
Lead Carbonate	36%	S-W Ozlo (leaded zinc)	55%
Lead Sulphate	19%	Lead Carbonate	36%
Zinc Oxide	36%	Magnesium Silicate	9%
Magnesium Silicate	9%		

Vehicle: Acid refined oil.

Note:

The exposure panel is two coats of Rx 471, SWP OGW (1929 formulation) applied over lead and oil primer over weathered painted northern pine siding of poor grade.

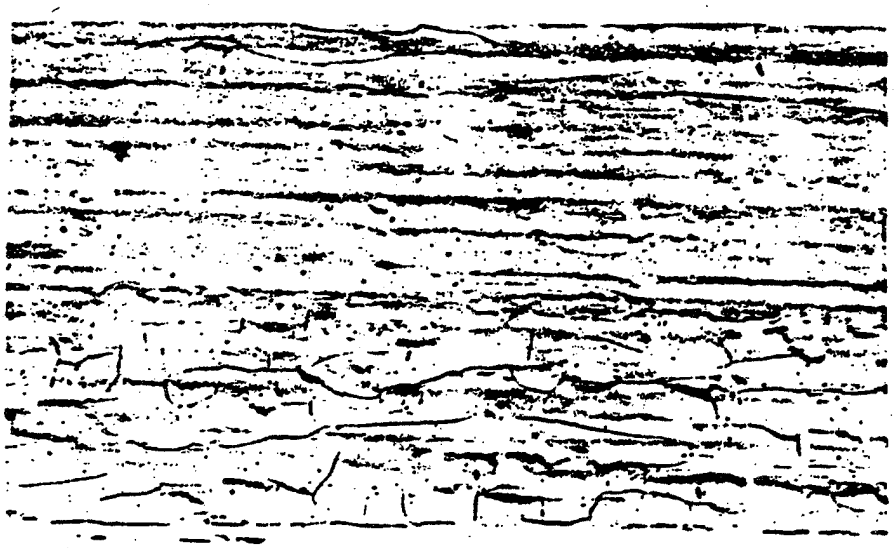
Exposure reading:

After 36 months exposure, the paint is considerably darkened, but shows no film failure. It is chalking moderately with a uniform general appearance. It affords an excellent protective film.

Remarks:

The demand of the trade for a whiter, more attractive brilliant white paint constitutes the principal reason for changing this formulation.

The PROGRESS OF SWP - STEP by STEP



Building #1 - Panel #5

The First Step - the 1930 SWP Formulation

Label Analysis:		Formula Analysis:	
White Lead	34%	S-W Ozlo (leaded zinc)	45.5%
Zinc Oxide	29.5%	Lead Carbonate	18.0%
Titanium Pigment	36%	Titanox "B"	36.5%

(Titanium-Barium pigment)

Vehicle: Combination of acid and alkali refined linseed oils.

Note:

The exposure panel is two coats of Rx 471 SWP OGW (1930 formulation) applied over unprimed weathered painted fir siding of poor grade.

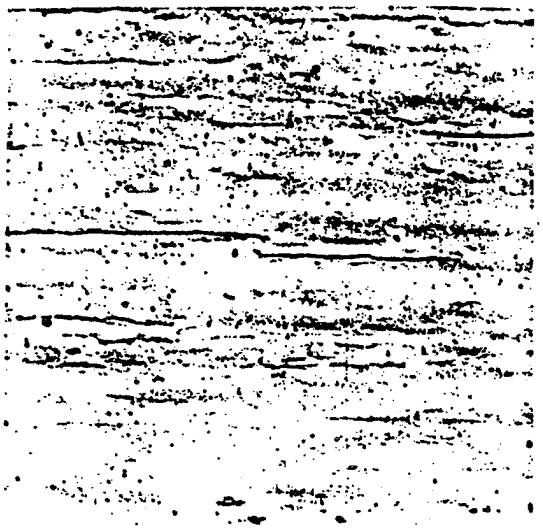
Exposure reading:

After 43 months exposure, the paint is very white, shows slight cracking and is chalking heavily. The general appearance is good.

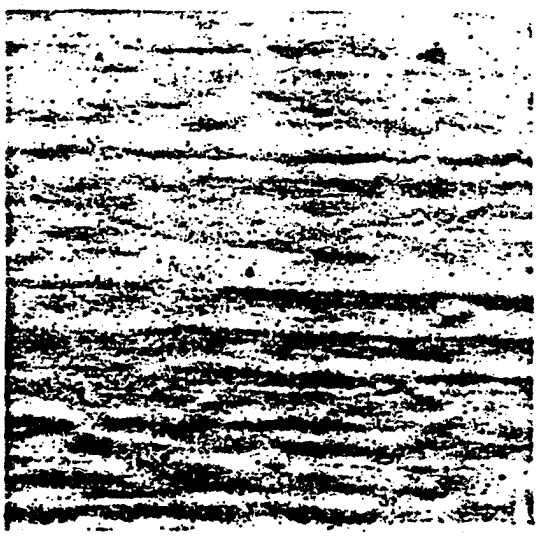
Remarks:

This formulation shows an improved appearance compared with the 1929 SWP formulation, but is inferior to it in protective value. At the time the change was made, Titanox "B" was the only available titanium pigment sufficiently developed and commercially available. It contributed whiteness but its barium content proved to be an objectionable feature.

Note the number of fine cracks. Such cracks usually did not appear until after the second year of exposure. Many competitors, however, are still using this type of titanium pigment in both primer and finish coat - and in quantities which, based upon our experience, are definitely dangerous and unsafe to use.



Building #1 - Panel #4



Building #2 - Panel #6

The Second Step - the 1934 Formulation

Label Analysis:		Formula Analysis:	
White Lead	50.5%	S-W Ozlo (leaded zinc)	45.66%
Zinc Oxide	29.5%	Lead Carbonate	34.34%
Titanium Dioxide	10. %	Titanium Dioxide	10.00%
Magnesium Silicate	10.%	Magnesium Silicate	10.00%

Vehicle: Combination acid and alkali refined linseed oils.

Note:

The exposure panel is two coats of Rx 471 SWP OGW (1934 formulation) applied over unprimed weathered painted fir siding of poor grade.

Exposure reading:

After 43 months exposure, the paint is very white. It is chalking heavily and while it shows slight cracking, there is an improvement over the Titanox "B" formulation.

Remarks:

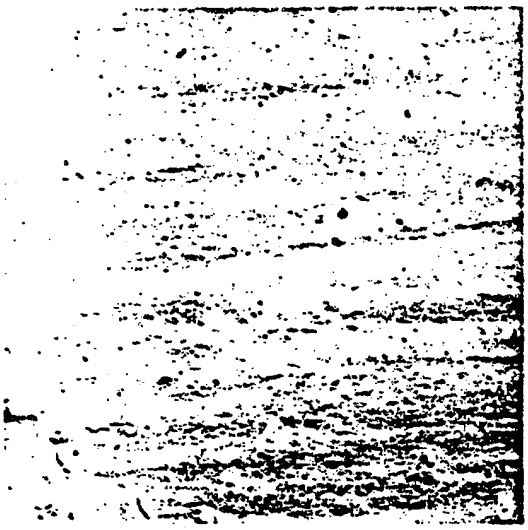
An improvement in toughness or elasticity was gained by eliminating the barium in Titanox "B" and replacing this pigment with Titanium Dioxide and Magnesium Silicate. The same type refined linseed oils were used.

Notes regarding panel #6 on Building #2
The exposure panel is two coats of Rx 471 SWP OGW (1934 formulation) applied over lead and oil primer over weathered painted northern pine siding of poor grade.

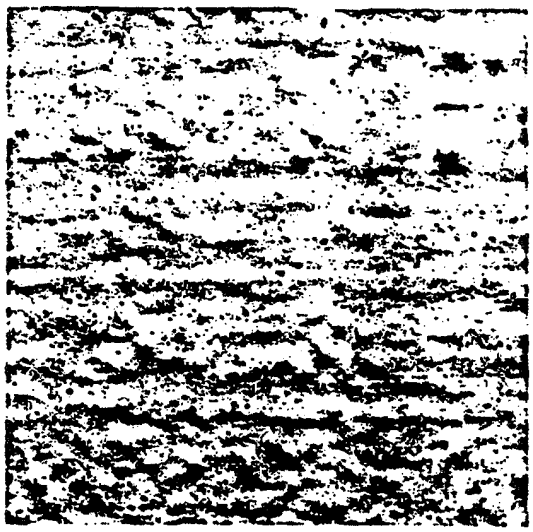
Exposure reading:

After 36 months exposure, this material is very white, has no surface failure and is chalking heavily. The general appearance is excellent.

The PROGRESS OF SWP - STEP by STEP



Building #1 - Panel #3



Building #2 - Panel #7

Label Analysis		Formula	
White Lead	50.5%	S-W Ozlo (Leaded Zinc)	45.66%
Zinc Oxide	29.5%	Lead Carbonate	34.34%
Titanium Dioxide	10%	Titanium Dioxide	10.00%
Magnesium Silicate	10%	Magnesium Silicate	10.00%

Vehicle: Specially refined linseed oil.

Note: Panel #3 Building #1

The exposure panel is two coats Rx 471 SWP OGW (1935 formulation) applied over unprimed weathered fir siding of poor grade.

Exposure reading:

After 43 months exposure, the paint is very white. It is chalking freely and shows no cracking or other surface failure. The general appearance is excellent - both from a distance and up close.

Remarks:

After arriving at what seemed to be the most desirable pigment formulation, attention was directed to further study of the vehicle. A new process of refining the oil was developed, which not only resulted in the improved toughness observed in the exposure panel, which also eliminated, completely, the crystalization we were experiencing when the paint was stored for considerable time in hot rooms.

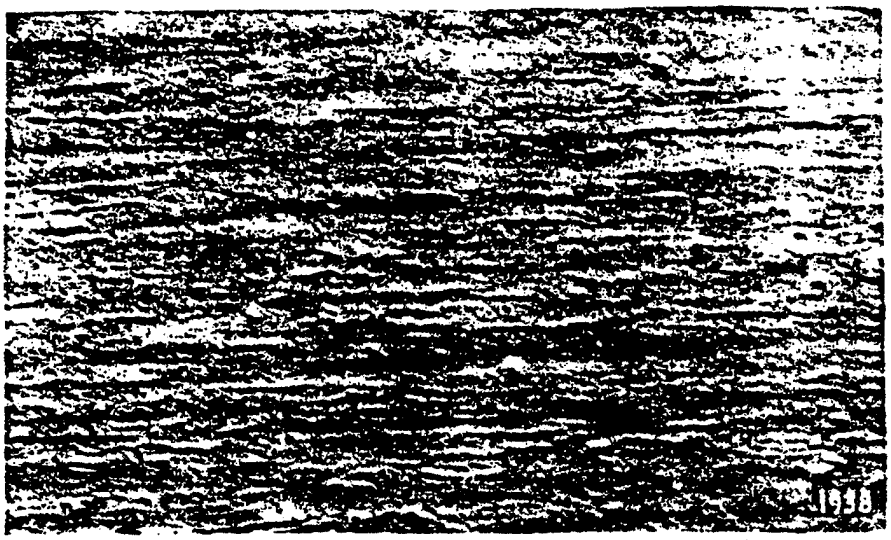
Notes regarding Panel #7 - Building #2

The exposure panel is two coats of Rx 471 SWP OGW (1935 formulation) applied over lead and oil primer over weathered painted northern pine siding of poor grade.

Exposure reading:

After 36 months exposure, the panel is slightly darker than Rx 471 using old oil formulation. There is no surface failure. The paint is chalking freely and has excellent appearance.

SWP QUALITY AND PERFORMANCE PROGRESSES - STEP by STEP



The Fourth Step - the 1938 SWP Formulation

Label Analysis		Formula Analysis	
White Lead	45.5%	S-W Ozlo (leaded zinc)	45.5%
Zinc Oxide	29.5%	Lead Carbonate	29.9%
Titanium-Magnesium Pig.	25.0%	Titanium-Magnesium-Pigment	24.5%

Vehicle-Special refined linseed oil (developed for 3rd step SWP)

Note: This panel is two coats Rx 471 SWP OGW (1938 formulation) applied over unprimed weathered painted fir siding of poor grade.

Exposure reading:

After 43 months exposure the paint has an excellent appearance of uniform bright whiteness. It is chalking uniformly and freely. The protective film has been improved through increased toughness or elasticity and a better control of chalking.

Remarks:

Further refinements in balance of pigment formulation have been based upon findings of our many experimental formulations under observation. An outstanding development is a new combination pigment, Titanium-Magnesium pigment. The increased use of titanium in our formulation allows us to obtain proper opacity with less weight per gallon. And with these new light weight, strong pigments, weight per gallon has no significance today in the value of paint. In fact, these new pigments offer the same possibilities to the paint formulator as did the new light weight alloys to the automobile industry. This represents the very best thought of both our own and the industry's pigment men. The sum total of all these developments is a bonafide top quality in SWP with superiority over every known house paint on the market.

We are entering upon an enlarged program of closely observed paint testing in the field - described elsewhere in this book. We have a number of "exploratory" formulations at this time. The conclusion is inescapable - based upon all our experience - that just as certain as we have this 1938 SWP that is absolute TOPS today - there is going to be an SWP of TOMORROW to beat it in some desirable respect. But until that time comes - we consider our 1938 SWP formulation to be without equal anywhere.

and N O W -

The 5th Step -

The New Member of the SWP Line - SWP ~~Primer-Sealer~~ UNDERCOATER -

Everyone admits that the Painter has had trouble in general with the application of prepared house paint over some surfaces and certain new types of wood. It has been our hope that these two problems could be solved by special thinning directions, but we have learned long since that the Painter cannot be depended upon to follow directions on the label and in cases of difficult types of wood, such as Redwood, he will not, at times, allow the necessary drying time before proceeding with the second coat.

Because of our desire more nearly to meet the demand of the paint trade and at the same time with our ideas of proper formulation for this purpose, we are introducing into the line the new Sherwin-Williams' ~~Foundation Coat or Primer~~ UNDERCOATER.

The demands for a product of this type call for definite characteristics, which we are sure are included in the goods we are offering:

1. Easy brushing with a "slip" somewhat akin to Lead in Oil.
2. Far greater opacity than Lead in Oil.
3. The proper adhesion to either new wood or an old finish no matter how badly weathered.
4. A certain amount of filling qualities for badly weathered surfaces.
5. An adaptability for tinting easily without changing the fundamental characteristics.
6. Relatively quick drying with a semi-gloss possessing the proper "tooth" for the following coats.

It would have been relatively easy for us to offer a product similar to many competitive house paint lines, but in the very type of their formulations we recognized hazards we were not willing to take. Frankly, we recognize the desire for two coat work and we believe that a certain satisfactory quality in two coat work can be obtained if sufficient covering and opacity are obtained in the first coat, but we also recognize the hazard in attempting to get three coat performance with a two coat job - especially when we have, as our background, the excellent three coat experience we have had for years with SWP. And we refused to be stampeded into any two coat system on the basis of being equivalent to a three coat system until these systems have been given a thorough and sufficient "road test".

Very definitely, we know that the story back of the formulation of most of the present two coat systems is an over-powering desire on the part of the raw material manufacturer to move the kind of pigments he has for sale and if one were to study materials used therein, he will note that the majority of the products call for an excess amount of Barium Pigment, Titanox B. This is the same pigment with which we had a somewhat unfortunate experience a few years ago even when we used it to a much less percentage.

The basis for building up the so-called "first coat" of the two coat system has been not to meet <u>satisfactory</u> priming with <u>some</u> opacity, but to meet <u>questionable</u> priming with an <u>extreme</u> opacity that is almost

equivalent to "surfacing" the job. The competitors goods are heavy bodied and poor brushing, so that painters naturally would have to leave a heavy coat on the job, the covering being cut down to about 400 feet per gallon. With this covering and because of the fact that their formula calls for no zinc whatsoever, they do not have the value of zinc as an ~~adherence~~ DRYING characteristic and their formulators knowing well that a thick coat of this primer will not dry without the presence of zinc, add rosin varnishes to obtain this adhering or drying result.

Repeated checks on this type of formulation have proven to us that such a foundation coat, even when followed with the more orthodox type of finish coat, is dangerous in the long run. Our previous experience has shown that a high inert barium-titanium type formulation looks fairly satisfactory for the first two years, but eventually fails both in adherence to the old film and in checking thus presenting a poor repainting surface. We feel certain therefore that the high inert Barium Titanox formulation that is in vogue - to which must be added rosin varnish - and still further complicated by the fact that they are applied as a thick coat - is far too dangerous a foundation formulation. And we will not rush in an attempt to meet this competition with this type of formulation.

Frankly, the new SWP ~~foundation coat primer~~ UNDERCOATER is formulated and designed from the same type of pigments and the same type of oils that have always characterized SWP. You will note, from the label, the presence of Leaded Zinc and Lead Carbonate coupled with the Titanium Magnesium Pigment which has proved so satisfactory in our exposure test and which pigment is the basis of our present SWP.

You will find the product so formulated as to give, without any reduction except in cold weather, the added amount of opacity that the customer desires on the sort of work he is meeting in the field these days. You will note that we have not discounted the idea of having plenty of oil for penetration into the old film or into the new wood. We know from our experience that a certain amount of oil and penetration is desirable and has proven so over the million of jobs that have been finished with the typical SWP formula. However we have given you, in this new foundation primer, a dual-purpose vehicle so that we do get a primer action and sealing at the same time - there is not an excess of oil. The product dries with a semi-flat finish, even over a hard glossy, non-weathered finish, which has been the cause for the number of complaints of crawling that we have run into with primer reduced with oil.

We cannot stress too much the fact that we maintain our allegiance to Ozlo Leaded Zinc base which has proved itself so satisfactory over the years now as the best base for ready mixed paints. Although the amount of zinc has been materially cut down in this formula, there is just a proportion there to bring about the proper drying of our film to put the first coat in an exceptionally good shape for the receiving of the following coats.

THINNING DIRECTIONS

SWP and NEW SWP UNDERCOATER No 450

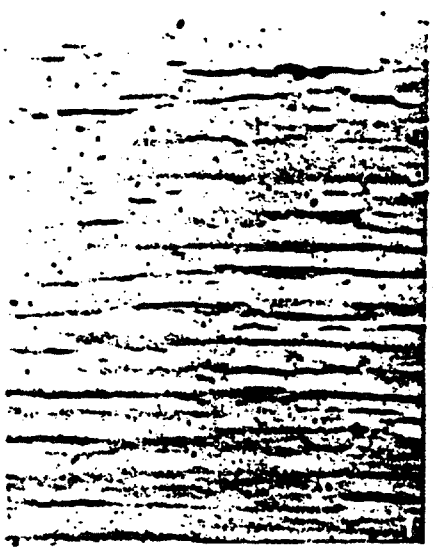
We are confronted with the necessity of changing the label instructions on our SWP, making suitable mention of our new Undercoater, and in line with the fact that there is nothing wrong with SWP, except for crawling on an occasional job, we are going to specify definitely that SWP reduced as previously indicated on the package still gives a satisfactory job. At the same time, we will, in another box, call attention to the fact that best results are obtained by the use of the Undercoater, and also point out that the Undercoater can be used as a primer on three-coat new work by proper reduction of the Undercoater for the first coat--one pint to the gallon.

Our competitors, who had very unsatisfactory prepared house paints, make no mention on their labels of using their house paint as a first coat, either for priming or for repaint work, and they lead one to believe that it is absolutely necessary to buy both of the articles which they offer, primer or undercoater, and house paint, in order to get a satisfactory job. Realizing how inadequate their previous goods were and the system they recommended to give satisfactory performance, we can understand their desire to right-about-face on the whole program, but such a situation does not exist with our house paint. We understand, also, that competitors are finding it necessary to carry two lines of goods, their old formula as well as the new formula, which must present a very difficult stockkeeping proposition.

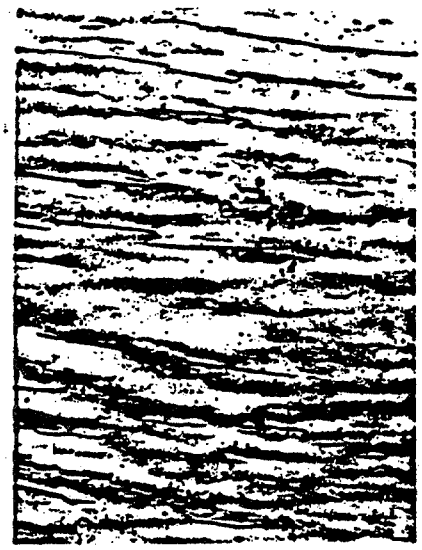
SHADING UNDERCOATER:
Our label directions will definitely point out the fact that the Undercoater may be tinted with Color in Oil, and this is the way we will expect the painter to handle the problem. At the same time, we also call attention to the fact that tinting with as much as one pint of SWP gives a perfectly satisfactory job.

The competitor is obliged to have several shades of Undercoater, because the formulation of his first coat primer or undercoater is entirely different in make-up from his top coat, and, in order to make his story sound, he has to carry four or five, or in some cases as many as eight, various colors of undercoater, whereas since our story is an equally balanced pigment of the same type, both in our undercoater and finishing coats, there is no objection to the addition of a certain amount of SWP for tinting purposes.

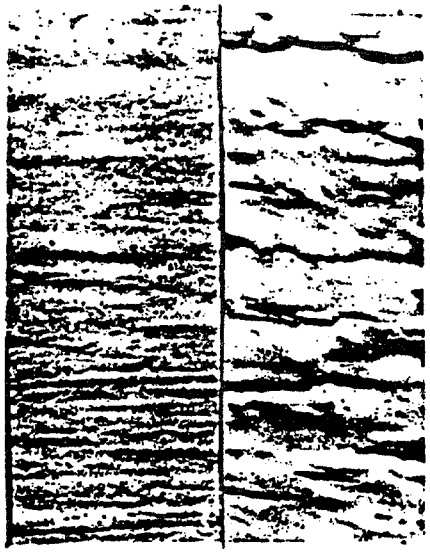
We are tr ing to avoid, of course, the extreme gloss which caused our crawling, and, therefore, we limit the amount of oil that will be added by limiting the amount of SWP suggested for tinting. If a darker shade is used, for example, on the Verdas Green, we will use one pint of Willow Green to a gallon of Undercoater. Label instructions on the SWP Colors will specify the means of obtaining the properly tinted Undercoater, which means that the customer will buy SWP, the Undercoater, and a small package of a tinting SWP color, if he elects this syten rather than using Oil Colors for tinting, although either of them will give an equally satisfactory job.



Panel "A"
SWP over competitive Primer



Panel "B"
SWP over competitive Primer



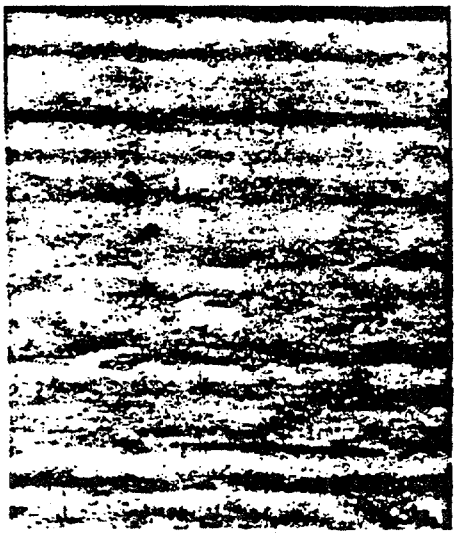
Panel "C"-"C-A"
SWP over experimental Lead titanate Primer

PRIMER EXPOSURE TESTS

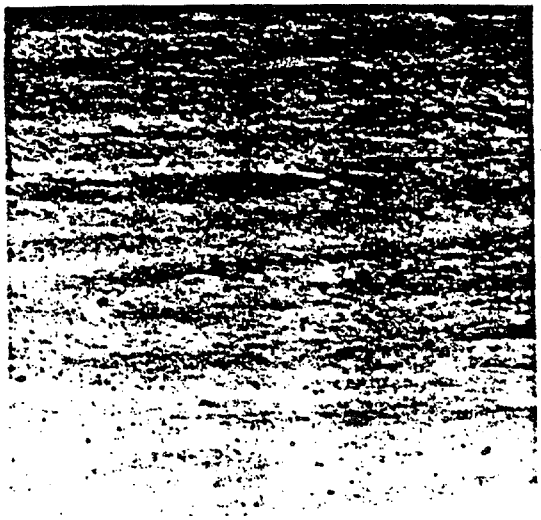
Building No. 3
Panels 26-27-28-29-30

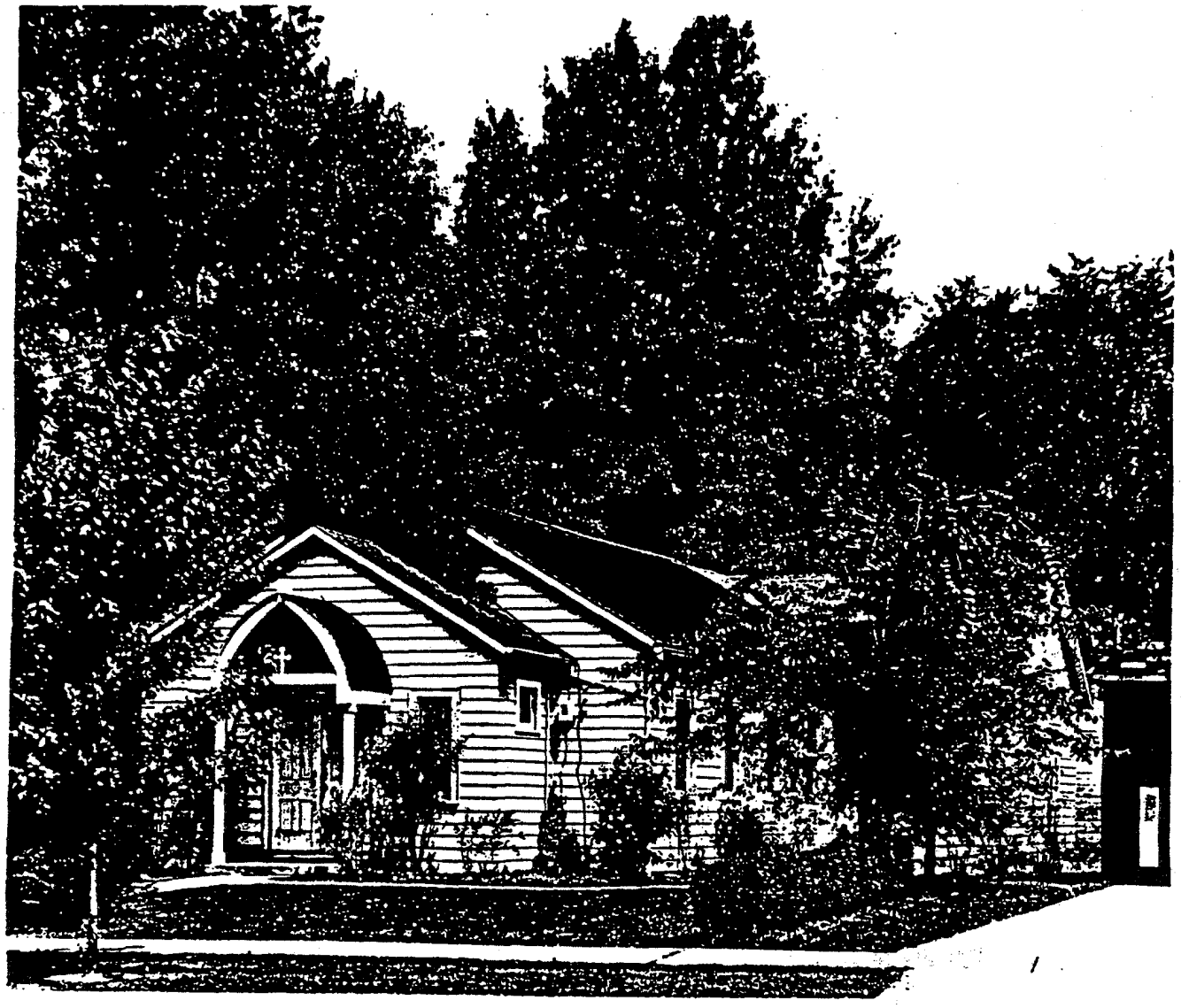
The uniform finishing coat of SWP over these various first coaters reveals strikingly, the important part played by the foundation coat. Over panels A & B, SWP cracks. Over lead titanate primer the paint film is good on good boards but cracking badly on rough boards (3-A). The adjoining "control" panels D & E over SWP & lead first-coats, respectively are in perfect condition.

Panel "D"
2 coats of SWP



Panel "E"
SWP over lead & oil primer





This church shows a two year old exposure of SWP Foundation Coat under SWP OGW 1936 Formulation. For "control", a section of the building on the front - facing South - and a section on the East side - were painted with our standard recommendation of 2 coats of SWP.

The closest examination fails to reveal any difference in either appearance or condition of the two paint films.

Because of the attractiveness of this little white church in its rural setting it is reported many wedding parties come here from far and near.

The PIGMENTS of SWP

S - W OZLO

Leaded zinc has come to be employed in the majority of the leading house paints, today, and S-W OZLO (leaded zinc) is, more than ever, the keystone of SWP pigment formulation.

OZLO is a chemical union (one single pigment) of lead sulphate and zinc oxide. It shows many times greater resistance to sulphur fume discoloration than lead carbonate. OZLO tempers the lead carbonate in SWP with less of the objectionable zinc brittleness than if zinc oxide were used as a separate pigment. It contributes proper smoothness and impermeability to make SWP the outstanding washable house paint.

S - W LEAD CARBONATE

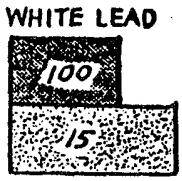
Lead carbonate is retained because SWP is a better paint with it than without it. It combines with OZLO to secure the desired balance of lead and zinc. Lead carbonate has good adherence and affords good protection. Its weaknesses - which we overcome in SWP - are surface checking, spotty chalking and darkening due to discoloration. The film of straight lead and oil paint is not smooth enough to wash well.

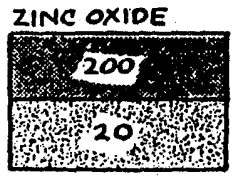
TITANIUM PIGMENTS

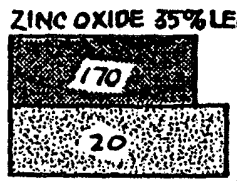
There are now 5 different pigments offered in this group of titanium pigments - 4 of them concern us in house paint - we have used 3 of them, have discarded 2 and will probably supplant the one we are now using for the latest development, by manufacturing it in our own titanium pigment plant - now being built and going into production early next year.

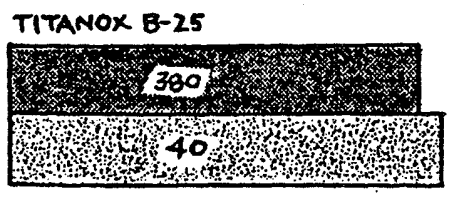
Titanium dioxide used in SWP is the whitest and most opaque white pigment known. Because it was prohibitive in cost and not a stabilized safe pigment to use in 1930 when we made our first step in modernizing SWP, Titanox "B" (titanium barium pigment) was employed. We achieved whiteness and brilliance in this SWP formulation but considered the barium content undesirable as tending to cause cracking of the film. Pure titanium dioxide was introduced in 1934 and proved its superiority as the exposure panels shown in this book disclose.

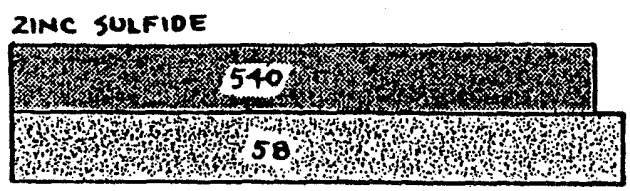
The combination of titanium dioxide and magnesium silicate has yielded excellent results. The chalking appears more uniform and better controlled. The paint film shows freedom from surface failures of cracking and checking and is tougher and more elastic under all the exposures we have observed.

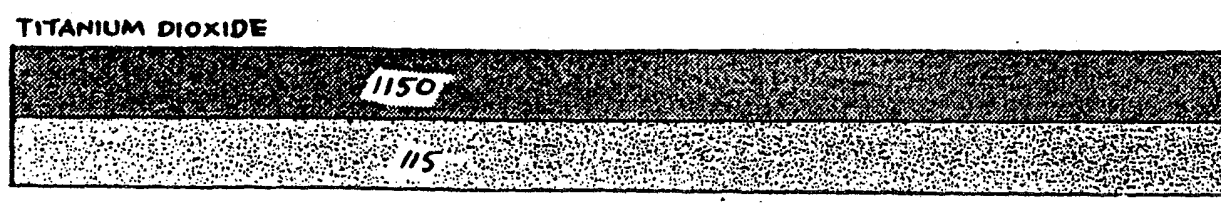












T I N T I N G S T R E N G T H
a n d H I D I N G P O W E R

Top Band - Rating in tinting strength based on white lead as 100.

Lower Band - Square feet which one pound of pigment will hide.

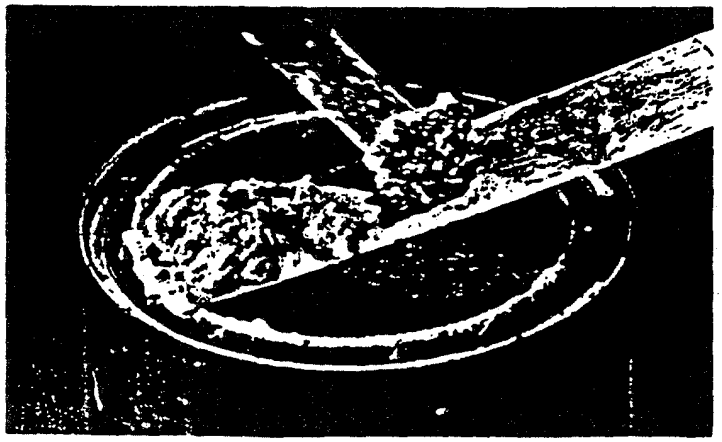
(According to R. L. Hallet's results - A.S.T.M. proceedings - 1930)

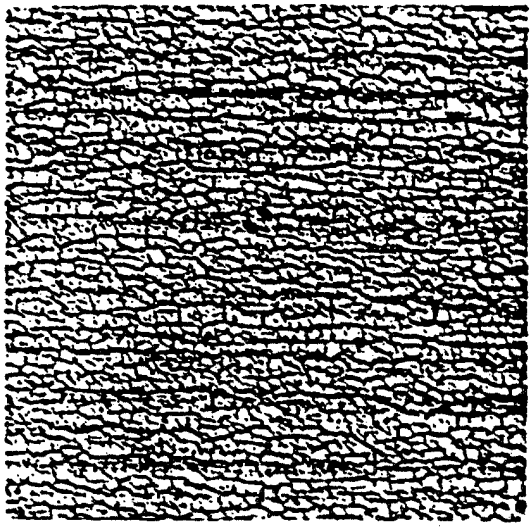
THE IMPORTANCE OF THE VEHICLE

The samples of linseed oil shown here are: left to right. (1) Aged raw linseed oil (2) acid refined (3) alkali refined and (4) the new specially refined oil used in 1938 SWP.

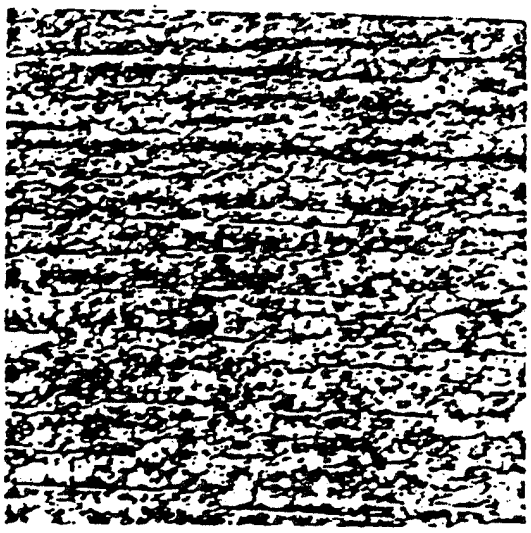
Every paint maker serving southern warm states experienced the trouble illustrated below, whether he would admit it or not. These lumps are "zinc soap" commonly called crystalization, "cornflaking" or other names. We know for a fact that competitors sought the solution - just as we did. We have conquered the difficulty in the new refined oil we have been using in SWP for the last two years. No longer is there the hazard of crystalization in storage in poorly ventilated warehouses or on the dealer's shelf in southern states.

The new oil is not chemically bleached to the water whiteness of our former refined linseed oil vehicle for SWP - but the 1938 SWP on the house is whiter and stays whiter - and it stays Safe in the Package.





Panel "A"



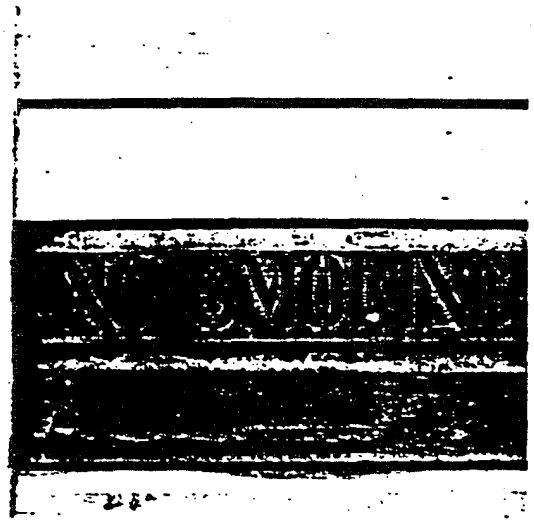
Panel "B"

White Lead (Carbonate) and Oil

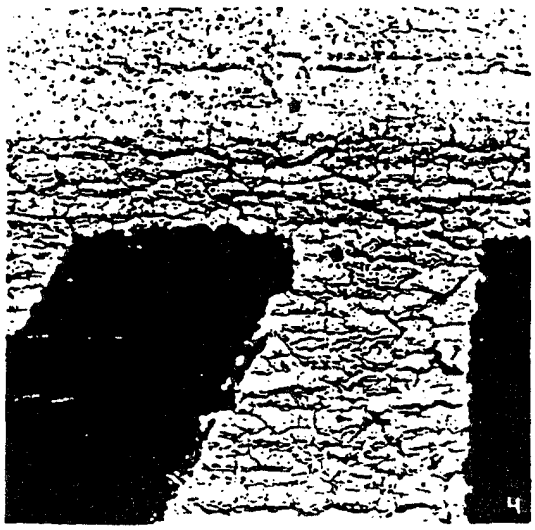
The characteristic "lead check" is familiar to all paint men. Panel "A" exposed 43 months has chalked away the gray smudge that appears on Panel "B" exposed 12 months. Both panels are very dark in appearance because of atmospheric discoloration.

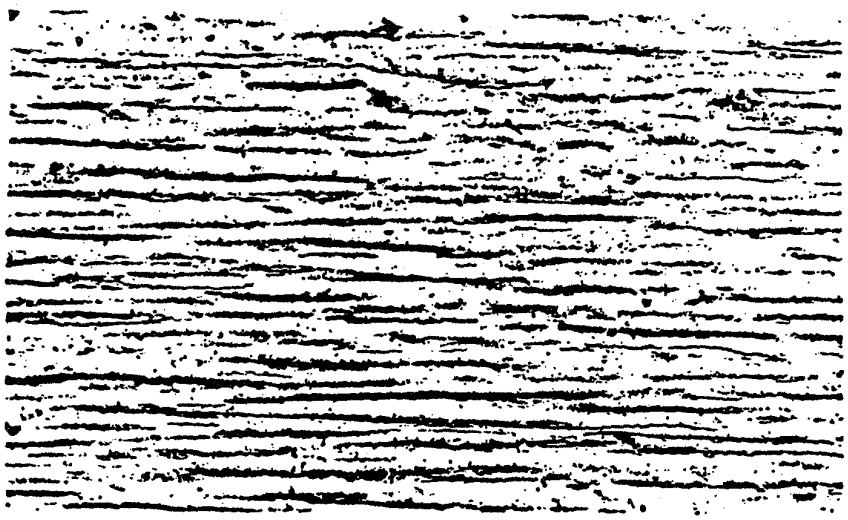
Panel "C" appears at the end of Building No. 1. The owners "no smoking" sign was stencilled over a panel of white lead applied over our SWP exposure panel "for permanence". After 43 months the contrast is most striking. Panel "D" is a closeup magnification of the two surfaces.

Panel "C"



Panel "D"





Building #2 - Panel #2

At the time these exposures were painted out, this competitor had the following label analysis.

Competitor "B"

Label Analysis:

Pigment:		Vehicle:	
Lead Sulphate	18.81%	Linseed Oil	92.00%
Lead Carbonate	36.19%	Turpentine &	
Zinc Oxide	35.00%	Japan Drier	8.00%
Silicates	10.00%		

Note:
This panel is two coats applied over lead and oil primer over weathered painted northern pine siding of poor grade.

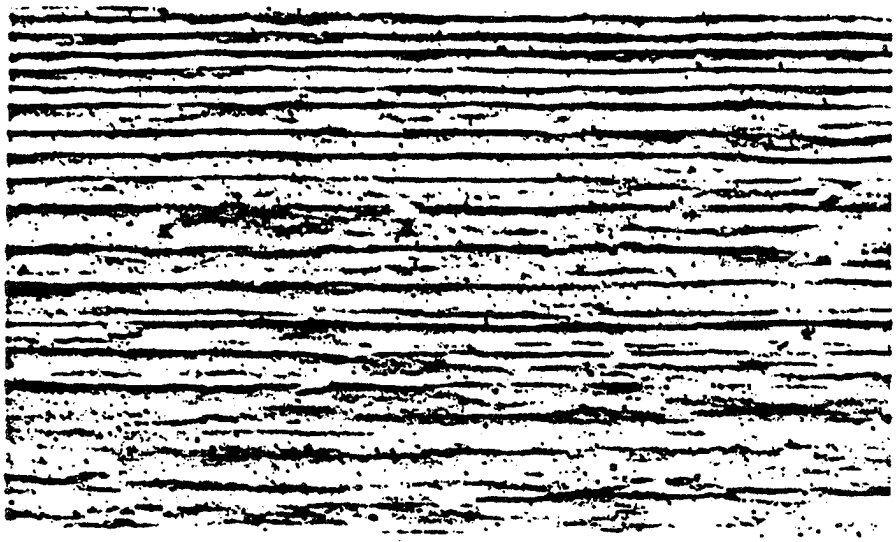
Exposure reading:
After 36 months exposure, the paint shows considerable darkening, cracking is quite general and there is heavy chalking. Its appearance from the distance is only fair.

Remarks:
This formula resembles SWP Rx 471 of 1929 manufacture.

This competitor has at the present time these two formulations:

Analysis	Type 1	Analysis	Type 2
Lead Carbonate	29.2%		36.3%
Leaded Zinc 35/65	30.8%		53.8%
		Magnesium Sil.	9.9%
Titanox "B"	40.0%		

(No exposure on these two)



Building #2 - Panel #3

At the time these exposures were painted out, this competitor had the following label analysis:

Competitor "C"

Label Analysis:

Pigment:

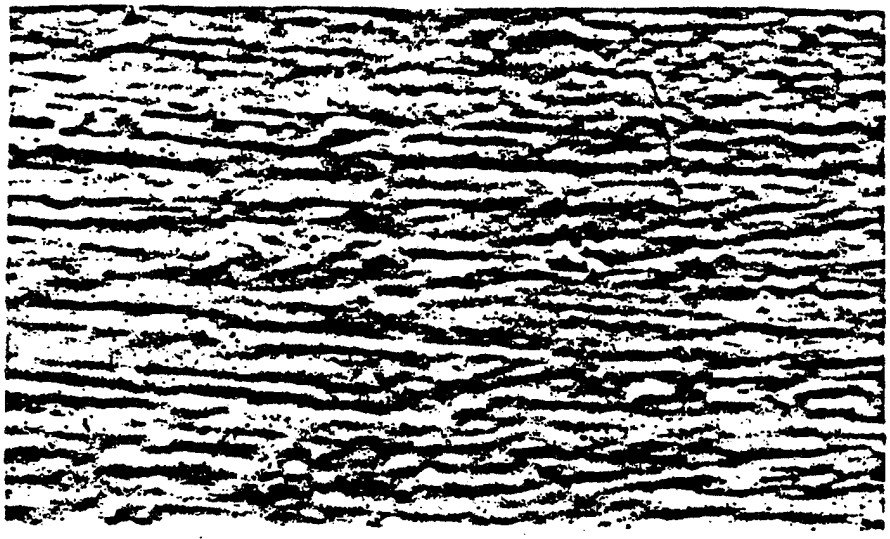
Zinc Oxide	74.0%
Titanium Dioxide	23.2%
Undetermined	2.8%

Vehicle:
Tung Oil

Note:
This panel is two coats applied over lead and oil primer, over weathered painted northern pine siding of poor grade.

Exposure reading:
After 36 months exposure, the paint is slightly darker. It has only slight cracking, but has chalked so excessively that the paint has washed very thin over high parts of the surface. Ridges, knots, and nails are conspicuous and nails show rusting.

Remarks:
It is evident that this type of formulation is helpful in showing what to avoid in house paint.



Building #2 - Panel #5

At the time these exposures were painted out, this competitor had the following label analysis.

Competitor "E"

Label Analysis:

Pigment:		Vehicle:	
Lead Carbonate	29.12%	Linseed Oil	88.00%
Lead Sulphate	12.48%	Japan Drier	3.70%
Zinc Oxide	23.30%	Naphtha	8.30%
Titanox "B"	35.10%		

Note:
This panel is two coats over lead and oil primer over weathered painted northern pine siding of poor grade.

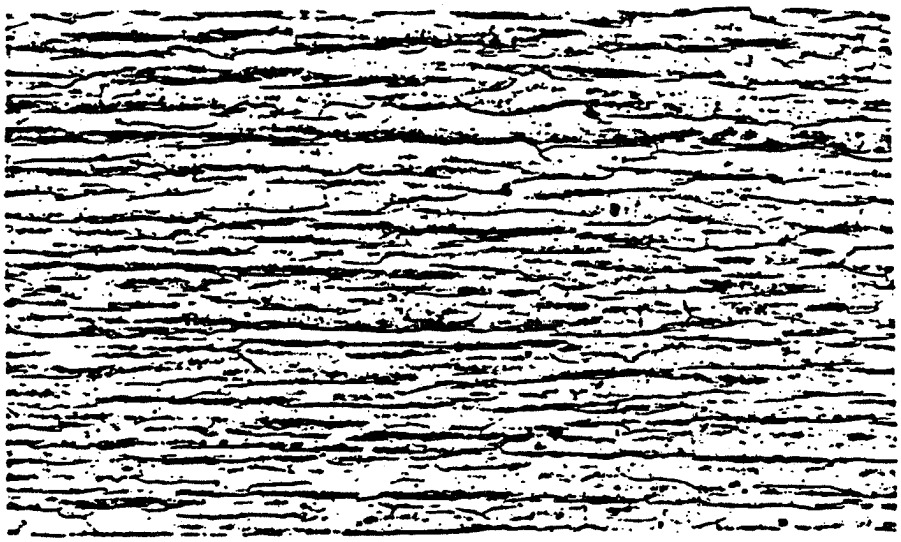
Exposure reading:
After 36 months exposure, the paint appears very well, only slightly darker than SWP (Step #2). There are no surface failures. It is chalking heavily.

Remarks:
Resembles "First Step" of SWP.

This competitor now has the following formulae:

Analysis:	Type #1		Type #2
Lead Carbonate	49.3%	Lead Carbonate	29.0%
Leaded Zinc 35/65	31.3%	Leaded Zinc	36.0%
Titanium Dioxide	11.0%		
Magnesium Silicate	8.4%		
Barytes		Barytes	26.3%

(No exposures on these later formulae)



Building #2 - Panel #3

At the time these exposures were painted out, this competitor had the following label analysis.

Competitor "F"

	Label Analysis:		
Pigment:		Vehicle:	
Lead Carbonate	50%	Linseed Oil	91.00%
Zinc Oxide	50%	Turpentine Drier	2.06%
		Turpentine	6.94%

Note:
This panel is two coats over lead and oil primer over weathered painted northern pine siding of poor grade.

Exposure reading:
After 36 months exposure, the paint is dark in color, there is bad cracking over the entire surface; it is chalking heavily and its appearance is poor.

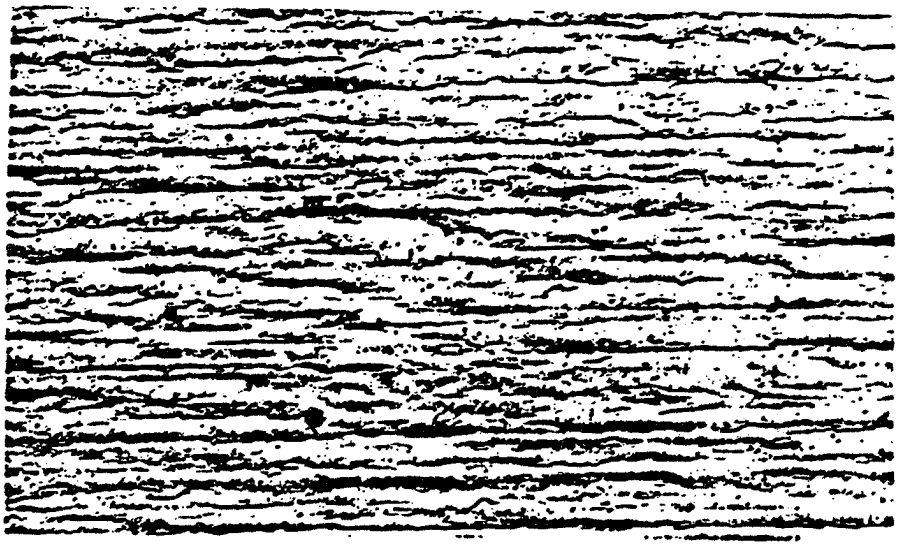
Remarks:
This paint exhibits the characteristic failure of lead and zinc paint.

This Competitor has now changed to an entirely different type paint, as follows:

Analysis:

Leaded Zinc	45%
Lead Titanate	7%
Titanox "B"	48%

This is recommended as a finish coat over a special first coat. We have panels of this system now on exposure for two years. Another year or two will probably indicate the type of failure. The present appearance is bright with a noticeable yellow cast.



Building #2 - Panel #10

At the time these exposures were painted out, this competitor had the following label analysis.

Competitor "H"

Label Analysis:

Pigment:		Vehicle:	
Lead Carbonate	55%	Linseed Oil	86%
Zinc Oxide	30%	Drier	14%
Magnesium Silicate	15%		

Note:
This panel is two coats over lead and oil primer, over weathered painted northern pine siding of poor grade.

Exposure reading:
After 36 months exposure, the paint appears very dark, is cracking badly over the entire surface and has heavy spotty chalking with very poor appearance.

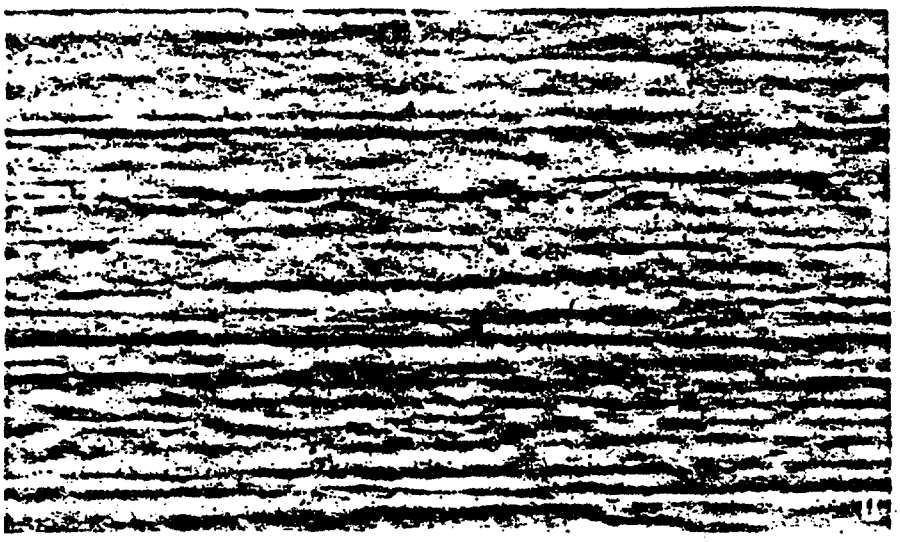
Remarks:
This paint exhibits the characteristic lead-zinc failure.

This competitor has now changed to the following type formulation:

*Label Analysis:

Pigment:

Leaded Zinc	47.2%
Lead Carbonate	15.8%
Titanium Dioxide	9.0%
Magnesium Silicate	28.0%



Building #2 - Panel #11

At the time these exposures were painted out, this Competitor had the following label analysis:

Competitor "I"

Label Analysis:

Pigment:

Lead Carbonate	34.34%
Lead Sulphate	16.16%
Zinc Oxide	29.50%
Titanium Dioxide	10.00%
Magnesium Silicate	10.00%

Note:

This panel has two coats over lead and oil primer over weathered painted northern pine siding of poor grade.

Exposure reading:

After 36 months exposure, the paint appears white, with no surface failures, is chalking heavily, with excellent appearance.

Remarks:

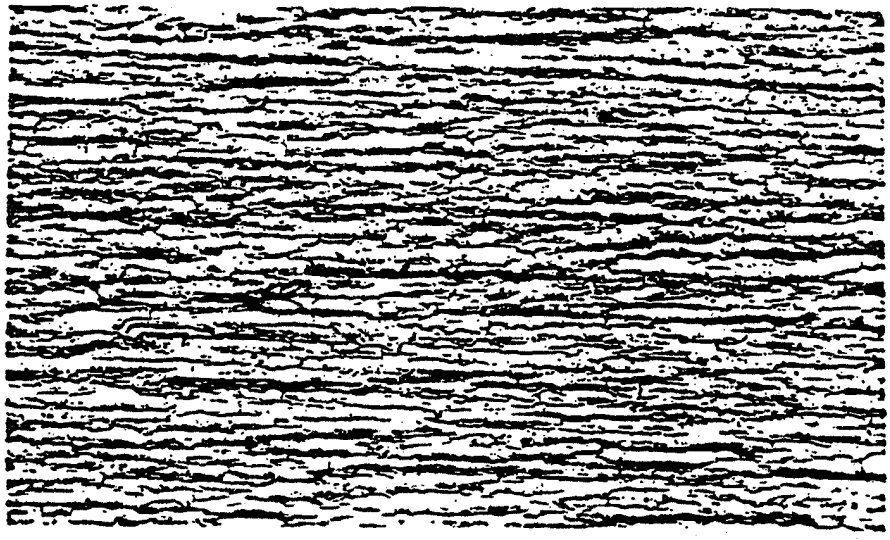
This company copied exactly our formula for Rx 471 Second Step.

From an analysis of a later formulation, certain changes are noted, the most important being an increase in Titanium Dioxide.

Latest formula:

Pigment:

Lead Carbonate	35.7%
35/65 Lead Zinc	34.3%
Titanium Dioxide	12.0%
Magnesium Silicate	9.0%



Building #2 - Panel #12

At the time these exposures were painted out, this competitor had the following label analysis:

Competitor "K"

Label Analysis:

Pigment:		Vehicle:	
Lead Sulphate	56%	Linseed Oil	88%
Zinc Oxide	34%	Turpentine and	
Magnesium Silicate	10%	Japan Drier	12%

Note:
This panel has two coats over lead and oil primer over weathered painted northern pine siding of poor grade.

Exposure reading:
After 36 months exposure, the paint is considerably darkened with heavy cracking over the entire surface and chalking heavily, with poor appearance.

Remarks:
Paint shows characteristic lead-zinc check with heavy checking, possibly promoted by poor vehicle balance of oil and drier, otherwise similar to S-W 1929 formula.

This Competitor has the following label analysis at present:

Pigment:		Vehicle:	
Lead Sulphate	49%	Linseed Oil	89%
Zinc Oxide	31%	Turpentine and	
Titanium Dioxide	10%	Japan Drier	11%
Magnesium Silicate	10%		

Similar to S-W "Step #2" - 1934 formula.

Building #2 - Panel #13

Competitor "L"

Thermolyzed Tung Oil Paint
(No analysis available)

Note:
This panel, two coats over lead and oil primer, over weathered painted northern white pine siding.

Exposure reading:
After 36 months exposure, the paint is very white, has slight cracking and is chalking excessively. Appearance is excellent.

Remarks:
Excessive chalking is serving to keep paint white in appearance, but is rapidly reducing its protective value.

NEW UNIFIED PROGRAM

for COUNTRY-WIDE EXPERIMENTAL HOUSE PAINT TESTING

In order to take advantage of new developments in pigments and all other ingredients used in making house paint it is necessary for us to have means to test new experimental formulas - adequately.

The fact that SWP House Paint is used under all climatic conditions makes it necessary for us to parallel these conditions with exposures in every part of the country. These exposures must be - above all - actual house paint jobs with each house selected with care and accuracy according to pre-determined plans to be carried out in every section of the country. This is to make certain that no unforeseen variables enter into the situation to nullify the value of the data obtained. In order that these variables may be taken into consideration, the following information will be recorded for each test:

A. Type of House
1. Kind of wood
2. Type of eaves and cornices
   (a) flush
   (b) extended
   (c) boxed, etc.
3. Type of insulation, if any
4. Air-conditioned
5. Percent of moisture in wood

B. Condition of House
1. Drains and downspouts
2. Paint
   (a) Number of re-paints
   (b) Condition of paint
   (c) Age
   (d) Material used for last paint job
   (e) Type of paint failure now on house.
3. Structural defects
4. Ventilation

C. Location
1. Topography
   (a) Valley
   (b) Hillside
   (c) Hilltop, etc.
2. Direction faced
3. Locality
   (a) Suburban
   (b) Country
   (c) Metropolitan
4. Location with respect to nearest metropolitan area.
5. Immediate vicinity
   (a) Industrial
   (b) Residential
   (c) Business

D. Atmospheric Conditions

(a) Temperature
(b) Humidity
(c) Rain fall
(d) Sunshine
(e) Air pollution

The following locations have been selected tentatively both because of a climatic condition obtained and account of proximity to a S-W factory point:

Massachusetts	Sea coast - fog
New Jersey	Sea coast
Florida	Extreme ultra-violet rays
Texas	Extreme dry heat
Minnesota	Cold winter
Kansas	Wind erosion
Missouri	Humidity
Illinois	Extremes of heat and cold
Ohio	Extremes of heat and cold
California	Sunshine-heat

The table which follows supplies interesting data covering the variation in climatic conditions in different parts of the country and will show how important the accuracy of all exposure readings must be in order to make them dependable.

State	City from which following Statistics were taken	Mean Min. Winter Temp. of	Mean Max. Summer Temp. of	Annual Precipitation Inches	Annual Snowfall Inches	Relative Humidity A.M.	Relative Humidity P.M.	Sunshine % of Possible Hours
Maine	Portland	18	74	43	74	77	75	58
Mass.	Boston	21	78	44	45	74	70	55
Conn.	New Haven	22	78	47	40	76	74	61
New York	Albany	18	80	37	55	76	76	54
New Jersey	Atlantic City	27	76	42	18	82	-	62
Penna.	Pittsburgh	25	83	37	31	78	66	44
Maryland	Baltimore	29	84	43	24	71	69	58
Va.	Norfolk	34	85	50	9	81	75	54
N.C.	Charlotte	34	87	50	8	78	63	-
S.C.	Charleston	44	87	53	0	78	-	56
Ga.	Atlanta	36	86	50	3	85	65	61
Fla.	Jacksonville	47	90	53	0	82	76	60
Ala.	Montgomery	40	90	51	2	81	65	-
Miss.	Meridian	38	89	53	2	85	72	58
La.	New Orleans	48	88	58	1/2	83	72	53
Texas	Galveston	50	88	48	1	83	78	60
Okla.	Oklahoma City	28	89	32	8	80	60	67
Ark.	Little Rock	35	89	50	11	81	63	64
Minn.	St. Paul	7	80	29	37	80	63	54
Wisc.	Milwaukee	16	73	31	51	88	72	47
Mich.	Detroit	20	79	32	37	79	71	52
Nebr.	Omaha	15	84	31	24	78	61	60
Kansas	Dodge City	19	88	20	19	78	53	69
Iowa	Des Moines	14	83	32	33	80	64	60
Mo.	Columbia	22	87	38	18	71	-	69
Ill.	Springfield	22	84	37	20	78	65	-
Ind.	Indianapolis	23	84	42	23	76	65	54
Ohio	Cleveland	22	77	36	43	76	70	45
W.Va.	Elkins	19	81	46	56	87	76	37
Ky.	Lexington	28	84	43	21	78	65	59
Tenn.	Chattanooga	35	87	52	6	81	68	55
Colo.	Denver	18	84	14	47	61	39	69
Calif.	Los Angeles	45	82	16	-	78	64	73