

Paint Research
December, 1952

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#27 - Cont.

<u>Paint No.</u>	<u>Description</u>	<u>Results</u>
QJ 116 P	Rex 471, regular (510), heat bodied, 20 dry extender.	Very slight micro-checking (erosion at Chicago). Normal.
117 P	Same, but SO ₂ bodied (510).	Same. No sign of darkening.
145 P	Same as 116 P but 312 dry extender.	As 116 P but no sign of checking. Not considered significant at the present stage.
146 P	Same, but SO ₂ bodied (510).	Same.

0007-SWP-044252

N122072

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5. Exposures 14809-16 F, recalled some time ago from Florida as of 24 months, vertical south, are hereby reported in conjunction with recent ratings on the corresponding Chicago panels at 51 months. The latter were exposed both north and south and seem to show results of somewhat more value than those of the Florida panels. The tests, all on cedar bevel siding primed with Rex 450 Undercoater, compare Nylal #300 and #400 extenders with the regular 20 dry magnesium silicate at equal poundage. Two sets of paints are involved because of difficulty in getting correct viscosities.

Identification and results:

<u>Paint No.</u>	<u>Description</u>	<u>Florida</u>	<u>Chicago</u>
OJ 787 N	High Visc. Reg. 471	Normal, slightly slow clean-up.	Normal, quite clean but eroding.
788 N	" " Nylal 300	Similar, slightly cleaner.	More erosion, also slightly more dirt. Not satisfactory.
789 N	" " Nylal 400	Equally clean, but more surface flaking.	Considerably better, like 787 N.
750 N	Low Visc. Reg. 471	Same as 787 N	Essentially same as 787 N.
751 N	" " Nylal 300	Same as 788 N	As 788 N, erosion and dirt.
752 N	" " Nylal 400	Same as 789 N	Like 789 N, better.

4. Exposures 15088-41 C, F were examined after 18 months at Florida vertical south and 20 months at Chicago south only. The tests are on cedar bevel siding primed with Rex 450 Undercoater. The purpose was to check the effect of 80₂ bodied linseed oil in Rex 471 SWF Gloss White with respect to darkening, which would be a possibility in the presence of lead pigment. Identification and general results to date on the tests, which continue on exposure, are as follows:

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Many minor differences were noted in the readings at both locations over 3 years, but very few if any of these differences added up to a trend for or against any particular oil. Very likely the main reason for this is that the samples all carried the usual 50 gallons of (2) linseed as the major part of the binder. The following differences might bear mention, but are by no means positive trends:

1. Regular Rex 471 good in clean-up, but serious erosion.
 2. (44) by Ekey process possibly slightly better in both rexes.
 3. All blended oils slightly less erosion but more dirt, with a possible tendency for highest soya content to be most pronounced in this respect.
 4. Variation in neutralization seems insignificant, since "no neutralization" sample is like others, relatively good.
2. Exposures 14559-67 C, F were examined after 30 months' exposure at Florida, vertical south, and at Chicago north and south. All are 2-coat work using Rex 450 Undercoater, on cedar bevel siding. Panels were prepared under cool weather conditions. The control or guide paint is regular Rex 471 SWP Gloss White using (2) and (310) linseed. Identification and brief results to date are:

<u>QJ No.</u>	<u>Description</u>	<u>Florida</u>	<u>Chicago</u>
416 N	Regular Rex 471	Normal, moderate mildew.	Normal, clean but eroding.
417 N	Bodied oil as AV-1101, P.E. Soya Esters, NaOH catalyst.	Same	Same
418 N	Same, but AVM-51, BaO Catalyst "	"	"
511 N	Using (48) #1; 50% linseed, 30% soya, 20% (5017) Dehydrol	Noticeably cleaner	Very slightly cleaner, erosion same.
511 NF	Same, but a factory batch.	Ditto	Not as clean; slight failure.
512 N	(48) #2; as 511 N, but Dehydrol is (2325).	Like 511 N, possibly even cleaner.	As regular.
512 NF	Same, but a factory batch.	Ditto	Ditto
513 N	Using CV-49, a stock 50/30/20% linseed/soya/CWO.	Very slightly less dirty than guide.	Slightly cleanest in the past, but no choice now.

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0007-SWP-000113624

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The P. C. and C. Sales Department has submitted samples of J. F. Anderson's Exterior Primer and Exterior Gloss White to be evaluated for general performance, such as brushing, flow, brightness, opacity, etc. These materials were compared with SWP and 450 Undercoater. The competitive paints are not equal in quality to SWP Gloss White or 450 Undercoater. The J. F. Anderson Exterior Gloss White and exterior primer are quite low in titanium content which results in low opacity and brightness. The paints will be exposed at Chicago and Miami, Florida for durability characteristics.

	<u>J. F. Anderson Exterior Gloss White</u>	<u>SWP Gloss White - Rex 471</u>	<u>J. F. Anderson Exterior Primer</u>	<u>Rex 450 Undercoater</u>
Weight per Gal.	14.52 lbs.	14.45	14.00	12.57
Viscosity #5 Orifice	34.4"	28 - 35"	31.8"	18 - 22
Brushing	Good	Good -	Good	Good
Flow	Very short	Short	Good	Good
Brightness	Rather low	Good	Rather yellow	Good
Gloss	Slightly low	Good	Slightly high	Standard
Hiding Units per gal.	147	194	141	156

Exposure series examined during the month include the following:

1. Series 13606-27 C, F were examined after 3 years' exposure at Florida vertical south and at Chicago north and south, all on cedar bevel siding primed with Rex 450 Undercoater of contrasting shade. The tests involve special bodied oils from the Resin Research Department, replacing the linseed oil bodied by the standard or direct process, which is used in the control formulas (late 1948) of Rex 471 SWP Gloss White and Rex 465 SWP Colonial Yellow. The special oils are:
 - A. (44) bodied by the Eckey process.
 - B. (1275) soya/(140) chinawood bodied by the Eckey process, at the proportions of 55/45%, 65/35% and 75/25%.
 - C. Same bodied by the direct process, but 65/35% only.
 - D. The 65/35% Eckey-bodied type, varying neutralization wash by using (1) HCl, (2) oxalic acid and (3) no acid.

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0007-SWP-000113625

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#97 - SWP

We have prepared several laboratory batches of SWP to check the brushing, flow and gloss characteristics of Card 88, Card 89 and several variations of the latter formula. It has been reported that the Chicago plant obtained low mill rates on the new formula for SWP Gloss White due to the texture of the 511 dry extender. In the General Purchasing Minutes dated December 25 it was reported that Cleveland rejected a shipment of 511 dry from International Talc which had a residue of 5.5%. The supplier claimed a residue of 1.5%. However, it appears they cannot supply a finer ground product and steps should be taken to eliminate this material from any house paint formulations. We have found that by the use of 10 gallons (798) to improve the flow of Card 89 we obtain sufficient body without the use of 511 dry. Samples of the following paints were sent to Cleveland for their inspection:

	<u>Viscosity - #3</u>	
	<u>Fresh</u>	<u>Over Night</u>
448 R - Rex 471, Card 88	28.2"	33"
449 R " " " 89	26"	29.8"
451 R " " " 89	25.2"	29"
(Using 10 gals. (798), no 511 dry.)		

If factory production runs lower in body than our laboratory batches we would suggest the use of 513 dry Sierra Mistron Talc or 2304 dry fine textured magnesium silicate.

Three samples of raw and bodied safflower oil and two samples of SWP Gloss White Card 88 identified as YA-1086 and YA-1087 made from these oils were received from Oakland. Both paints have 100% safflower binders with YA-1086 having the standard amounts of unbodied and bodied oils while A-1087 contains four gallons of OTV 858, a safflower version of (798) blown linseed. YA-1087 has about the same degree of flow and gloss as Chicago production made on Card 88 using linseed oils. Paint YA-1086 is deficient in both properties.

The Oakland safflower oils were compared with the linseed oils (2), (510) and (798) in the SWP Gloss White formula, Card 89. In this particular formula the safflower oils appeared to be deficient in flow compared with the regular linseed vehicle. However, the regular production made on formula card No. 89 is too short in flow and the formula is being revised at the present time to correct these deficiencies. From these results it has been suggested that all SWP production made in Oakland from safflower oil should be made on formula card 88 and 10 gallons of the safflower (798) type oil should be used to improve flow and gloss.

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0007-SWP-000113626

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<u>Paint No.</u>	<u>Identification</u>	<u>Results</u>
QJ 163 L	Same, but (3516) made from 80-500.	Slightly poor in erosion, quite clean.
QJ 799 K	Using (2525) bodied Dehydrol	Similar, but dirty in first year.
QJ 800 K	(48) of 50/30/20 type/(2525) at 3/1.	Ditto.
QJ 809 K	(2351) blown soya/ bodied CWO, 4/1.	Clean, but slight erosion tendency.
QJ 810 K	(2351)/bodied CWO/(2525), 3/1/1.	Slightly better film, early dirt poor.
QJ 811 K	AVM-8 blown soya/bodied CWO, 4/1.	Same, erosion slightly poorer.
QJ 40 L*	AVM-13 and 14, P.E. soya esters (entire vehicle)	Erosion normal, early dirt rather poor, but clean after 2 years.
QJ 181 L*	Same, but AVM-15 and -16.	Ditto.
- - - *	du Pont #40, stock. Labeled as "55% processed soya, 29% linseed oil."	First 2 years at Florida showed poor clean-up; but all other ratings show it superior in both clean-up and durability.

*These three continued to 4 years' exposure at Florida.

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0007-SWP-000113627

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A final report was written on exposure series 12018-58 F, C, oil tests in Rex 471 SWP Gloss White, on the basis of 56 months' exposure at Chicago, vertical south and north, cedar bevel siding primed with Rex 450 Undercoater. Due to advanced erosion on the Chicago panels, many tests required the consideration of data from earlier readings and also from the Florida tests, most of which were retired and reported in November, 1950, at 50 months. Three Florida tests were continued to 4 years.

Condensed identification and the most significant trends found on exposure are presented below. For full details the complete reports of November 24, 1950, and November 30, 1952, should be consulted. Film failure other than erosion was slight. All substitutions of oil are for bodied portion only (40%) unless specified.

<u>Paint no.</u>	<u>Identification</u>	<u>Results</u>
QJ 160 L	Reg. guide, Rex 471 of 4-25-47, all linseed.	Normal or average.
QJ 170 L	CVR-957, reg. (3516), 80/20% soya (1275)/CWU (140).	About same.
QJ 171 L	CVR-958, (3516) made from Pittsburgh's SO-500 soya.	About same.
QJ 172 L	Blend of kettle-bodied (1275)/(140), 52%/8%.	Slightly greater erosion, but slightly earlier clean-up.
QJ 173 L	Same, but based on SO-500.	Same as preceding.
QJ 174 L	Same, but based on (1275) bodied with SO ₂ -CO ₂ .	Bad erosion, also dirty.
QJ 175 L	As preceding but based on SO-500.	Perhaps poorest of series, erosion and dirt.
QJ 176 L	(1275) heat-bodied, (140) added and blown with SO ₂ -CO ₂ .	About as guide.
QJ 177 L	Same but based on SO-500.	About as guide.
QJ 161 L	(48) of the 50/50/20 type, plus 50/50 blend of SO-500 and (2) linseed.	Poor; erosion, early dirt.
QJ 162 L	Similar, but (3516), also less raw soya.	About as guide.

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- d. In the tint tests, same basis as the whites, the Colonial Yellow shade shows up the calcium silicate to much better advantage than the Grays, but again the locations conflict. Erosion at Chicago is serious enough to spoil the appearance of the high-poundage sample, while the normal-poundage sample looks relatively good. At Coffeyville, the reverse is true, the normal sample having a tendency not to chalk enough to clean itself of dirt and mildew.

The Grays actually follow about the same pattern in fading and clean-up, but the high-poundage sample looks poor because the chalk-mak is yellowish. It also shows much more checking at Coffeyville than the control, with the normal-poundage sample best in this respect.

Therefore, the detailed study indicates very much the same conclusion as quoted above from the Extender Report. If Cabot's Wollastonite retains the good properties of the above material without the bad grinding and viscosity effects, it could be a very useful extender.

Exposures 11945-8 C were concluded at the end of 5 years at Chicago, north and south on cedar bevel siding, and the results studied along with those of parallel Florida exposures, south only, at 4 years. The purpose was to compare Rex 471 SWP Gloss White and du Pont's #40 White as indicated below, not so much the two paints as such, but primarily the Rex 450 Undercoater - Rex 471 SWP system as against the du Pont system of self-priming.

Regular Rex 471 over Rex 450 was used on the left 1/3 of each panel with the following on the right 2/3:

- (a) Rex 450 plus du Pont #40
- (b) du Pont #40 self-primed
- (c) Same, but reduction of first coat,
4 parts to 1 part oil.

Considering the earlier stages of exposure as well as the final fatings, all three du Pont tests have shown surprisingly good durability. Most of the first 2 to 3 years found them rated as poorer than Rex 450-471 in general appearance due to poor clean-up and yellow cast, but in the later stages the cracking and erosion failure on the Rex 450-471 went to the point where it neutralized the better whiteness. The exact composition of the du Pont sample (purchased) is not known, but from the earliest stages we have seen indications that the formula contained some form of chalk-resistant rutile titanium. This would go far to explain both its good film durability and its slow clean-up.

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Batch	Rex	Inert	Viscosity #5		Brushing	Flow	Gloss
			Fresh	5 Days			
580 R	Rex 471 SWP	SL2 Dry	27.2"	36"	Fair	Fair (-)	Good
581 R	Gloss White	Wollaston- ite P-1	19.8	23	Good (-)	Good	Good
582 R	Rex 478 SWP	SL2 Dry	51.6	54.2	Good (-)	Fair	Good
583 R	Geneva Cream	Wollaston- ite P-1	24.6	26.2	Good (-)	Fair +	Good
584 R	Rex 474 SWP	SL2 Dry	51.6	53.1	Good (-)	Fair +	Good
585 R	Chelsea Gray	Wollaston- ite P-1	23.4	24.8	Good (-)	Fair +	Good

The Wollastonite offered by Cabot is reported to be similar to the Fibrous Calcium Silicate submitted to us in 1947 by Thompson-Weinman. Unfortunately, Thompson-Weinman did not keep accurate records of their sampling and therefore exposure tests must be repeated on the Cabot material. Nevertheless, reference was made to our earlier exposures of Fibrous Calcium silicate, panels 12586-89 C, K as a source of supplementary information.

Panels 12586-89 C and K had been on test slightly over 4 years at Chicago and about 4-1/2 years at Coffeyville, vertical south on cedar siding. Based partially on these tests, calcium silicate was rated in our Comprehensive Report on Extenders (January 17, 1952) as "unsatisfactory, except in moderate amounts or in yellow shades." A more thorough study of the exposures cited, especially Coffeyville, indicates the following:

- Normal poundage of calcium silicate ground poorly, gave very low consistency.
- Increased poundage, from 290 to 390 pounds in Rex 471 SWP Gloss White and from 325 to 425 pounds in SWP Tint Base, gave fairly satisfactory grinding and body.
- In the SWP White exposure, which covered the poundages cited above against the normal amount of 20 MSK in both pre-war and bodied oil type formulas, the special extender at the increased poundage seemed at least equivalent to the control at both locations. Perhaps because of the thin body of the sample with normal poundage, it showed very bad erosion at Chicago. It was considerably better, possibly better than the control, in resistance to the checking and cracking which is characteristic of Coffeyville exposure.

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0007-SWP-000113630

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The paints made with the CTV 8560 oils were better in brushing than those made with the CTV 8557 series comparing paints of similar body. In general all the paints are too short in flow with the exception of 352 R and 286 R. It would appear that the maximum draft used in the preparation of CTV 8560 produced oils with somewhat better brushing properties similar to those obtained with vacuum bodied oils.

The paints made with 100% bodied oil are too high in consistency to be evaluated for brushing properties. However, they will be reduced with thinner and exposed for durability along with the paints containing 19 gallons of bodied oil, and the unpigmented oils plus driers..

Resin Amine D Soaps

Three laboratory batches of SWP Gloss White were made to evaluate the performance of two magnesium Rosin Amine D soaps prepared by Dr. Grummitt and one prepared by the Resin Research Department.

RD 0851 (equivalent weights of magnesium to Rosin Amine D)
From Resin Research Department

Magnesium Rosin Amine D (same composition as RD 0851)
Prepared by Dr. Grummitt.

Magnesium Rosin Amine D (one part magnesium to three parts
Rosin Amine D based on equivalent weights).
Prepared by Dr. Grummitt.

When the Rosin Amine D soaps were used in concentrations of 5 to 10 pounds per 100 gallons in oil based paints the flow and gloss characteristics were definitely improved. The RD 0851 from the Resin Research Department and the duplicate sample prepared by Dr. Grummitt produced the best flow and gloss. The magnesium Rosin Amine D soap based on one part magnesium to three parts Rosin Amine D was the least effective. The paints will be exposed at Chicago and Florida to check the effects of such soaps on durability.

Godfrey L. Cabot, Inc. has submitted a sample of their Wollastonite for inspection and test. The sample was compared with Nyltal 300 in SWP for grinding properties as well as brushing, flow and consistency characteristics. Using the same mill adjustment we obtained the same fineness of grind with Wollastonite as with Nyltal 300. Wollastonite has definitely lower consistency characteristics than Nyltal 300. If used as the inert in SWP a higher poundage of Wollastonite would be required to obtain the standard viscosity. The experimental paints will be exposed at Chicago and Miami, Florida.

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0007-SWP-000113631

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SWP Gloss White
Using 19 Gallons Heat Bodied Oils per 100 Gallons Paint

Batch	Bodied Oil		Viscosity #3 Orifice		Brushing*	Flow*	
			Fresh	Over Night			
327 R	CTV 8557	Sample A	16"	18"	+ 2	10	6
328 R	"	" B	22.2"	22.8"	+ 1.6	7	6
329 R	"	" C	24.0"	26.0"	+ 2	7	6
330 R	"	" D	24.8"	28.0"	+ 4	6	6
331 R	"	" E	25.4"	31.0"	+ 5.6	7	6
332 R	"	" F	27.6"	34.0"	+ 7.6	8	8
333 R	CTV 8560	Sample A	15.2"	15.6"	+ .4	10	6
334 R	"	" B	19.0"	20.2"	+ 1.2	9	6
335 R	"	" C	20.2"	21.0"	.8	9	6
336 R	"	" D	20"	22.2"	2.2	9	6
337 R	"	" E	21.6"	22.8"	1.2	8	6
338 R	"	" F	25"	24.8"	1.8	8	6
339 R	"	"	25.2"	29"	3.8	8	6
340 R	(31.0)		28"	32"	4	7	6

Oil Blends

				<u>Viscosity #3 Orifice</u>				
				<u>Fresh</u>	<u>Over Night</u> (5 days)	<u>Brushing*</u>	<u>Flow*</u>	
286 R**	14	parts OKO S 70		29.2"	28.4"	1	8	7
	5	" " S 37						
370 R	2-3/4	" CTV 8557 Sample A		26.5"	34.4"	7.6	6	6
	16-1/4	" " " F						
371 R	1-3/4	" CTV 8560 " A		24.8"	30.2"	5.4	8	6
	17-1/4	" " " F						
372 R	5-3/4	" CTV 8557 " C		25"	31"	6	7	6
	13-1/4	" " " E						
373 R	2-3/4	" CTV 8560 " D		24.4"	29.4"	5.6	8	6
	16-1/4	" " " F						

*10 - Best 0 - Poorest

**This paint contains 16 gallons (798) for (2)

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#97 - SWP

In the Paint Research monthly report for October it was reported that the Varnish-Resin Laboratory prepared two series of linseed oils in the pilot plant for our inspection and test. These oils were compared in SWP for brushing and flow to determine what effect the cooking procedure and different viscosities have on such characteristics. The CTV 8557 series was heat bodied with sulphur dioxide catalyst followed by an inert gas purge. The CTV 8560 series was prepared in a manner similar to CTV 8557 with the exception that a maximum draft was used in the stack to simulate vacuum bodying of oils.

SWP Gloss Whites were made using 19 gallons of each oil as the bodied oil portion of the formula and the paints were checked for viscosity, brushing and flow. The brushing characteristics will be checked on the high shear viscometer as soon as time permits.

Bodied Oil Characteristics

<u>Bodied Linseed Oils</u>		<u>Viscosity</u>		<u>A. V.</u>	<u>Used in Paint</u>
		<u>G-H Tube</u>	<u>S-W Cup #5</u>		
CTV 8557	Sample A	10-1/2"	21.4"	4.2	527 R
"	" B	30"	54.8"	5.5	528 R
"	" C	42"	75.4"	6.0	529 R
"	" D	51"	92.4"	5.8	530 R
"	" E	64"	115.0"	6.2	531 R
"	" F	81"	138.2"	5.0	532 R
CTV 8560	Sample A	15"	29.2"	5.0	533 R
"	" B	17-1/2"	37.8"	6.6	534 R
"	" B ₂	21"	42.1"	5.1	535 R
"	" C	25-1/2"	50"	5.1	536 R
"	" D	29-1/2"	58.8"	4.7	537 R
"	" E	55-1/2"	102.2"	4.4	538 R
"	" F	61"	111.5"	4.5	539 R
	(510)	57"	104"	6.4	540 R

<u>Oil Blends Used</u>		<u>Viscosity</u>		<u>Used in Paint</u>
		<u>G-H Tube</u>	<u>S-W Cup #5</u>	
14	parts OKO S 70	51"	59.2"	286 R
5	" OKO S 37			
2-3/4	" CTV 8557 Sample A	57"	108"	370 R
18-1/4	" CTV 8257 " E			
1-3/4	" CTV 8560 " A	57"	109"	371 R
17-1/4	" CTV 8560 " F			
5-3/4	" CTV 8557 " C	56"	104"	372 R
15-1/4	" CTV 8557 " E			
2-3/4	" CTV 8560 " D	58"	106"	373 R
16-1/4	" CTV 8560 " F			

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0007-SWP-000113633

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- QJ 603 P Regular, all linseed oil, 20 dry inert.
Checking, fair appearance.
- 766 P 2504 dry - Very fine Mg silicate, 9 gals. (213).
No checking, but otherwise only fair.
- 717 P Higher in 2504, (798) for (213).
No checking, fair color but dirty.
- 718 P Same, but 515 dry Mistrone Talc T-076.
Same results.
- 758 P 2504 as in 717 P but 16 gals. (4106) alkyd.
Poorest in all respects except gloss-retention.
- 896 P 2140 dry Titanox RC as titanium, 512 Nylal 500,
oil vehicle. Moderate in checking, fair to
good color, rather dirty.
- 897 P Same but 566 dry Calcium carbonate.
Similar, possibly less fade.
- 895 P As 717 - 718 P but high in 512 dry.
No checking, but only fair color, and dirty.
- 896 P As 766 P but 20 dry; 20 gal. OKO-M17 oil.
As preceding.
- 898 P Same but OKO-M57.
Similar, but slightly better in color,
poorer in dirt.

(All except 896 P and 897 P use 2174 dry
Ti-Pure R-610 titanium.)

0007-SWP-044264

0007-SWP-000113634

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QJ No.	De- scription	Florida				Chicago South				Chicago North			
		6 Mo.		12 Mo.		6 Mo.		14 Mo.		6 Mo.		14 Mo.	
		Chalk	Dirt	Chalk	Dirt	Chalk	Dirt	Chalk	Dirt	Chalk	Dirt	Chalk	Dirt
490 P	Aliphat- Glyc.	9	5	5	6M	7	7	6	7	7	2	7	6
491 P	Aliphat- P.E.	9	5	5	6M	7	7	6	6	8	1	6	5
492 P	EN 828 soya	6	6	5	7M	8	7	6	7	7	4	7	6

*As guide, this dirt varies widely, the 7 rating is on a single panel.

"M" refers to mildew, more noticeable than on other panels.

Panels 18008-35 CS, CH, CS Repaint and CH Repaint were prepared during the month for exposure at Chicago. The paints represent a coverage of those used in the 1952 house tests.

A house test was started at 12453 S. State Street, Chicago, W. Compton owner. This house was formerly painted with a test of Rex 496 Ivory in 1946. The present test calls for a 2-coat job in gray, using Rex 450 Undercoater shaded and comparing two batches of Rex 474 Chelsea Gray: QJ 174 R, regular, Card 19 using Titanox RC versus QJ 175 R special, with (SL5) instead of (SL0) and using Ti-Pure R-610 as titanium. Because of a change of plans, the owner was unable to get help to finish the job during the month. The first coat was applied, but only a small part of the finish coat, and the job may have to hold over until spring.

Panels 15461-70 F, C were examined after 12 months' exposure at Florida vertical south and 14 months at Chicago north and south. These are cedar bevel siding panels primed with Rex 450 Undercoater. Several reformulations of Rex 477 Westchester Gray were tested in an effort to improve flow, gloss and production uniformity, as a result of complaints. There are important variations at both locations, but we feel that results are inconclusive at one year. The main factors are checking at Florida and fading and dirt collection at both locations, and there is considerable contradiction among these factors at present.

A brief summary follows:

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0007-SWP-000113635

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Panels 15568-80 F, C were examined after 12 months at Florida vertical south and 14 months at Chicago north and south on cedar bevel siding primed with Rex 450 Undercoater. The tests consist of various modified oils substituted for (S10) bodied linseed in Rex 471 SWP Gloss White. The only appreciable failure is found on the Florida panel carrying RC 6575, made with the glyceryl ester of Neofat #19, C-20 fatty acids of fish oil. The question of dirt-collection and clean-up, clearly the most important during the first year in this type of study, could involve a very lengthy discussion on the basis of readings to date. In general, most tests look cleaner at one year than at 6 months.

We had a coverage of this series in the December, 1951, monthly report, 6 months results, and are issuing a routine progress report on 12 months results. Rather than attempting a general discussion, we are presenting a brief tabulation of results at both stages. Further details on composition will be furnished on request.

Comparative Ratings of Exposures

QJ No.	De- scription	<u>Florida</u>				<u>Chicago South</u>				<u>Chicago North</u>			
		<u>6 Mo.</u>		<u>12 Mo.</u>		<u>6 Mo.</u>		<u>14 Mo.</u>		<u>6 Mo.</u>		<u>14 Mo.</u>	
		Chalk	Dirt	Chalk	Dirt	Chalk	Dirt	Chalk	Dirt	Chalk	Dirt	Chalk	Dirt
488 P	Reg., (2) + (S10)	7	7+	5	8	7	8	6	7	8	6	7	6
419 P	Swift's soya	9	5	8	7	8	7	6	7	8	4	7	8
420 P	(1275) soya	9	6	8	6M	8	7	6	7	8	1	7	6
421 P	(5019)-sty- rene, light	7	8	7	6M	8	8	6	7	9	5	6	6
422 P	Similar, hvy	7	6	7	7	8	8	7	8	9	5	7	6
449 P	Aliphatic-P.E.- tung	8	5	6	8	8	9	7	7	9	6	7	8
450 P	Aliphatic-Glyc.- tung		4	6	7	7	7	6	7	8	4	7	6
451 P	Neofat 19- Glyc.	6	6 (Checking)	8	7	8	8	7	6	8	4	6	5
489 P	Safflower- tung	8	7	5	8	8	9	7	7	9	5	7	6

(Cont.)

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Paint	Add	Original	Viscosity - #5 Orifice	
			24 Hr.	5 Weeks
QJ 870 Q	.20 gal. Triethylamine	45.8"	57.4"	59.5"
"	.60 " "	45.3	55.0	54.8
"	.60 " Morpholine	45.8	55.2	54.7
"	1.25 " Ethanol	45.3	55.8	56.0
QJ 27 R	.20 " Triethylamine	45.4	45.5	44.4
"	.60 " "	45.4	42.2	42.8
"	.60 " "	45.4	58.5	59.6
QJ 800 Q	.20 " Morpholine	42.0	54.7	56.8
"	.60 " "	42.0	51.8	55.0
"	.60 " Triethylamine	42.0	53.2	54.0
"	1.25 " Ethanol	42.0	55.0	54.4

More work will be required to determine the real value of amines as consistency control agents. Early results indicate that they do have some value for this purpose. The effect is noted shortly after addition. After the initial decrease has occurred, the consistency shows a small increase. The limiting factor in the use of amines will be their odor. One quart per hundred gallons of Rex 471 usually cannot be detected but somewhat larger amounts impart a disagreeable odor, suggesting presence of fish oil. Larger amounts of amines can be added to higher acid vehicles, indicating reaction with the fatty acids. Amine additions did not have an adverse effect on the drying properties of house paint. Further tests are in progress at this time.

Exposures 15457 - 41 F, C were examined after 12 months at Florida vertical south and 15 months at Chicago north and south, all on cedar bevel siding primed with Rex 450 Undercoater. With Rex 456 S&P Fume Resistant White (leadless) as the basic formula, four zinc oxides were compared, straight pound for pound substitutions:

2295 dry Azo ZZZ-55
2059 " New Jersey XI-505
1707 " New Jersey XI-50
Eagle-Picher #416

No differences of significance show up at present. At Chicago, all seemed to perform very closely alike through 7 months, and at 15 months only a very slightly retarded clean-up tendency with #416 is noticeable. At Florida #416 and also XI-505 show slight but rather puzzling differences as compared to the others, both being slightly cleanest at 12 months because of slightly freer chalking, yet both were slightly dirtier in the first 8 months according to the routine reports.

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the amine rather than with the basic pigments present in the paint. Triethylamine has been used successfully to prevent livering. Work has been done to determine whether various amines can be used to stabilize the consistency of SWP Rex 471 Gloss White.

Laboratory batches of Rex 471 were made in which amines were added to the paste portion before the paint was ground. Consistency of these batches will be observed during an extended storage period. Initial data are listed below. Additions are based on 100 gallons of Rex 471. Consistency is recorded in seconds on the #5 orifice, S-W flowmeter.

No.	Add	As Made	Viscosity - #5 Orifice		
			24 Hr.	1 Week	5 Weeks
LL-13	- Control	27.6"	54.4"	55.5"	55.2"
LL-14	.20 gal. Triethylamine	33.6	53.4	54.0	54.2
LL-15	.60 "	33.0	32.0	31.4	31.0
LL-16	.20 " Morpholine	35.8	54.6	54.8	54.5
LL-17	.60 "	50.0	52.0	50.0	48.0

The preceding test was repeated with the addition of enough linseed fatty acids to bring the acid number of the vehicle to 10. Results are tabulated below.

No.	Add	As Made	Viscosity - Stomper		5 Weeks
			24 Hr.		
LL-18	- Control	88 KU	92 KU		92 KU
LL-19	.20 gal. Triethylamine	88 KU	95 KU		95 KU
LL-20	.60 "	87 KU	95 KU		94 KU
LL-21	.20 " Morpholine	91 KU	99 KU		98 KU
LL-22	.60 "	87 KU	95 KU		95 KU

Further tests are in progress in which amines and other agents were added to Rex 471 made according to standard procedure but which showed excessive increase in consistency. The following results have been obtained.

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#97 - SWP

An investigation has been under way to improve the brushing properties of SWP. To date we have investigated various oils such as Archer-Daniels-Midland's Alinco Z₁ and Z₂ and OKO S57 and S70 linseeds. Various combinations of (510), (515) and (798) were also evaluated for brushing properties in SWP.

Paints made with S-W oils such as (510), (515) and (798) showed no improvement in brushing or flow characteristics. The Alinco linseed oils from ADM are typical of (510) in brushing properties. However, paints made with 40% OKO linseeds, 80% (798) and 80% (2) are definitely better in brushing and flow than 40% (510) and 80% (2).

The Varnish-Resin Laboratory has prepared two series of linseed oils in the pilot plant for inspection and test. These oils will be compared for brushing and flow to determine what effect the cooking procedure and different viscosities have on such characteristics.

<u>CTV 8557</u>	<u>Viscosity</u>	<u>A. V.</u>
Sample A	10-1/2 sec.	4.2
B	30 "	5.3
C	42 "	6.0
D	51 "	5.8
E	64 "	6.2
F	81 "	5.0

<u>CTV 8560</u>			
Sample A	13	sec.	5.0
B	17-1/2	"	6.6
B ²	21	"	5.1
C	25-1/2	"	5.1
D	29-1/2	"	4.7
E	55-1/2	"	4.4
F	81	"	4.3

CTV 8557 was heat bodied with sulphur dioxide catalyst followed by an inert gas purge. CTV 8560 was prepared in a similar manner to CTV 8557 with the exception that maximum draft on the stack was used in the preparation of this vehicle.

For reasons not always too apparent, house paints sometimes show considerable increase in consistency on aging. Reactivity of zinc oxide with free fatty acids can be a contributing factor. Amines are said to exert a stabilizing action toward zinc oxide, possibly through reactivity of the -COOH groups with

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Panels 15280-91 F, C were examined after 12 months' exposure at Florida, vertical south and 13 months at Chicago, north and south. All are cedar bevel siding primed with Rex 450 Undercoater of contrasting shade. The essential tests consist of the use of CV 928 bodied safflower oil and 100% safflower oil using CW 3093 as raw safflower with an undercoater carrying 100% safflower, as against controls using 100% linseed. Rex 471 SWP Gloss White, Rex 477 Westchester Gray and Rex 485 Colonial Yellow are tested. Because of unsatisfactory appearance due to poor flow, especially in the safflower paints, a supplementary set was painted out using about 5/8 gallon of Rheotol per 100 gallons, in both coats. The improvement in flow was appreciable.

In general the whites at one year are quite satisfactory, with a slight tendency toward better clean-up due to the use of safflower. In the tints the results show a number of conflicts which are difficult to fit into any general statements at the present stage. The Chicago results are fairly clear in trend, indicating less dirt and more fading due to safflower oil and no differences due to Rheotol. At Florida, the Gray and Yellow tests directly contradict each other on fading and dirt, also on the effect of Rheotol (seems to affect color-retention of Colonial Yellow adversely). There is also some microscopic checking on the specials of both tints at Florida, though it is probably too slight at present to indicate a definite shortcoming of safflower oil.

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#97 - Cont.

A series of low zinc oxide - calcium carbonate house paints was prepared based on suggestions received from du Pont. The white carries a 2 to 1 TiO_2 combination of Ti-Pure FF and R 610 with 150 pounds of acicular zinc oxide and 650 pounds of Camalcarb calcium carbonate (H. T. Campbell and Sons) per 100 gallons. It is suggested as a second grade white or even an all-purpose white. Brooker thinks a similar paint made with all R 610 TiO_2 has possibilities as a first grade tint base. Variations included the use of Titanox RC HT to replace the TiO_2 on an equal cost basis, and replacement of Camalcarb by No. 10 White from Georgia Marble Company. The paints were shaded to SWP Chelsea Gray and Colonial Yellow, including in the latter comparisons of ferrite versus raw sienna tinting colors. du Pont cooperative tests have shown better tint retention using Harrison Raw Sienna tinting color.

A new garage on the property of F. C. Gangush at 14507 S. Parnell Avenue, Dolton, Illinois was used as a test for such low zinc oxide paints. One white used the first formulation described above, another similar but reducing the extender content to 400 pounds, and also the Titanox RC HT modification. Regular SWP 471 Gloss White was used as the control, all paints tested over SWP 450 Undercoater. The test paints were applied on small areas on both the south and north sides. The owner reported that both test paints looked much alike, and both brushed somewhat easier than Rex 471 and turned out noticeably whiter. Rex 471 went on at a normal spreading rate of slightly less than 550 square feet per gallon, and as nearly as could be judged from the small areas, the test paints spread about the same.

Panels 17682-86 CS, CN and F were prepared during the month for exposure south and north vertical in Chicago and south only in Florida. The formulas test the effects of additions to SWP of aluminum or magnesium Rosin Amine D soaps to improve flow and gloss.

Panels 17751-68 CS, CN and F were prepared during the month for exposure south and north vertical in Chicago and south only in Florida. The paints represent blends of SWP 471 Gloss White Card 66 and SWP 473 Tinting White Card 2 to determine what amount of titanium calcium may be used to obtain a desired rate of chalking and clean-up. Tests are in white, Colonial Yellow and Chelsea Gray, and du Pont's Two-Purpose Outside White is also included.

Panels 17769-70 CS and F were prepared during the month for exposure south only at Chicago and Florida, testing Blue Star Mines A-100 Talc against Asbestine and Nylal 300 in SWP White, Colonial Yellow and Westchester Gray.

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#97 - SWP

In conjunction with our work on interior colors, work is being undertaken to develop a tint base formula which will be less subject to chalk mask than the current tint base. The first exposures have been started on a paint which might best be described as a trim enamel type white. This has been exposed both in the white and in a series of oxide pink tints. The panel numbers are 17887-913 and 17928-51 C, F. The new tint base is pigmented only with non-chalking rutile TiO_2 2174 dry, in a semi-alkyd vehicle, with Super Ad-It as a fungicide.

Exposures put out in cooperation with Titanium Pigment Corporation, numbered 15835-72 C, F, were examined after approximately 12 months' exposure at Florida vertical south and Chicago north and south, all cedar bevel siding panels. We prepared Colonial Yellow and Westchester Gray SWP Tint Bases, Rex 471 SWP Gloss White and Rex 436 SWP Fume Resisting White (lead-free), whereas T.P.C. prepared a series of whites and of grays both lead-containing and lead-free. The main feature of our series, however, was the use of Titanox AA free-chalking anatase titanium as against blends with A, RA NC and RC HT in the whites and RC as against RA NC in the tints, also magnesium silicate extender as against calcium carbonate in tints. The T.P.C. grays used similar comparisons of titaniums in the tints, but various other Titanox pigment blends were used in their whites and 45 I basic silicate white lead figured prominently in both. Each laboratory painted out and exposed all samples involved, using undercoaters accompanying each set of paints, and also self-primed work.

Titanium Pigment Corporation reported that their set, exposed at Sayville, N. Y. only, all showed satisfactory performance at one year. Our tests were also essentially all satisfactory, but a few general statements could be made.

1. Most tints show microscopic checking at Florida, and this approaches serious proportions on the T.P.C. paints over their primer, which is zincless. Further, most of their whites over this primer showed signs of checking, while they showed no failure self-primed.
2. Rutile yellowing was particularly notable on the Chicago exposures. In the whites 50% of the titanium as Titanox RC HT resulted in marked yellowing of lead-free (fume resistant) paints. In lead containing (Rex 471) paints only very slight yellowing is noted with this pigment. Rutile yellowing of both gray and yellow tints was very definite in those paints which used Titanox RC plus calcium carbonate as the extender. Grays carried a brown chalk face, while the Colonial Yellows appeared faded due to a "greenish" off-color chalk face. Rutile yellowing is not serious on paints pigmented with Titanox RA NC-magnesium silicate, Titanox RA NC-calcium carbonate, or Titanox RC-magnesium silicate.

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5. Dirt collection was somewhat greater on the lead-free than on the lead-containing paints, and also on the paints carrying the larger amounts of rutile pigments.

Panels 15954-58 F, C were examined after 12 months' exposure at Chicago and at Florida, vertical south, all cedar bevel siding. Rex 450-primed and self-primed work. This series represents a cooperative project with the St. Joseph Lead Company, each making a set of paints, interchanging them and preparing panels of all. Several zinc oxides are compared, as follows:

- A. SWP Rex 456 Fume Resistant - Azo ZZZ-55 and -55, New Jersey's XI-592, -505 and -50, and St. Joseph's #17, 40 and 42.
- B. SWP Rex 471 Gloss White - Same, but lead-containing formula, based on mechanical-mix version of Rex 471 (co-fumed pigment) which is used as the control.
- C. St. Joseph samples - Same zinc oxides, lead-free formula. Chicago results show no appreciable differences. Florida tests show some variations in mildew growth, but the only consistent trend does not point to any zinc oxide as such, but to the St. Joseph paints in general as somewhat poorer. Also at Florida there is considerable very fine microscopic checking, and again the indication is not clear as regards particular zinc oxides at this stage, except that St. Joseph #42 and Azo ZZZ-55 are definitely poor in the Rex 471 group. We are surprised to note that at one year the Rex 456 samples are showing practically no checking as against slight to definite in the blend type Rex 471 and in St. Joseph's paints.

Exposures 16048-16115 C, F, put out in cooperation with the Pigment Division of du Pont were examined after 12 months at Florida vertical south and 15 months at Chicago north and south; all are cedar bevel siding primed with Rex 450 Undercoater except a few using a du Pont zincless primer. Paints made by us testing several blends of Ti-Pure anatase and rutile pigments and Ti-Cal in Rex 471 SWP Gloss White, Rex 456 Fume Resisting (lead-free) and SWP tints Colonial Yellow and Westchester Gray were compared with similar paints made by du Pont. The emphasis in their set of paints did not differ greatly from ours except that they compared their bodied linseed oil with our (510) in addition to pigment changes.

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#97 - Cont.

The white tests are essentially normal and satisfactory at one year, with somewhat more dirt collection due to the more chalk-resistant titaniums. However, a peculiar mildew condition on certain Florida panels brought to light the possibility that an error was made in the priming of the du Pont paint test on our panels, consequently we are planning to repeat this part of the series.

Some possibly significant microscopic checking has developed on the Florida tints, particularly where Ti-Cal is used in conjunction with calcium carbonate. du Pont used only R-610 TiO₂ with calcium carbonate, at high to low zinc oxide contents, whereas the S-W paints use both R-610 and titanium calcium R-60 with both magnesium silicate and calcium carbonate. The tints with calcium carbonate show less fading. du Pont's buff tints were outstanding in tint retention and further tests are being made to determine whether this is due to their purported use of raw sienna. "Rutile yellowing" in this series closely parallels similar pigmentations in the T.P.C. series as described above. The checking experienced in the tints suggests studies of the use of some mica to overcome this tendency.

Panels 17920-7 CS, CW, CN, CW, F, and FW were prepared during the month for exposure at Chicago south and north vertical and Miami south vertical. The series compares Rex 10 Farm, Ranch and Plantation White Card 9, SWP Fume Resisting White Card 19 and SWP Gloss White Card 65. The paints were applied over Rex 450 Undercoater and self-primed, both two coat work, on cedar and white pine panels. At the time of exposure the Rex 10 films had a yellow cast, low and spotty gloss compared with the other paints (Rexes 456 and 471).

Panels 17956-40 CS, CN were prepared and exposed during the month, at Chicago only. This series consists of normal cedar bevel siding on north exposure, testing four samples of Rex 471 SWP Gloss White:

OJ 58 R, regular, Card 66, all linseed vehicle.

OJ 59 R, using 100% perilla oil, raw and bodied.

OJ 60 R, " " safflower oil, " " "

OJ 61 R, " " P.E. soya esters AVM 63 and AVM 64.

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#97 - Cont.

The panels are 5-coat work, first Rex 450 Undercoater, then two coats of each Rex 471. The same is true of the south exposures except that they consist of six panels 12 feet long mounted on a frame with a small eave above to shade the upper two panels. Due to "flatting out" of the last coat by dew, this test had to be turned off and repeated. In the final job there was no trouble with dew, but we did have an unexpected difficulty with OJ 60 R (safflower) which set up much more slowly than the others and was still tacky, "soft," and low in gloss after two days. At one week it stood out as very white, but the low gloss and "softness" seem to indicate a weakness of film. This shows up to a less extent on the north panels. OJ 60 R was by far the most affected by dew on the first painting of the south tests. We have not encountered difficulties of this type in our many previous tests of safflower paints.

Paint technologists from Montgomery Ward and from Sears Roebuck visited the Chicago exposure farm during the month.

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#112 - Fire Retardant Paints

Unical ND, an organic blowing agent supplied by du Pont's Chemical and Miscellaneous Sales Section, proved ineffective in building expansibility into a conventional Enameloid as well as in a pigmented polyvinyl chloride film. Unical ND was dispersed in an Enameloid White Rex 720 to the extent of 10 and 20% based on the weight of pigment present. Films brushed on metal in one and two coat applications blistered, charred, flaked, and peeled off when exposed to the flame of a bunsen burner. Blisters formed between the films and the substrate. There was no tendency toward intumescence through the formation of bubbles or blisters within the films.

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#97 - SWP

The brushability of paints as rated by a number of experienced painters is being compared with the values of their viscosities at shear velocities of 10,000 reciprocal seconds determined on the high shear viscometer. Some of the painters are in excellent agreement with the values obtained by the instrument. Others vary considerably from the values of the viscometer as well as from the opinions of their fellow painters. This seems to stem mostly from the fact that some painters evidently have considerable difficulty in separating the "ease of brushing" from the overall characteristics of the test paints. Consequently, they include such factors as flow, etc. in their rating. This seems to be true despite the fact that they have been instructed explicitly to test the paints only for the slip under the brush.

As a result of the limited experience we have had with painter opinion ratings on brushability, it seems that considerable practice is required on the part of the painter in actual "brushability" testing, as contrasted with overall rating of paints, before reliable brushing opinions can be obtained. So far, it appears that the rating of the instrument is considerably less biased than painter opinion.

More data are being accumulated, and it is hoped that a general picture of the reliability of the high shear viscometer for rating brushability of paints will soon be obtained.

In this connection, it has been reported previously that some criticisms have been received from the trade on poor brushing qualities of current SWP production. Reformulation work is under way to improve brushing, flow and gloss characteristics. In general, the paints which show the greatest improvement in brushing have S-W cup viscosities in the range of 28 - 32 seconds on the #3 orifice. The best vehicle combination from the standpoint of brushability involves (25 A 4) reduced OKO M 37 linseed, (798) blown linseed, and (510) heat bodied linseed. The batch of regular SWP 471 Gloss White Card 66 has an S-W cup viscosity of 33.6 seconds, and 3.2 poises as determined on the high shear viscometer at 10,000 reciprocal seconds, and was rated as having a definite pull under the brush. The paint made with the revised vehicle had viscosities of 33 seconds and 3.0 poises on the same instruments, and had a slight plus pull under the brush.

Several additional tests were made of Newark's (798) blown linseed oil production to check the flow and wetting characteristics of this oil. The initial tests on this oil in SWP were reported in June. The Newark and Chicago (798) production oils were compared for flow and wetting properties in a special semi-liquid oil color formulation, using lamp black 2019 dry as the pigmentation and (798) and (548) mineral spirits as the vehicle. The oil colors were ground for five hours on a ball mill. The oil colors made with the Newark and Chicago (798) appeared to be similar in flow and wetting characteristics. The fluid oil color made with Newark's (798) had a viscosity of 92 K.U. compared with 90 K.U. for the Chicago (798).

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applied more cautiously the 741 Q looks excellent. The spreading rate was slightly less than 450 sq. ft./gal. Small test areas on the south use Rex 450 - Rex 471 and one coat of Rex 476. The former looks just slightly whiter than either of the one coat jobs, but gloss and flow seem very closely alike.

Exposures 15422-4 F, C were examined after 12 months at Florida vertical south and 14 months at Chicago north and south. The test compares only regular Rex 471 SWP Gloss White and the same using Dow Latex #744. This material, vinyl chloride-vinylidene chloride, was cooked at about 1 part to 8 parts of air-blown (44) linseed. This replaced only the bodied oil of the Rex 471. Considering that some of the early preparations of this blend showed poor compatibility with the Rex 471 vehicle during drying, this sample, which was satisfactory in laboratory tests, is showing up very well at one year (regular cedar siding, over Rex 450 Undercoater). The performance has been practically identical to that of the regular.

Panels 15506-10 F, C were examined after 12 months' exposure at Florida vertical south and 15 months at Chicago north and south, cedar bevel siding primed with Rex 450 Undercoater. RC 7465 P.E. soya ester and RC 7470 P.E. linseed ester from Resin Research and Dr. Runn's P.E. soya ester AV-1101 were substituted for the 19 gallons of (510) bodied linseed oil in Rex 471 SWP Gloss White, with a regular sample as control. Results at one year and at earlier stages showed only slight differences. The special oils seemed very much alike and essentially equal to (510). The linseed ester might be criticized for a rather rough film and slightly retarded clean-up, yet in the earlier months on Chicago exposure it did not become quite as dirty as AV-1101.

Exposures 15511-25 C, F were examined after 12 months at Florida, vertical south and 15 months at Chicago north and south. The paints described below were applied to cedar bevel siding, both over Rex 450 Undercoater and as 2-coat self-primed work. To test polyvinyl methyl ether from General Aniline and Film Corporation as a plasticizer in SWP Gloss White, using 1/2, 1, 2, 4, 8 and 16 gallons (first dissolved in (4046) xylene at 50% by volume) added to a standard batch of Rex 471. The batches using 2 gallons or over were increasingly sticky in brushing but good in flow. Results to one year show the performance of all specials as essentially equivalent to that of the regular. Florida reported somewhat greater dirt collection on the higher blands at about 6 months, but this was not verified by Chicago north tests.

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#87 - Cont.

SWP Gloss White Rex 471 Formulated With Rosin Amine D Oils

QJ No.	Varnishes	Type	Viscosity #3		Drying Properties	
			Fresh	O'Nite	Set-to-Touch	O'Nite
882 Q	RD 3581 RD 3584	Soya RAD vehicle	42"	41.6"	Over 11 hr.	Soft, very tacky.
883 Q	RD 3583 RD 3582	Linseed RAD vehicle	47.2"	43.2"	Over 11 hr.	Soft, very tacky.
884 Q	RD 3581 RD 1853	Soya RAD vehicle	46.8"	46.8"	Over 11 hr.	Soft, very tacky.
885 Q	RD 3583 RD 1854	Linseed RAD vehicle	44"	44.1"	Over 11 hr.	Soft, very tacky.
886 Q	(2) and (510) 10% RD 2528	RD 2528 Mg RAD (soap)	40.3"	43"	7 hr.	Good
887 Q	(2) (510)	Regular vehicle	44.6"	54.9"	6 hr. 15 min.	Good

The paints listed above were also made with twice the drier content but no improvement was obtained in the drying properties of the paints made with the Rosin Amine D oils.

At the Trade Sales Technical Board meeting at Chicago on May 20 and 21, it was reported that there have been some criticisms of SWP due to poor brushing qualities. We have reformulated SWP for better brushing properties and samples of the first production were submitted to Cleveland for their inspection and approval. In this reformulation the amount of (510) was reduced and some of the (2) was replaced with (798) to reduce the pull under the brush and to improve the flow. The thinner was all introduced as (5027) to improve wet edge. The proposed formula is approximately 2-1/4% higher in cost, due partly to the (5027) and partly to the change in oils.

A house test was finished during the month at 1549 West 183rd Street, Homewood, Illinois, R. Greenwald, owner. This was a house less than three years old, needing painting because of a rather poor job of brushing on the original work. Many thin spots lacked hiding and were starting to erode. Special SWP Gloss White QJ 741 Q was formulated using 10 gallons of (4106) alkyd and with certain other modifications (including use of mica) to approximate the brushing qualities of Rex 476 Repaint White, yet to remain similar to Rex 471 in cost and in spreading rate. The job was done by the owner, and a fair to good job was done. He did not wish to take time to putty the rusted nail heads, which were quite general, but sanded and spot-primed the worst of them. Due to neglect of his wet-edge time, a few areas at the top show lap marks. Where

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#97 - SWP

The Resin Research Department has prepared six oils modified with Rosin Amine D for test in SWP.

No.	<u>RD 3581</u>	<u>RD 3582</u>	<u>RD 3583</u>	<u>RD 3584</u>	<u>RD 1853</u>	<u>RD 1854</u>
Resin	Rosine Amine D	Rosin Amine D	Rosin Amine D	Rosin Amine D	Rosin Amine D	Rosin Amine D
Oil	(1275)	(2182)	(44)	Neofat 3 R	Soya oil and fatty acids	Linseed Oil and fatty acids
(348) Red.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.
Body	H -	Z ₅	H -	Z ₅	X - Y	X +
Wt./Gal.	7.75	8.0	7.8	8.0	8.03	8.03
Acid Value	0.58	4.6	0.5	4.2	5.35	6.5
Color	7	10 +	7	10 +	11	11
Solids	95%	95%	95%	95%	95%	95%
Solvent	5% (348)	5% (348)	5% (348)	5% (348)	5% (348)	5% (348)

SWP Gloss Whites made with the modified Rosin Amine D oils are very poor in drying properties. The set-to-touch time of paints containing these oils is considerably more than 11 hours and the film remained soft and very tacky over night. However, there was only a minor decrease in drying of SWP due to the addition of 10 pounds RD 2528 (Mg. RAD soap). Paints were also prepared using ten pounds per 100 gallons of three Rosin Amine D soaps for exposure at Chicago and Florida this spring. The three soaps listed below were submitted by the Resin Research Department.

RD 2543 Aluminum Rosin Amine D soap.

RD 2528 Basic Magnesium Rosin Amine D soap. (semi-fluid type)

RD 0832 Basic Magnesium Rosin Amine D soap. (resinous type)

Our tests have indicated that the magnesium soaps give better flow and gloss and have less effect on initial viscosity than the aluminum soaps. However, before these soaps are used in SWP it is essential that exposure tests be run to determine their effect on durability. The exposure tests to date on alkyls containing Rosin Amine D do not appear good due to excessive chalking and checking.

0007-SWP-044280

0007-SWP-000113650

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#97 - SWP

Since the current trend in our house paint formulations is toward the use of more (798) non-break (blown) linseed oil and since Newark has proposed an alternate manufacturing schedule using a higher temperature for blowing, it was decided that it would be advisable to check the (798) production in SWP as manufactured by the various plants. Samples of (798) were received from Oakland, Newark, Cleveland and Chicago. These oils were tested in SWP Repaint White - Rex 476 and SWP Gloss White - Rex 471 for general properties such as brushing, flow, viscosity and color staining properties.

	<u>Oakland</u>	<u>Newark</u>	<u>Cleveland</u>	<u>Chicago</u>
Acid Value	No data available	2.7	5.2	5.4
Color		12 X	11 (-)	10
Viscosity		C -	G	C
Sp. Gr.		0.956	0.95	0.945

SWP Gloss White - Rex 471

Batch	(798)	<u>Viscosity #5</u>		Brushing	Flow	Gloss	<u>Drying Properties</u>	
		Fresh	O'Nite				Set	O'Nite
905 Q	Chicago	51.6"	54.8"	Good	Good -	Good	5 hr. 30 min.	Good
906 Q	Cleve.	51.6"	56.4"	Good	Good -	Good	5 hr. 45 min.	Good
907 Q	Newark	55"	59"	Slightly sticky	Good -	Good +	5 hr. 45 min.	Good
908 Q	Oakland	52.2"	56.4"	Good	Fair	Fair +	5 hr. 45 min.	Good

SWP Repaint White - Rex 476

898 Q	Chicago	24.2"	27.4"	Very good	Good	Good	7 hr. 15 min.	Good
899 Q	Cleve.	28.2"	24"	" "	Good	Good	5 hr. 50 min.	Good
900 Q	Newark	28.9"	50"	" "	Good	Good	5 hr. 50 min.	Good
901 Q	Oakland	25.4"	26"	" "	Fair +	Fair +	7 hr. -	Good

0007-SWP-044281

0007-SWP-000113651

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#97 - SWP

The SWP Gloss Whites were made with 8 gallons of (798) in place of (2) raw linseed and the SWP Repaint Whites are based on 20 gallons of (798) per 100 gallons as in the regular formula.

There are only minor differences in the general performance of these oils in SWP Gloss White - Rex 471 or SWP Repaint White - Rex 476. The (798) made by Oakland is slightly lower in gloss and flow characteristics than the other three samples and the Newark production produced slightly the best gloss in these two rexes. However, all paints were rated equal in brightness, although there exists a slight variation in the initial color of the four oils.

Panels 17396-400 CS, GN and F were prepared during the month for exposure south and north vertical at Chicago and south vertical in Miami. The paints, based on SWP Gloss White, carry as 40% of the vehicle siliconized oils of the following composition: RD 1076 - the reaction product of soya fatty acids and PTBBA with P.E., then reacted with Silicone C; RD 2580, the reaction product of the pentaerythritide of dehydrated castor with Silicone C; and RD 2582, as RD 2580, using soya oil.

0007-SWP-044282

0007-SWP-000113652

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April, 1952

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#97 - SWP

Bodying Agents in SWP

An investigation has been under way to determine the bodying action of Troykyd No. 20 BA, (524) bodied linseed and the acetone insoluble portion of (524) in SWP Gloss White. Dr. Grummitt, of the Sherwin-Williams Laboratory, Western Reserve University, has prepared the solutions listed below for our evaluation. Bentone 54 was also added, in line with Dr. Weaver's request.

1. 10% solution of the acetone insoluble part of (524).
Acid number of NVM is 15.0
2. 10% solution of (524) in (548).
Acid number of NVM is 22.8.
3. 10% solution of Troykyd No. 20 BA.
Acid number of NVM is 20.8.

The initial set of paints using 1/8 to 1/2 gallon of each agent per 100 gallons of paint are based on paint 702 Q. The three paints using one gallon of each bodying agent are based on 747 Q and the three paints using two gallons of agent are based on paint 755 Q. Due to the fact that all paints were not made at one time we found it necessary to make a new base paint when the larger quantities of bodying agent were added to the series.

The tests have been checked for stability over the past 50 days and the laboratory data are listed below. The acetone insoluble portion of (524) produced the same degree of reactivity as regular (524) and Troykyd #20 BA. All paints made with these bodying agents appear similar in viscosity over a 50 day storage period.

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0007-SWP-000113653

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#97 - Cont.

Bodring Agents in SWP Gloss White - Rex 471

Paint	Bodring Agent	Amount Agent Per 100 Gals.	Viscosity Readings - #5 Orifice			
			Fresh	1 Day	7 Days	30 Days
725 Q	10% Solution Acetone	1/8 gal.	24.2"	25.4"	27.6"	27.8"
726 Q	Insoluble of (524)	1/4 "	25	26.6	28.8	27.2
727 Q	in (548)	5/8 "	24.8	26.6	28.8	27.6
728 Q	"	1/2 "	25.4	28.4	29.8	27.6
744 Q	"	1 "	24.2	30.2	28.8	-
750 Q	"	2 "	35.6	38	35.4	-
729 Q	10% Solution of	1/8 gal.	23"	25"	27"	26.8"
730 Q	(524) in (548)	1/4 "	24	25.2	28	27.2
731 Q	"	5/8 "	24.2	25.2	28.8	26.6
732 Q	"	1/2 "	25	25.8	29	28.5
745 Q	"	1 "	23.4	29	26.2	-
751 Q	"	2 "	32.6	35.8	34.4	-
733 Q	10% Solution Trotykd	1/8 gal.	23.2"	20.4"	28"	26.4"
734 Q	#20 BA in (548)	1/4 "	25	24.4	29	27.5
735 Q	"	5/8 "	26.6	25.2	30	28
736 Q	"	1/2 "	26.4	25.6	29.6	26.2
746 Q	"	1 "	23.2	30	24.8	-
752 Q	"	2 "	34	38.2	33.4	-
737 Q	Bentone 34	4 lbs.	21.6"	26.8"	28.8"	28.2"
738 Q	"	6 "	22.4	29.6	30.6	30
739 Q	"	8 "	24.2	33	33	34.4
740 Q	"	10 "	26.6	36	34.8	37
702 Q	No agent	-	21"	22.6"	27.8"	26"
753 Q	No agent	-	21.6"	24.4"	23.4"	-
747 Q	1 gal. (548) added	1 gal.	17.8"	22"	21.2"	-

At Cleveland's request, we have reformulated Outside Ivory Paint No. 2 067 H A2 in line with our program of lead conservation. The proposed revision, QJ 809 Q, was sent to Cleveland for their inspection. The basic carbonate white lead was replaced with basic silicate white lead on an equal volume basis. The 2174 dry TiO₂ was decreased from 224 pounds to 160 pounds to reduce the hiding in line with the old One Coat House Paint Tint Base CH 4696.

In the reformulation of this rex the bodied linseed (510) was increased and the raw linseed (2) reduced to obtain satisfactory brushing, flow, etc. The formulation has a PVC of 54% and a ZnO content of 32.2%.

0007-SWP-044284

0007-SWP-000113654

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#97 - Cont.

Magnesium and Aluminum Soaps in SWP Gloss White

The Resin Research Department has submitted several metallic soaps to be evaluated for flow characteristics in SWP.

RD 0851 - Magnesium Soap (resinous)

RD 2528 - Magnesium Soap (Semi-Fluid)

RD 2545 - Aluminum Soap

Paints were made containing 10 pounds of each soap per 100 gallons. The experimental paints were all higher in flow and gloss than the regular SWP. RD 0851 and RD 2528 improved the flow without changing the initial viscosities. However, the aluminum soap appeared slightly more reactive than the magnesium soaps over a three week storage period.

Panels 16874-89 CS, CN and F were prepared for exposure south and north vertical in Chicago and south vertical in Florida. The paints evaluate Titamox RC 50 in SWP Gloss White and Tinting White shaded to Colonial Yellow and Westchester Gray.

Panels 16907-15 CS, CN and F were prepared for exposure south and north vertical in Chicago and south vertical in Florida. The purpose is to determine whether the addition of small amounts of mica would counteract any loss of durability of SWP which may have resulted from the decrease of active lead pigments in recent formulas.

Panels 15150-2 F, C were examined after 5 years' exposure at Florida vertical south and also at Chicago, north and south. These are cedar bevel siding panels, primed with Rex 450 Undercoater and testing regular Rex 471 SWP Gloss White with (510) and (2) against a special using a sample of hexane-extracted linseed oil (from M. W. Pascal, July, 1948) replacing (2). Although a slight possibility of slow chalking and dirt collection was reported during the first year, both the 2-year examination and the present study at 5 years indicate that the two samples are very closely alike and both definitely satisfactory.

0007-SWP-044285

0007-SWP-000113655

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May, 1952

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#97 - SWP

Data on panels 9199-9205 C, which were retired some time ago without a report, were compared with Florida results, both essentially 3 years' exposure vertical south, cedar bevel siding primed with Rex 450 Undercoater shaded gray. Special Rex 471 SWP Gloss White formulation RB 745 was the basic formula, using no 18 dry basic carbonate white lead, but 14% of 9 dry basic sulfate white lead (RB 746, the same except 8% of 9 dry and 6% of 18 dry, was also tested; both of these are "carry-overs" from series 9094-9101, which compared varying percentages of these two pigments and was reported on under date of March 15, 1950). The variations in this series of RB 745 are planned to see if additions of lead in the vehicle portion would affect performance in any way similar to the use of 18 dry in the pigmentation. Lowe Brothers V-35 leaded oil, Lowe Brothers V-50, and both Lowe Brothers and S-W vehicles using same metals as in V-35 but as driers, were tried.

No differences of any importance were found in the performance of any of these on Chicago exposure. Florida reports showed slight checking on all tests with special vehicles, but this was found to be extremely slight. The series 9094-9101 had shown a slight inferiority due to increasing content of 9 dry.

0007-SWP-044286

0007-SWP-000113656

Paint Research
March, 1952

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#97 - SWP

It was reported in January and February that the Varnish-Resin Laboratory had submitted several samples of small kettle manufactured (310) bodied linseed oil, for test in SWP. These oils were compared with (310) made in the large kettle at the Cleveland Linseed Oil Mill. A study is being made to determine how variations in body and acid values affect such properties as brushing, flow, body and package stability.

There has been no great change in viscosities over the 60-day storage period. All oils have shown about the same increase in consistency for this period. However, as previously reported, oils bodied to 81 and 90 seconds give sticky brushing characteristics which are not desirable in SWP.

Exposures 15262-79 C, F were examined after 12 months at Florida vertical south, and also at Chicago north and south. All are cedar bevel siding, one-half the series being primed with Rex 450 Undercoater regular and the other with Rex 450 made with 100% safflower oil. The tests are all variations of Rex 471 SWP Gloss White using safflower oil. The main study is of five bodied safflower samples submitted by Resin Research, used at 40%. These oils are bodied at various temperatures, with and without the use of SO_2 . There is also a factory batch of bodied safflower CV 92B and a 100% safflower sample. In the special-primer group there is also a Rex 471 using CV 49, 50/30/20% soya/linseed/chinawood.

Florida results at one year show no appreciable differences, but study of the past record indicates a possibility of better clean-up on all specials than on the regular Rex 471. At Chicago, essentially the same can be said although there are minor variations in dirt and appearance. The special bodied safflowers all seem equal. 100% safflower looks very good on south exposure, but rather dirty on the north. However, it looks better than CV 49, which is also a little dirty on the south.

0007-SWP-044287

0007-SWP-000113657

Paint Research
February, 1952

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#97 - SWP

The International Talc Company shipped a car of Fine Textured Talc to the Chicago plant for use in experimental plant batches of SWP. This material was checked for general paint properties against regular magnesium silicate 20 dry and 512 dry Nyltal 500 in SWP Gloss White. Our tests indicate that the Fine Textured Talc is similar in grinding properties to Nyltal 500 512 dry but more in line with 20 dry for consistency. The factory obtained slightly better grinding rates with the Fine Textured Talc than with Nyltal 500.

The Chicago plant has reported the following production rates on plant batches of SWP made with these inerts:

<u>Talc Under Test</u>	<u>Factory Batch</u>	<u>Gals./Hr.</u>	<u>Grind</u>
Fine Textured Talc	2000 gals.	348	2-1/8 H
" " "	2000 "	308	2-1/2 H
Nyltal 500 512 dry	27000 "	298	2-1/2 H
20 dry	2000 "	150	1-3/4 H

The laboratory batches compared as follows:

<u>Paint No.</u>	<u>QJ 567 Q</u>	<u>QJ 568 Q</u>	<u>569 Q</u>
Inert	20 dry	512 dry	Fine Textured Talc
Grind	3 H	3 H	3 H
Viscosity on #5 Orifice			
Fresh	30.2"	22.6"	27.8"
Over Night	34.8	24.2	31.9
12 Days	48.6	30.8	48.6
Grinding Time	4 min. 9.2 sec.	3 min. 30.2 sec.	3 min. 51.4 sec.
Ease of Mixing	Standard	Standard	Standard
Brushing	Sl. sticky	Sl. sticky	Sl. sticky
Flow	Sl. short	Sl. short	Sl. short
Drying			
Set-to-touch	6 hr. 50 min.	5 hr. 50 min.	6 hr. 30 min.
Over Night	Good	Good	Good
Gloss	Good	Good	Good
Color	V. sl. gray	V. sl. yellow	Brighter than 563 Q

0007-SWP-044288

0007-SWP-000113658

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February, 1952

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#97 - Cont.

In preparing laboratory batches of Rex 471 SWP Gloss White excessively high viscosities were encountered when magnesium silicate 20 dry is used, whereas 512 dry Nyltal 500 gave standard body. Since this could be due to moisture content, determinations were made of laboratory stock and 20 dry was found to contain 0.21% water or loss at 150° C. and 512 dry 0.15%. 20 dry showed a pH of 8.8, 512 dry 9.1. To see if water soluble salts content was involved, a sample of 20 dry was washed and re-dried. These various samples of extenders were then used in SWP, with the following results:

		<u>Viscosity in Sec. on #3 Orifice</u>					Quart Sample 19 Days
		<u>Pint Sample</u>					
	<u>Extender</u>	<u>Imme- date</u>	<u>O'Nite</u>	<u>2 Days</u>	<u>6 Days</u>	<u>15 Days</u>	
RB 3657	512 regular	25	26	27	30	51	30.2
RB 3658	20 lab stock	29	36	43	50	52	55.8
RB 3659	20 washed and dried	35	54	39	46	52	55.4
RB 3660	20 dried	36	53	39	43	48	53.4

Since it is known that viscosity increases are sharp with very small additions of water it must be recognized that the dried samples may have already picked up some moisture before they were actually mixed in the batches. A more strict approach would be to quench the hot extender in the oil. There is no indication that washing the extender reduced the paint viscosity but there is a slight indication that thorough drying would move in that direction.

The January Monthly Report reported that the Varnish-Resin Laboratory had submitted several samples of small kettle manufactured (510) bodied linseed oil for test in SWP. These samples are very similar in acid values but vary from 90 to 51 seconds in viscosity. The oils were compared with (510) made in the large kettle at the Cleveland Linseed Oil Mill. A study has been in progress to determine how variations in body and acid value affect such properties as brushing, flow, body and package stability.

As a supplement to the data listed in the January report, we have recorded a few additional viscosities on the various test paints. These viscosities were taken after the paints had been in storage for one, two and four week periods at room temperature. The two paints made with the 81 and 90 second oil have become definitely sticky due to the progressive increase in viscosity.

0007-SWP-044289

0007-SWP-000113659

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Bodied Oil Tests in SWP Gloss White
Using Small Kettle (310) Production

Paint	Oil Properties			Paint Viscosity - #3 Orifice					
	(310)	Body	A.V.	Fresh	O'Nite	4 Days	1 Week	2 Weeks	4 Weeks
560 Q	(310)*	59"	-	22.2"	22.6"	23.4"	26.2"	30"	31.4"
561 Q	A	90"	7.6	30.6	30	30.4	34.4	38.6	43
562 Q	B	81"	7.0	29.2	30.4	29.8	32.2	35.9	40.6
563 Q	C	51"	7.6	22.6	23.2	23	24.4	25.6	28
564 Q	D	86"	7.8	22.6	23.8	24.4	29.2	30.4	32
565 Q	E	61"	6.8	24.1	25.6	25.6	29.2	31.4	29.4
566 Q	F	61"	7.4	23.4	24.5	26.1	32.2	32.8	32.2

*Large kettle production.

The Vegetable Products Research Laboratory submitted a sample of AVM 70 25% (1550)/75% (1273) for evaluation in SWP Cream Rex 478. This oil was compared with an oil of similar composition (RD 0578) from the Resin Research Department. Both oils lacked proper flow characteristics so it was found necessary to use some (798) to improve this property. RD 0578 is a modification of RE 8937 previously reported to have compared favorably with 100% linseed on exposure in SWP.

Experimental SWP Creams - Rex 478

Batch	Oil Tested	Viscosity #3 Orifice		Brushing	Flow	Drying		
		Fresh	O'Nite			Set-to-touch	O'Nite	Gloss
587 Q	(310)	28.6"	28.8"	Good	Sl. short	4 hr. 30 min.	Good	Good
588 Q	AVM 70	29"	27.8"	"	"	5 hr. 35 min.	"	"
589 Q	RD 0578	29.4"	30.4"	"	"	4 hr. 30 min.	"	"

Due to the fact that the management decided to use our present stock of (1550) in some other manner, work was discontinued on this investigation.

A new ALT Record of Exposure Test card has been designed to employ numerical ratings (10 - 0) to replace old card carrying word descriptions.

0007-SWP-044290

0007-SWP-000113660

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Exposure series examined during the month include the following:

1. Panels 13003-19 F, C were examined after approximately three years' exposure at Florida, vertical south, and Chicago, north and south. The tests involve Rex 471 SWP Gloss White and Rex 493 Woodland Brown samples using polyallyl esters of linseed and soya oils prepared by Resin Research. All are on cedar bevel siding, primed with Rex 450 Undercoater.

Because of presumably limited interest in the subject and a lack of validity of certain parts of the series, we are not attempting to present many details here, but they may be had on request. In general, these polyallyl ester samples in Rex 471 look quite good, but there are several cases of greater failure on the specials than on the guides. The important point here is that the Rex 471 tests contain only 10 to 20 gallons of the resins; the indications are that they would be definitely detrimental at 100% or 80%. This recalls the fact that considerable trouble was experienced with wrinkling under ultraviolet at the higher percentages in the preliminary laboratory tests. There are some indications that the linseed esters perform slightly better than the soya. The Woodland Brown specials show no appreciable failure, but look bad due to fading and dirt.

2. Exposures 15685-15702 F, C, a series testing P. E. soyas, AV-1100 light and AV-1125 bodied, against Driscoy D-F and Z-2, with (2) raw linseed and (310) bodied linseed as control, and 15968-85 F, C, a repeat series painted in warmer weather were examined after two years at Florida vertical south and Chicago north and south. The tests were all on cedar bevel siding primed with Rex 450 Undercoater shaded in contrast with the finish coat. Rex 471 SWP Gloss White, Rex 459 Berkeley Yellow and Rex 474 Chelsea Gray are covered. The oils are used both as 40% (bodied portion) only and at 100%.

The results are rather difficult to present in a brief space because of certain inconsistencies in results among the several duplicate or parallel tests. The only generalizations that might be made are:

1. Dirt collection definitely varies with the painting time in the early stages. The 100% soyas, even in later stages, are not quite as clean as the regular in the warm weather series, but seem a little more satisfactory in the cool weather group. While these results are apparently contrary to expectation it may indicate that differences in drying decrease at lower temperatures.
2. Fading of tints varies with the painting time, but Chicago and Florida tests reverse each other.
3. No particular oil or combination is consistently favored for tint retention or for dirt-collection in tints.
4. Definitely more checking at Florida on the tints of the cool weather series than warm weather, but it is only microscopic checking. Both special type oils seem better than the regular, with P.E. soya best.

0007-SWP-044291

0007-SWP-000113661

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#97 - Cont.

3. Exposures 13802-3 F, C were retired after 24 months at Florida vertical south and 27 months at Chicago north and south. In this series, Rex 471 SWP Gloss White, 100% linseed oil, was tested against the same using a petroleum drying oil from the Sinclair Refining Company Laboratories. Both were applied to cedar bevel siding over Rex 450 Undercoater. The special vehicle was made by replacing the (2) with the lightest of several samples which Sinclair sent us and replacing the (510) with the heaviest (No. 126-90 and 126-88). The special oils performed very poorly, except that the gloss was good for a short time and the clean-up, after a poor start, eventually became about equal to the regular. Checking started early, especially at Florida, and has become very heavy, also extending into cracking in some cases. We are informing Sinclair of these final results. Last year, when we sent them a progress report they indicated that they were not interested in further development of the oils. mainly because of price considerations.

4. Exposures 14300-30 F, C were examined after two years at Florida, vertical south, and at Chicago, north and south. All, with the exception of a few copper-iron stain tests, are on cedar bevel siding primed with Rex 450 Undercoater shaded gray to emphasize erosion.

Full details cannot be presented in this limited space, but a general summary of identification and exposure results follows:

Part A. Various proprietary and special oils in Rex 471 SWP Gloss White
Card 57 used as bodied portion only, with raw oil (60%) as linseed.

1. P.E. soya esters AVM 51 (Barium catalyst) and AV 1100 (Sodium catalyst) - both good, but only AVM 51 shows any appreciable edge over regular.
2. Ardol, ADM's modified soya, bodied by us - good, much like regular.
3. ASV #4, same description - same or very slightly poorer.
4. Driscoy Z-2, Spencer-Kallogg's soya - same as ASV #4.
5. Aliphatic 17 B esters R3C4206 and R5C4597 from General Mills - on the poor side, especially 4206, dirt and incipient checking, also heavy brush marks.
6. ADM 75-5, linseed-cyclopentadiene copolymer, Y and Z-3 viscosities - passably durable at Chicago, and good as to clean-up, but checking quite serious, especially Y sample, at Florida.
7. Var 70 and Var Z-3, soya-linseed copolymer oils from ADM. Very serious checking, even at Chicago, and tendency toward dirt.

0007-SWP-044292

0007-SWP-000113662

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#97 - Cont.

Part B. Same as A, except using 100% of the special oils.

1. P.E. soya AV 1101, which is (3521), and AV 1141 (light, sodium catalyst) - a little dirty at Chicago, but particularly good in all respects at Florida.
2. Ardol as in A, plus their regular (light) - also good, much like preceding but not as outstandingly good at Florida.
3. ASV #4 as in A, plus their regular (light) - checking at Florida, durability fair at Chicago, but tendency toward dirt.
4. I. soya, A and Z-2 - durability entirely satisfactory, also good clean-up; in other words, a close second to P.E. soya so far.
5. R5C4206, full amount of oil - quite good at Florida, but eroding and gray dirty color at Chicago.
6. Var 70, full amount of oil - checks and cracks very badly, especially at Florida.

Part C. Using a special no lead - no zinc pigmentation, 314 pounds of 2030 semi-nonchalking titanium oxide and 420 pounds of CW 2747 Nytal 500 (now 512 dry), with certain combinations of the special oils, no less than 50% (2) linseed oil in any case. This idea was based on good exposure results reported by du Pont, which they claimed to be due to a hardening effect of soya-linseed vehicles similar to that of zinc in pigmentation. (510), AVM 51, AV 1101, Var ASV #4, Ardol and R5C4597 were used, all at 36% PVC, some at 50% PVC also. Somewhat the same durability characteristics show up as in A and B. However, the group as a whole is so poor that detailed results are of little interest. Besides heavy dirt and mildew growth, there is heavy checking at Florida and erosion at Chicago.

Part D. Samples from Part 3 using (510), Var Z-3 and bodied Ardol were also tested against parallel samples from Part A, regular pigmentation, on special 8 x 24" pine panels exposed at 45° Chicago only, and testing staining effects due to copper and iron pieces nailed to the face of the panels. The regular pigmentation samples show no copper stain but very heavy iron rust stain, while the no lead - no zinc samples show only a little of each.

0007-SWP-044293

0007-SWP-000113663

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#97 - Cont.

5. Series 15210-27 F, C covering Rex 471 SWP Gloss White, Rex 436 Fume Resisting White and several competitors, was reported on after 12 months' exposure at Florida vertical south and 10 months at Chicago north and south, all cedar bevel siding.

The most thorough tests compared the SWP and Pittsburgh systems. Rex 471 and Pittsburgh's #1-54 Titanic White were tested (a) over Rex 450 Undercoater, (b) over Pittsburgh's #1-201 Primer (low in lead), (c) as 2-coats self-primed and (d) as one coat only. Except for the last category, there was no film failure so far. Titanic White looks generally somewhat dirtier than Rex 471, especially as to mildew growth. Rex 436, tested over Rex 450, looks cleanest and whitest.

The one coat tests with Rex 436, Rex 450 and #1-201 being included show some film break-down, but the significant differences seem to indicate #1-54 failing slightly more than Rex 471, and #1-201 primer considerably more than Rex 450. The Rex 436 one coat test is indeterminate because of a probable error in painting.

Rockcote Breather Type Paint #794-BT from the Rockford Paint Mfg. Company, Rockford, Illinois was included, over Rex 450, self-primed and one coat only. In general it was starting to fail by checking and erosion somewhat faster than any of the other materials, although chalking about normally. Rockcote has been consistently dirty and seems very susceptible to mildew growth. Among the claims for this material were: "dries to a beautiful low gloss; -- allows moisture vapor to pass through the paint film rather than to peel it from the surface." It contains diatomaceous silica, no zinc and 33% basic carbonate white lead.

0007-SWP-044294

0007-SWP-000113664

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January, 1952

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#97 - Cont.

Anti-Skinning Agent in SWP

A few tests were made to determine if some anti-skinning agent could be added to SWP without interfering with proper drying. Our tests have indicated that at least 1-1/2 gallons of anti-skin (5026) is required to prevent skinning over night in partly filled quart cans. The skinning tests were run in partly filled quart cans with covers set slightly to one side to permit the passage of some air and thinner vapors.

Batch	Anti-Skinning Agent in Rex 471 Card 65	Set-to-touch Time	
		75 - 80° F.	40° F.
400 Q	No (5026)	6 hr.	Over 24 hours.
401 Q	1 gal. (5026)	7 hr. 15 min.	" " "
402 Q	1-1/2 gal. (5026)	6 hr. 45 min.	" " "

We believe 1-1/2 gallons of (5026) could be added without slowing down the drying to any great degree under normal drying conditions.

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#87 - Cont.

Group. 3. Unsatisfactory in essentially all respects.

CW 1875 Micronized H.O.A. Asbestine.
Southwark #1 Gilder's Whiting. See 2 (b) asterisk.
1246 Soapstone
1822 Talc Dust
599 Barium Carbonate
1194 Ground Limestone. See 2 (b) asterisk.
Aluminum Flake #5.
A.S.P. Clay #1 (Reasonably good in yellow shades).
A.S.P. Clay #11 (ditto).
A.S.P. Clay #4 (Poorest of these three).
2198 Georgia Clay.
Calcium Silicate (Fair in yellow shades; moderate amounts may be O.K.).

Panels 12472-87 F, C were reported on after 36 months' exposure at Florida, vertical south, and 40 months at Chicago, north and south. All are cedar bevel siding primed with Rex 450 Undercoater. Tests involved Rex 471 SWP Gloss White of June, 1946 and also Rex 465 SWP Colonial Yellow and Rex 363 SWP Slate, the variations being:

1. Using 19 gallons of (3316) 80/20% soya/chinawood bodied oil.
2. Using all oil as AVM-14 (bodied) and AVM-15 (normal body), P.E. soya esters. (In Rex 471, the paints are repeated using 20 MGK extender for 20 L).

The results to about three years followed the generally satisfactory pattern observed in earlier reports. The special vehicles are performing at least as well as the regular (100% linseed) control on practically every panel. In the few cases where differences may possibly be significant, the (3316) shows a slight disadvantage in dirt and microscopic film failure. In most cases, the P.E. soya paints, especially white, seem unusually good.

Panels 14368-71 F, C were examined after 24 months' exposure at Florida, vertical south and the same at Chicago, north and south. Cedar bevel siding, primed with Rex 450 Undercoater shaded gray, was used in this series. Rex 471 SWP Gloss White, card 59, was tested using three bodied oils, all of which were 50% linseed and 30% soya and varied as follows. (a) CV 49, in which the remaining 20% is china-wood (low acid value, solids at 71%), (b) (48) batch #1, using (3017) Dehydrol and (c) batch #2, using (2325) Dehydrol.

Neither location showed any significant differences in these comparisons at two years. A check of earlier ratings disclosed no differences of importance. For every slight change in rating of one material at one location, there is a counteracting indication at another location. Unfortunately, there is no 100% linseed control by which to judge the general suitability.

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#97 - Cont.

It should be realized that in trying to compress such a large number of materials into a few categories, certain allowances must be made. For particular uses, certain items may be either better or poorer than classified.

Group 1 (a). Satisfactory in essentially all respects.

20 L, 20 F, 20 MK magnesium silicates.
2188 Micro Valva (in other series some difficulties with chalk mask).
1779 Water Ground Mica (7 to 10%).
Velvatone magnesium silicate.
Talc RC 500.
Carbola Talc plus Metronite or Micro-Nite.
CW 2679 Micronized 20 F.
312 Nytal #300.
Sierra Fibrene C 400.

Group 1 (b). Possibly satisfactory.

10 Lesamite (tints).
2247 Atomite
Asbestol Filler (some erosion and dirt collection Chicago).
1989 Microne Talc (old sample).
Talc #162
Fibrene C
Warm Springs Talc
Oolitic Calcium Carbonate
3 dry Silica Smoke (preferably in combination with magnesium silicate).
Royal Talc
Talc #41
Talc #49
Pyrax B (borderline case, not consistently good; poor grinder).
Pyrax HP (ditto).

Group 2 (a). Not satisfactory because of poor durability.

8 China Clay
306 Barytes
1817 Surfex
Talc #42

Group 2 (b). Not satisfactory because of fading or dirt.

2077 Celite (dirt).
213 Blanc Fixe (fading extreme).
566 Whiting*
"B" York Ground Limestone (dirt).*
"A" York Ground Limestone (dirt).*
"E" Grade Limestone (dirt).*

*Possibly O.K. in tints at proper relation to CPVC.

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as a standard. It produced a paint of slightly higher than normal viscosity, very slightly gray in appearance, with good gloss, good minus brushing and good minus flow. The comparison was made with 20 dry magnesium silicate, which was rated as standard in ease of mixing and was very slightly gray in appearance but had good gloss, brushing properties and flow. The batch made with 512 dry Nylal 300 was standard in mixing properties, had good color, but was slightly deficient in gloss, brushing and flow properties. The batch made with MSK #1 was entirely comparable to that made with 20 dry. All of the batches in this series showed somewhat higher than normal after-bodying tendencies. We have suggested that a sufficient quantity of 160 Talc be obtained from International to make several plant batches of house paint before we arrive at a final approval.

Inert	Grind After Reduction	Viscosity #3			Time of Grind	Drying	
		Fresh	O'Nite	20 Days		Set-to-touch	O'Nite
20	3 H	28"	32.6"	47"	8 min. 48.4 sec.	5 hr. 40 min.	Good
512	3-1/2 H	27.2"	32.2"	33.2"	6 min. 52.8 sec.	8 hr. 40 min.	Good
MSK #1	3 H	27.2"	35.6"	42.6"	8 min. 13.7 sec.	6 hr. 40 min.	Good
160 Asbestine	3-1/2 H	29"	38.4"	59.4"	7 min. 8.4 sec.	6 hr. 45 min.	Good

A comprehensive study was made of all house paint extenders tested on exposure during the past 8 years, mainly as a follow-up to our "Special Report on Extenders" of July 8, 1948. Space does not permit the presentation of full details of all tests. The following general statements apply, with certain necessary exceptions made in individual cases:

1. All have been on exposure for as long as considered necessary to give a definite evaluation. The minimum time is about 50 months, the maximum about 5-1/2 years.
2. The majority of tests cover both white (Rex 471) and Slate and Colonial Yellow tints (Rex 363 and Rex 375, old numbers). Both pre-war and bodied oil vehicle types are used in most cases.
3. All exposures are Chicago vertical north and south, cedar bevel siding, using Rex 450 Undercoater. Over one-half were also exposed at Coffeyville, south, and about one-third at Florida, south.
4. All tests are against 20 L magnesium silicate as guide or control.
5. Calcium carbonate extenders are not recommended as complete replacement. They usually have low binder requirements. All of these tests were on a volume replacement basis; it is now accepted that the "binder requirements" basis is preferable, or more accurately, the CPVC relations.

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#97 - Cont.

Vegblend in Exterior Paints

The Minnesota Linseed Oil Company has submitted a gallon sample of their blown Vegblend which is a mixture of vegetable oils oxidized to about a Z_2 body. Since it is a blown oil with a relatively high acid value and rather dark in color, we decided to evaluate this material in a barn paint formulation rather than in house paint.

The Minnesota Linseed Oil Company has also submitted a sample of Refined Vegblend that is break-free. A sample of this oil will be heat bodied to about Z_2 for evaluation in SWP tints and deep colors. Its usage will depend on the color of the oil after it has been bodied. The Refined Vegblend will command a price in the neighborhood of break-free or alkali refined soybean oil. The characteristics of the Refined Vegblend are as follows.

	<u>Std.</u>	<u>Min.</u>	<u>Max.</u>
Acid Value	19	12	27
Iodine No.	153	143	165
Appearance	Clear		
Color	11		
Break	Pass		
Viscosity			A
Sp. Gr.	0.926	0.924	0.928

Dehydrated Castor Oil in SWP

The Resin Research Department prepared a batch of RD 0378 based on approximately 25% (1550) light bodied dehydrated castor and 75% (1273) alkali refined soybean oil for our evaluation. The sample was compared with (310) bodied linseed oil in SWP for general paint properties. RD 0378 is a modification of RB 8937, previously reported to have compared quite favorably with 100% linseed in SWP in exposure at Chicago, Florida and Coffeyville, Kansas for 26 to 33 months.

Our initial tests on this oil in SWP indicate that the brushing is satisfactory but the paint is somewhat deficient in gloss and flow compared with (310). The flow was improved by the use of 8 gallons of (798). However, the introduction of (798) increased the cost about 1-5/8¢ per gallon over the regular. We have suggested that this oil be used only in SWP tints and only to dispose of the local overstock of (1550).

Extenders in SWP

The International Talc Company has submitted a sample of their 160 Talc for inspection and test. This material was compared with 20 dry, our regular Asbestine, 312 dry Nylal 300, and Loomis Talc MSX #1 in SWP Gloss White Rex 471, Card 66. The 160 Asbestine showed slightly less ease of mixing than 20 dry raven

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Chart No. 2
Bodied Oil Tests in SWP Gloss White

Lot No. of Oil	Oil Characteristics				Paint Characteristics							Brushing	Flow
	Viscosity 100% Reduced*	N.V.M.	A. V.	1 Day	Viscosity #3 Orifice								
					3 Days	7 Days	30 Days	90 Days	180 Days				
(310)													
195	98"	G +	71.4%	6.4	36"	54"	53"	63"	56"	53"	Sticky	G -	
197	94	J	70.0	8.0	40	42	43	62	57	51	Sticky	G -	
193	83	I +	70.9	7.5	31	42	41	48	42	42	G -	G -	
192	79	I	70.8	6.6	26	33	32	45	38	40	G -	G	
200	72	H +	71.3	6.6	29	37	35	40	37	36	G	G -	
233	67	H	71.4	6.6	26	34	34	35	30	32	G -	G -	
203	63	H	71.0	7.9	27	38	37	40	35	35	G	G -	
202	58	G +	70.9	6.9	25	31	31.4	35	31	31	V.G.	G	
209	58	G +	70.5	6.6	24	34	32	34	32	32	V.G.	G	
210	56	H	72.2	6.4	26	32	32.2	34	31	31	G	G -	
CV (926)													
195	98	G +	71.4	6.4	24	27	27	33	31	31	Slightly sticky	G	
197	94	J	70.0	8.0	36	55	53	66	58	57	Sticky	G -	
200	72	H +	71.3	6.6	29	37	36	41	37	37	G -	G	
209	58	G +	70.5	6.6	25	28	28	34	32	32	V.G.	V.G.	
210	56	H	72.2	6.4	26	30	30.2	37	35	35	G	G	
Small kettle (310) 57				9.8	38	44	52	44	40	40	Slightly sticky	F	
Small kettle CV (926) 57		G +	71.0	9.8	36	50	56	56	50	43	"	F	

*Reduced as CV (926) - 2 parts oil (310)/1 part mineral spirits (346) by volume.

Plants are now using (254C) reduced oil which is 80% oil (310)/20% mineral spirits (346) by weight.

Reduction is made to facilitate pumping. (254C) too heavy in cold weather.

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#97 - SWP

Bodied Oil Test in SWP

The Varnish-Resin Laboratory has submitted several samples of small kettle manufactured (310) bodied linseed oil for test in SWP. These samples are very close in acid value but vary from 90 to 51 seconds in body characteristics. The oils were compared with (310) as made in the large kettle at the Cleveland Linseed Oil Mill. We have been concerned for some time with the extreme characteristics of individual batches of (310) and a study has been under way to determine how such variations affect paint performance.

Paints were made on the SWP Rex 471 formula, Card 65, using each oil under identical conditions of mixing, grinding, thinning, etc. The paints were then checked for brushing, flow and gloss. As indicated by the data below, the high bodied oils (31 to 90 seconds) produced sticky brushing paints that were lower in gloss than the oils bodied to approximately 60 seconds. The sample of oil bodied to 51 seconds produced less flow and lower gloss than standard.

This work supplements an earlier investigation of samples of (310) made in the large kettle. Laboratory batches of SWP made with these oils showed good correlation between the body characteristics of the oil and the body, brushing and flow characteristics of the paint. In the earlier set of paints acid value also was found to play a part in the general performance of these paints. A report has been made on these paints but we are listing the earlier data (chart No. 2) for comparison purposes at this time.

Chart No. 1
Bodied Oil Tests in SWP Gloss White
Using Small Kettle (310) Production

Paint	(310)	Body	A. V.	<u>Paint Viscosity - #3</u>			Brushing	Flow	Gloss
				Fresh	24 Hr.	4 Days			
560 Q	(310)*	59"	-	22.2"	22.6"	23.4"	Very good	Good	Good
561 Q	A	90"	7.6	30.6"	30"	30.4"	Sticky	Fair	Fair
562 Q	B	81"	7.0	29.2"	30.4"	29.8"	Slightly sticky	Good	Fair
563 Q	C	51"	7.6	22.6"	23.2"	23"	Good	Good(-)Fair	
564 Q	D	66"	7.6	22.6"	23.8"	24.4"	Good +	Very good	Good
565 Q	E	61"	6.8	24.1"	25.6"	25.6"	Good	Fair	Good (-)
566 Q	F	61"	7.4	23.4"	24.5"	23.1"	Good	Good	Good

*Large kettle production.

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